Bipole III Transmission Project

Terrestrial Invertebrates, Amphibians, and Reptiles Technical Report

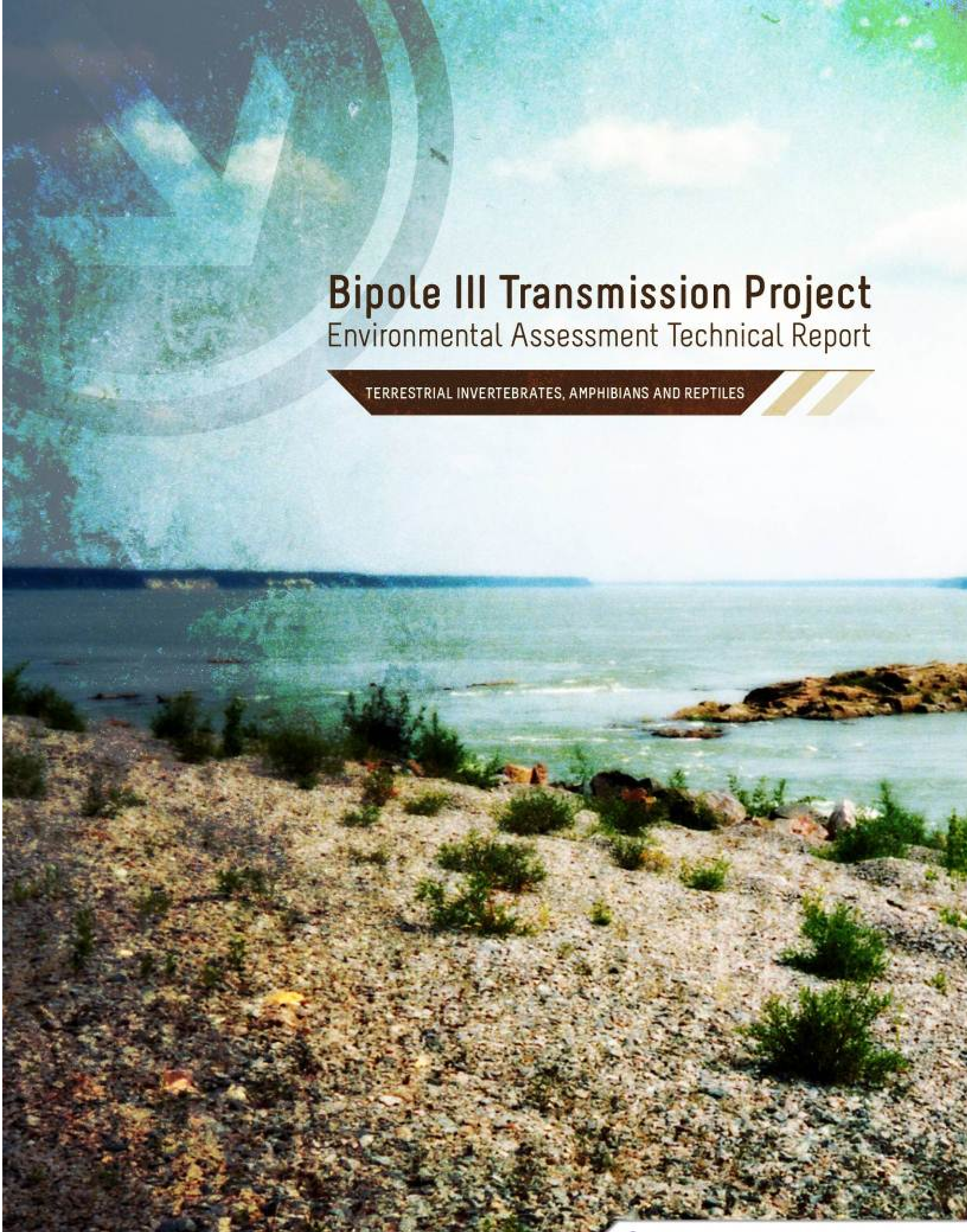
North/South Consultants Inc.
November 2011

Manitoba Hydro

Bipole III Transmission Project

Environmental Assessment Technical Report

TERRESTRIAL INVERTEBRATES, AMPHIBIANS AND REPTILES



North/South Consultants Inc. · Aquatic Environment Specialists

This publication is:

- Designed to use less paper and ink
- Printed on paper that contains at least 30% total recycled fiber

North /South Consultants Publication # 5504

BIPOLE III TRANSMISSION PROJECT
Environmental Assessment Technical Report

TERRESTRIAL INVERTEBRATES, AMPHIBIANS and REPTILES

Report Prepared for

MMM GROUP

and

Manitoba Hydro

November 2011

By

North/South Consultants Inc.
Aquatic Environment Specialists

83 Scurfield Blvd.
Winnipeg, Manitoba, R3Y 1G4
Website: www.nscons.ca

Tel.: (204) 284-3366
Fax: (204) 477-4173
E-mail: nscons@nscons.ca

EXECUTIVE SUMMARY

Manitoba Hydro is currently proposing the development of a new high voltage direct current (HVdc) transmission line, known as Bipole III along the west side of the province in an effort to improve the overall reliability and dependability of transporting hydroelectric power from northern Manitoba to the south. The major components of the Bipole III Project include a 500 kV HVdc transmission line, a new northern converter station including a construction camp and construction power, a new southern converter station including construction power, new 230 kV transmission lines linking the northern converter station to the northern collector system at the existing 230 kV switchyards, and new ground electrode sites for each converter station.

As part of the biophysical component description required in developing an Environmental Impact Statement for the project, North/South Consultants Inc. directed studies on the terrestrial invertebrates, amphibians, and reptiles (TIAR) within the Bipole III Project Study Area in an effort to provide information and to evaluate possible effects of the Project on TIAR species.

Methods

TIAR investigations were conducted using the following methods:

- Desktop review of published literature, grey literature, various government resources, previous EISs, and federal and provincial legislation;
- Habitat modeling for selected Valued Environmental Components, in order to aid in the identification of possible sensitive areas within the Bipole III Study Areas; and
- Field studies, where modeled habitats overlapped the Project Study Area, in order to aid in model verification and help determine the presence of Valued Environmental Components.

Field study methods included:

- Terrestrial invertebrate sweep-net surveys;
- Anuran (i.e., frogs and toads) call surveys;
- Prairie skink coverboard surveys; and
- Garter snake hibernacula visual encounter surveys at selected habitat transects.

Incidental TIAR species observations made during the course of surveys, or obtained from other disciplines or sources, were also recorded.

Valued Environmental Components

The assessment of the Bipole III Transmission Project as it relates to the TIAR species within the Local Study Area focused on selected Valued Environmental Components (VECs).

Selected VEC species included:

- Dakota skipper;
- Ottoe skipper;
- Uncas skipper;

- Plains spadefoot;
- Wood frog;
- Northern leopard frog;
- Red-sided garter snake; and
- Northern prairie skink.

Some of the criteria used in the selection of VEC species included: current or historical distribution ranges within or in close proximity to the Bipole III right-of-way (RoW); presence of suitable habitat within the Bipole III Local Study Area; listing by COSEWIC, SARA, or MBESA; and/or sensitivity to habitat loss/alteration, disturbance, and population changes.

Environmentally Sensitive Sites

Environmentally sensitive sites include sandy-soil prairie complexes, sandy-soil anuran breeding habitat, wetland anuran breeding habitat, and garter snake hibernacula.

Sandy-soil complexes are located within the Bipole III Local Study Area's Prairie Ecozone. These sites are concentrated in the St. Claude/Assiniboine River area. Although the Local Study Area does not overlap distribution ranges of selected VEC species, this area is in close proximity to historical populations of both the Ottoe and Uncas skippers, as well as the northern prairie skink. Sandy-soil prairie complexes in this area overlap the Stockton, Alonsa, and MacGregor Ecodistricts, totaling 4.40 km^2 within the Local Study Area and 0.09 km^2 within the HVdc transmission line RoW. Only a fraction of the modeled suitable Dakota skipper habitat, if any, may be true suitable Dakota skipper remnant prairie habitat. During field investigations, optimal undisturbed native prairie was not identified within the Bipole III Local Study Area. Further, the identification of specific locations of true suitable habitat within the modeled suitable habitat is difficult, and information on prairie locations was not available from CDC. As such, no Environmentally Sensitive Sites were identified at modeled suitable Dakota skipper habitat within the Local Study Area.

The plains spadefoot has an isolated distribution range within the Bipole III Local Study Area, limited to the vicinity of Dauphin Lake where suitable sandy-soil habitat is present. Suitable habitat overlaps both the Boreal Plain and Prairie Ecozones, including the Waterhen, Dauphin and Alonsa Ecodistricts. A total of 20.51 km^2 of habitat is found within the Local Study Area, 0.28 km^2 of which is contained within the HVdc transmission line RoW.

Northern leopard frogs were detected at 23 of 170 sites surveyed, most of which were in the Boreal Plain Ecozone. In the Prairie Ecozone, northern leopard frogs were detected at only five sites; no northern leopard frogs were detected in the Boreal Shield Ecozone. The identification of suitable northern leopard frog habitat within the Bipole III Study Area was based on survey results and model results; northern leopard frog occurrence was associated with shrubbed wetland (WETLAND_SHRUB) and agricultural land (AG) in the Prairie Ecozone, and grassland (GRASS) in the Boreal Plain Ecozone. Many of these habitat features were correlative with Ecozone.

Wood frogs were detected at 122 of 170 sites surveyed, most of which were in the Boreal Plain and Boreal Shield Ecozones. As wood frogs were prevalent at all wetland survey sites, the presence of wetlands serves as a good indicator of wood frog presence. Since many habitat types are highly correlated with ecozones, and regional context of results was difficult to extrapolate, the northern leopard frog model was also made to correlate with the distribution of wetland habitats. Wetland habitat is found throughout all five ecozones intercepted by the Project Study Area. There are 1698.16 km^2 of wetlands present within the HVdc transmission lines' Local Study Area, 20.69 km^2 of which is found within the HVdc transmission line RoW. Wetlands are also present within borrow areas, borrow excavation placement sites, the collector line and construction power line RoW, the Construction Camp footprint, the northern Converter Station footprint, at the preferred and alternate north electrode sites, and alternate south electrode site.

Garter snake hibernacula habitat is found in all three major ecozones of the Bipole III Local Study Area. A total of 56.86 km^2 of suitable garter snake hibernacula habitat is present within the HVdc transmission lines' Local Study Area, of which 1.24 km^2 is located within the HVdc transmission line RoW. The Summerberry and Overflowing River Ecodistricts contribute the majority of suitable habitat, with the RoW containing 8.72% and 9.23% of the suitable habitat available within the Local Study Area within these ecodistricts, respectively.

Environmental Effects/Mitigation Measures

The construction and operation of the Bipole III Transmission Project may impact TIAR species at sensitive areas within the Local Study Area. Activities potentially affecting TIAR species include:

Construction Phase:

- Clearing of habitat along the HVdc transmission line RoW, within borrow sites, at electrode sites, converter station as well as installation of permanent transmission line towers along the RoW and the deposition of borrow excavated material, resulting in habitat alteration and fragmentation where relatively undisturbed habitat exists, accumulation of hazardous materials, and increased use of seasonal access trails and transmission line RoW. This may result in direct mortality, negative sensory effects, as well as longer-term changes in movement patterns.

Operation Phase:

- Vegetation management within the HVdc transmission line RoW, resulting in continued habitat alteration, accumulation of hazardous materials, and continued use of seasonal access trails and RoWs. This may result in direct mortality as well as longer-term changes in movement patterns.

Decommissioning Phase:

- Removal of permanent structures and the natural regrowth of vegetation along the transmission line RoW and Project footprint, resulting in potential encroachment of native vegetation by invasive species.

With respect to terrestrial invertebrates, it is recommended that no clearing of suitable habitat occurs along the HVdc transmission line RoW where feasible. It is also recommended that a 30 m vegetation buffer be maintained around habitat polygons, within which ground disturbance, vegetation removal, and vehicle traffic is limited. These prairie habitats consist predominantly of low-growth vegetation. Although it is difficult to identify remnant native prairies within grasslands using cover class information, extensive clearing of overhead vegetation is not expected in such areas. With respect to sandy soils, approximately 4.40 km^2 is identified within the HVdc transmission line RoW, 3.71 km^2 of which is identified within the Prairie Ecozone near its known distribution range. Within these areas, where taller cover types exist and clearing is required, methods of tree removal that minimize disturbance to ground and soil are recommended. Where avoidance of buffered suitable sandy-soil habitat is not feasible, tower placement will be reviewed by Manitoba Hydro at the final design stage.

In order to minimize impacts on local anurans, mitigation measures must assist in prevention or reversal of any habitat alteration effects that may occur during Project activities. Recommendations include:

- Within the Boreal Shield, Taiga Shield, and Hudson Plain Ecozones, construction and maintenance in wetlands to occur during winter only;
- Within the Prairie and Boreal Plains Ecozones, construction occurs in fall or winter, outside of peak anuran breeding periods (i.e., outside of April 1 through August 15);
- Within these southern regions, a 30 m buffer is recommended around suitable anuran breeding and wetland habitat, within which ground disturbance, vegetation removal, and vehicle traffic will be limited; and
- Within these southern regions, RoW tower installation in wetlands and associated buffers be avoided where feasible.

A 100 m buffer is recommended around suitable prairie skink habitat polygons where intercepted by the Project transmission line RoW, in which ground disturbance, vegetation removal, and vehicle traffic will be limited wherever feasible. Additionally, avoidance of habitat during tower installation is recommended. If avoidance of suitable sandy-soil prairie habitat is not possible during RoW clearing and maintenance, activities will be completed in such a way as to best minimize disturbance to soil and ground cover. Where the avoidance suitable habitat is not feasible during the installation of permanent towers, pre-construction spring/summer field investigations prior to tower placement will help identify, and thereby minimize impact to, potential VEC-suitable habitat patches. Where skink nests are observed or located, a 200 m buffer is recommended.

Clearance and maintenance of the HVdc transmission line RoW may be beneficial to some reptiles, creating new movement corridors for migrating and feeding garter snake individuals. For garter snake hibernacula, it is recommended that a buffer of 200 m be maintained around the hibernacula habitat during peak hibernacula activity, including hibernation and emergence within which ground disturbance, vegetation removal and vehicle traffic will be limited during Project construction and maintenance. Where overstory/tall-growth vegetation (i.e., trees) requires removal for transmission line clearance, methods that best minimize disturbance to soil and ground cover are recommended. It is also recommended that permanent tower installation be conducted in the summer when garter snakes are not near hibernacula, or that field surveys be conducted prior to tower installation where habitat polygons overlap tower footprints.

Where sensitive areas exist, mitigation measures will aid in minimizing adverse effects arising from the Project. Negative residual impacts are mostly associated with the habitat alteration along the Projects' HVdc transmission line RoW.

Follow-up/Monitoring

A monitoring program is not anticipated for terrestrial invertebrate or for anurans. Standard transmission line environmental monitoring will be sufficient to ensure wetland mitigation recommendations are adhered to, such as the retention of adequate lake, stream, river and wetland buffers.

It is recommended that pre-construction field surveys be conducted at permanent tower installation sites where tower placement may overlap suitable habitat to aid in determining the possible presence of skinks and both prairie skink habitat and garter snake hibernacula habitat at permanent tower installation sites along the HVdc transmission line RoW. Furthermore, standard inspection and effects monitoring will ensure recommended mitigation measures are met.

ACKNOWLEDGMENTS

The study team would like to thank Manitoba Hydro and MMM Group Limited for the opportunity to conduct this study. In particular, Pat McGarry and Fiona Scurrah (Manitoba Hydro) and Kerry-Lyn Szwaluk and Larry Strachan (MMM Group Limited) were invaluable in providing technical support and direction during the course of this study. Thank you also to John Dyck (Plus4 Consulting) for providing continued support, direction and technical information throughout the project.

The author would also like to express her appreciation to fellow subconsultants Wildlife Resource Consulting Services MB Inc. (WRCS), Calyx Consulting, Szwaluk Environmental Consulting and Joro Geomatics for their field observations and the opportunity for discussions. In particular, this study would not have been a success without the help of Rob Berger (WRCS), Jason Kelly (WRCS), Jackie Krindle (Calyx Consulting), Kevin Szwaluk (Szwaluk Environmental Consulting), Gabrielle Leo (Joro Geomatics) and Doug Schindler (Joro Geomatics), as well as supporting unnamed individuals.

The collection of amphibian and reptile samples was authorized by Parks and Natural Areas, Manitoba Conservation under terms of permit # WPB 25007 and Wildlife and Ecosystem Protection Branch, Manitoba Conservation under terms of wildlife scientific permit # WB06083. Additionally, the collection of aquatic biological samples described in this report was authorized by Manitoba Water Stewardship, Fisheries Branch under terms of scientific collection permit # 49-10.

TABLE OF CONTENTS

Page

LIST OF TABLES

Page

LIST OF FIGURES

Page

LIST OF MAPS

Page

LIST OF APPENDICES

Page

1.0 Introduction

1.1 Background

Approximately 75% of Manitoba's hydroelectric generating capacity is delivered to southern Manitoba via the Bipole I and II HVdc transmission lines. The transmission lines share the same Interlake corridor over much of their length from northern Manitoba to a common terminus at the Dorsey Converter Station northwest of Winnipeg. The existing transmission system is vulnerable to outage of either or both Bipole I and II in the Interlake corridor and/or the Dorsey Station due to severe weather, fire, sabotage and other unpredictable events. System reliability studies conducted by Manitoba Hydro and its consultants have concluded that the likelihood of such events occurring, when combined with the potentially significant consequences of prolonged major outages, warrants substantial mitigation to reduce dependence on the Dorsey Converter Station and the existing HVdc transmission corridor.

Manitoba Hydro is currently proposing the development of a new high voltage direct current (HVdc) transmission line, known as Bipole III along the west side of the province in an effort to improve the overall reliability and dependability of transporting hydroelectric power from northern Manitoba to the south.

The major components of the Bipole III Project include:

- A 500 kV HVdc transmission line;
- A new northern converter station, the Keewatinoow converter station, to be located near the proposed site of the Conawapa Generating Station (GS) including a construction camp and construction power;
- A new southern converter station located at the Riel site in the Rural Municipality of Springfield including construction power;
- New 230 kV transmission lines linking the Keewatinoow converter station to the northern collector system at the existing 230 kV switchyards at Henday Converter Station and Long Spruce Generating Stations; and
- New ground electrode sites for each converter station, connected to the station by a low voltage feeder line.

To date, the evaluation of three Bipole III alternative routes has been completed and a preferred route has been selected (Maps 1 and 2, and Map Series 100). Originating at the Keewatinoow converter station, the Bipole III transmission line will be routed southwest to The Pas and west of Lake Winnipegosis and Lake Manitoba, terminating east of Winnipeg at the Riel Converter Station. The overall length of the line will be about 1384 km located on a 66 m wide right-of-way (RoW).

Two basic tower types will be used for the straight line sections of the transmission line. In northern Manitoba and forested/pasture areas in the south, the line conductors will be suspended from guyed lattice steel towers. In the more densely developed areas of southern Manitoba, self-supporting lattice steel towers will be used to minimize potential effects on farming practice (i.e., to reduce the tower footprint) and to reduce the land acquisition requirement. Towers used to support the transmission line will typically be 45 m in height and with a 7.8 m square base footprint for the self-supporting towers. Towers will be spaced approximately 480 m apart in most areas.

The new Keewatinoow converter station will be located approximately 5 km southwest of the Conawapa Generating Station site and will require approximately 42 ha. The ground electrode required for the converter station will be located approximately 10 km south of the converter site on the west side of the Conawapa access road. The electrode will be a buried iron ring approximately 500 m in diameter and will require a site area in the order of one mile square, as well as an access road for construction and ongoing maintenance. There will also be a low voltage (12 kV) overhead distribution line connection between the ground electrode site and the converter station, supported on guyed single wood poles and routed along an existing RoW. A temporary construction camp will be established at the future Conawapa GS site to house workers involved in the Keewatinoow converter station and ground electrode.

Construction power for the construction camp, converter station and electrode site will be provided by extending the existing 138 kV transmission line that runs from Kelsey GS to the Limestone construction power substation about 31 km to a new construction power substation located near the Keewatinoow converter station site. The proposed northern collector system will consist one 230 kV transmission line approximately 55 km in length from Long Spruce GS to the new Keewatinoow converter station, and four 230 kV transmission lines, each approximately 27 km in length, from Henday to Keewatinoow, sharing a common 310 m wide RoW (Map Series 100). Borrow sites will be selected for borrow excavation, and borrow excavation material placement areas will be identified.

In the south, the ground electrode required for the Riel converter station will be located approximately 20 km from the station site. As in the north, the electrode will be a buried iron ring approximately 500 m in diameter and will require a site area in the order of one mile square, as well as an access road for construction and ongoing maintenance. There will also be a low voltage overhead line connection between the ground electrode site and the converter station, supported by single wooden poles routed on a RoW on Manitoba Hydro property or within existing road allowances.

1.2 Scope

The scope of the Bipole III Project comprises the physical works and activities associated with site preparation, construction, operation and maintenance, and eventual decommissioning of the components described in Section 1.1.

The Project site selection and environmental assessment process addresses the requirements of a Class 3 Development pursuant to *The Environment Act* including conducting an environmental assessment, carrying out public consultation, and preparing an EIS. The environmental assessment scoping document entitled Bipole III Transmission Project: A Major Reliability Improvement Initiative (Manitoba Hydro 2009) was approved by Manitoba Conservation and is being used as guidance for the preparation of the EIS. The EIS will address the requirements outlined in the Manitoba Conservation Information Bulletin “Environment Act Proposal Report Guidelines” and will be supplemented by information from technical reports from sub-consultants and their respective disciplines, as part of a comprehensive multidisciplinary environmental assessment approach.

This technical report evaluates the Bipole III Transmission Project from a biophysical perspective, as it relates to the TIAR communities within the Project Study Area. As part of the preferred route evaluation process, possible effects of the Project on terrestrial invertebrate, amphibian and reptile (TIAR) species were examined. This information is needed to feed into the biophysical component required in developing an Environmental Impact Statement for the project.

In areas where habitat is of low to moderate sensitivity, construction and operation of overhead transmission lines and its associated components, including ground electrodes, converter station and construction camp , will typically have a small negative effect and therefore constitute a low risk to TIAR species habitat. However where TIAR species habitat is considered highly sensitive, due to isolation or scarcity, even a small negative effect may present a medium to high risk to associated TIAR species. It is therefore important to evaluate Bipole III Project Study Area from a TIAR species habitat perspective to minimize the risk to species of concern.

In this report, evaluation of the Project is based on:

- Existing information on distributions and habitat requirements of TIAR species;
- Models designed to support field studies by predicting potential species occurrences along the PR, based on availability of suitable habitat; and
- Results of field studies conducted in 2010, used to validate habitat models and examine species distributions within suitable habitat along the PR.

Data was examined at an ecozone level, ecoregion, and ecodistrict level, as based on the Ecological Framework for Canada (Ecological Stratification Working Group 1995).

1.3 Purpose

The purpose of the biophysical component of the assessment process was to provide information required in the identification of areas of importance within the Project areas with respect to species habitat requirements. Results of the study will assist in providing recommendations for mitigation measures where sensitive areas are present. The broad objectives of the biophysical program were:

- To describe the existing environment of the Project Study Area;
- To provide data and information to assist in the biophysical description of the Local Study Area;
- To provide data and information to assess potential adverse effects that may result from the Project; and
- To provide possible avoidance and mitigation strategies for adverse environmental effects where required.

1.4 Report Outline

This report focuses on the Valued Environmental Components (VECs) within the TIAR species. Specifically, this report focuses on skippers, anurans, skinks, and garter snakes due to their identification as VECs. Each group is discussed separately throughout the report.

2.0 Study Areas

2.1 Alternative Route and Component Evaluation

This phase of the route evaluation is the final of a three-part strategy. The initial Project Study Area consisted of a general area running along the west side of the province. At this stage of the evaluation, recommendations were made by each discipline on concentrated sensitive areas to avoid in the selection of the alternative routes and the area has been described in detail in the existing environment section of the Environmental Impact Statement (EIS).

The second phase of route evaluation involved the evaluation of three main Bipole III alternative routes within the Project Study Area. At this stage of evaluation the alternative routes consisted of three routes with many intersection locations. The assessment of the Bipole III Transmission Project alternative routes as they related to TIAR species focused on selected VECs within the alternative routes themselves. VECs were selected and evaluated using information from the literature, habitat classification data, field surveys and opportunistic observations. A total of four different attributes were examined in the evaluation and ranking of the Bipole III alternative routes: 1) distributions of selected at-risk species; 2) wetlands within the segment corridors; 3) sandy prairie within the segment corridors; and 4) the proximity of large sandy-soil communities to the segment corridors. Segments of the alternative routes were ranked based on these attributes. Results of the alternative routes evaluation are described from the TIAR perspective in the Alternative Routes Evaluation Report (North/South 2010). Multiple bio-physical and socio-economic criteria were evaluated to select a final preferred route as documented in the Preferred Route Selection report (Technical Report 23 BP III EIS).

This report represents the final stage of site selection and environmental assessment with assessment of the final preferred project.

2.2 General Regional Area Description

The Bipole III Project Study Area spans five of Canada's terrestrial ecozones (Map 1). The ecozone is the highest unit of classification within Canada's ecological classification hierarchy, and is intended to be representative of large and general areas characterized by similar abiotic and biotic factors (Ecological Stratification Working Group 1995). In total, eight ecoregions (Map 2) and 28 ecodistricts overlap the Bipole III Project Study Area. Within these ecozones TIAR species are distributed according to their individual niches, from prairie species residing in the sand prairies of south-western Manitoba to boreal species overwintering under forest leaf litter.

In this report, data was examined at ecozone, ecoregion, and ecodistrict levels where appropriate.

2.3 Specific Corridor and Site Descriptions

The Bipole III Transmission Study Area components are described in their respective sections below. The larger Bipole III Project Study Area has been described in detail in the existing environment section of the Environmental Impact Statement (EIS) as well as in the Alternative Routes Evaluation Report (North/South 2010).

2.3.1 Transmission Lines

The Bipole III HVdc transmission line will be centred within a 66 m wide RoW. The Local Study Area is defined here as the 3 mile corridor encompassing this RoW, as well as the areas surrounding the project components, such as the AC collector transmission line RoWs, the converter station, and ground electrode sites. Suitable TIAR species habitat within the 66 m wide RoW were evaluated relative to surrounding habitat within the Local Study Area. Additional components included in TIAR species evaluation associated with the transmission line included the construction power line at a 60 m RoW width, and five collector lines at a total RoW width of 310 m, as described in Section 1.1.

2.3.2 Northern Converter Station and Ground Electrodes

North ground electrode sites were evaluated with respect to TIAR species, based on a one mile square project footprint, encompassing the 800 m diameter underground electrode ring and adjacent area that may be influenced by Project activities.

For the northern converter station, a 1 km^2 footprint of the Keewatinoow converter station candidate site was evaluated, encompassing the 24.5 hectare converter station footprint and adjacent area that may be influenced by Project-related activities.

The construction camp footprint at the future Conawapa Generating Station site was also evaluated within the context of TIAR species.

The buffer areas adjacent to the Project footprint of both the ground electrode and northern converter station sites were included here in Project evaluation on order to identify VEC species suitable habitat in the neighboring area of the footprint that may be influenced by Project activities.

Where Project activities were planned on existing RoWs, such as the low voltage overhead distribution line connection between the ground electrode site and the converter station, effects on TIAR VEC species were not evaluated.

2.3.3 Southern Converter Station and Ground Electrodes

Similar to the north ground electrode site, south ground electrode sites were evaluated based on a one mile square project footprint, encompassing the 400 m diameter underground electrode ring and adjacent area. The adjacent buffer area evaluated in the context of the southern converter station site was used here to identify VEC species suitable habitat in the neighboring area of the footprint that may be influenced by Project activities.

Where Project activities were planned on existing road allowances, such as the low voltage overhead line connection between the ground electrode site and the converter station, effects on TIAR VEC species were not evaluated.

2.3.4 Borrow Areas

Aggregates required for use in foundation construction will generally be transported from established and appropriately licensed sources off-site. Suitable material for backfill of excavated organic soils may be hauled from newly developed borrow areas along the right-of-way. Borrow excavation material placement sites will also be identified. Normally, rubber-tired dump trucks are used to transport gravel and fill materials. Selection, development and reclamation of new borrow sites will be undertaken in accordance with provincial regulations and with the approval of the local Natural Resources Officer and local government authorities. Where borrow pits are required, exposed soils will be reclaimed by promoting re-growth of native vegetation and other mitigation measures in accordance with *The Mines Act*.

3.0 Methodology

3.1 Desktop

A review of information on TIAR species biology, spatial and temporal distributions and habitat preferences was collected from published literature, grey literature, and various government resources, to identify and describe TIAR species with distribution ranges overlapping the Bipole III Project Study Area. Assessment and status reports from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) were utilized where available for species of interest. Historical harvesting information was also received from the Conservation Data Centre (CDC) for some species, and specialists were consulted where needed.

Literature on transmission line effects was also examined for a review of approach, potential impacts, and sensitivity of relevant species to transmission line construction and operation. Federal and provincial legislation, including Canada's *Species at Risk Act* (SARA) and Manitoba's *Endangered Species Act* (MBESA) were also examined to identify at-risk species with distribution ranges within the Bipole III Project Study Area. Literature examining the potential impacts of activities associated with and relevant to the Project was also reviewed.

VECs were chosen from each of the three groups discussed in this report: terrestrial invertebrates, amphibians, and reptiles in order to better assess potential impacts from the Project. VECs were chosen based on specific criteria, as outlined in Section 5.2.3 below.

3.2 Modeling

Habitat models are an important tool in predicting the likelihood that a species of interest may be present within a given habitat. Such models were especially useful where the Study Area is too large to adequately survey in its entirety.

For our purposes, habitat models were built for selected VEC species in order to aid in the identification of possible sensitive areas within the Bipole III Local Study Area.

Habitat models were made for each VEC species of interest using information on distribution ranges, as well as known habitat requirements for feeding, reproduction and overwintering life stages. Model criteria for each VEC species are described in their respective sections below.

Using these model criteria, GIS shapefiles were created by Joro Geomatics Inc. for each species using selected cover class information from the Land Cover Classification - Enhanced for Bipole (LCCEB) spatial land cover database. The LCCEB was created by Joro Geomatics Inc., and is an enhancement of a national database mapping layer used to identify the vegetation of an area using remotely sensed imagery (Landsat data) collected ca. 2000. Cover type categories used in the models but not included in the LCCEB (i.e., sand prairie, open sand dunes, dry upland prairie ridge etc.) were obtained from the Manitoba Conservation Forest Resource Inventory (FRI) (Manitoba Conservation, 2009). The FRI data are based on aerial surveys from 1962 to 2007. Additional geology and water layers were used on an as-needed basis. The National Hydro Network (NHN) (Geobase 2009) classifications, for example, were used where water classifications were needed.

Once shapefiles were created by Joro Geomatics Inc. for each model, areas of suitable habitat could be predicted within the Bipole III Project and Local Study Area for each VEC species.

For anurans, these models were used in identifying call survey sites. Call survey results were then used to verify existing models and in the re-development of the habitat models using additional habitat predictor variables, as discussed in Section 3.4.

3.2.1 Terrestrial Invertebrates

Habitat models were built for terrestrial invertebrate VEC species by Joro Geomatics Inc. using associated habitat requirements. Due to the great diversity of the terrestrial invertebrate community, only at-risk species were considered here in the selection of VECs.

Terrestrial invertebrate models were used to identify locations for field investigations, including sweep-net surveys and visual encounter surveys. Habitat requirements used for each species are listed below. Associated models generated by Joro are presented in Appendix Table A1-1.

Dakota Skipper (*Hesperia dacotae)*

- Wet to mesic tall-grass prairies (and upland dry mixed-grass prairies in SK).

Uncas Skipper (*Hesperia uncas*)

- Short-grass prairie, usually on dry prairie hillside & pastures.

Ottoe Skipper (*Hesperia ottoe*)

- Dry, upland, mixed-grass (bluestem) prairies & sand prairies; and
- Does not occur in true tall-grass prairies.

3.2.2 Anurans

Anuran models were built based on literature reviews of all species found within the Bipole III Project Study Area. Breeding, summering and hibernation information was gathered for each species and based on this information, species distribution models were generated by Joro Geomatics. For the purpose of this report, only models for VEC anuran species were presented. Models created for reproduction, feeding, and overwintering life stages for the three VEC species are as follows:

Plains Spadefoot (*Spea bombifrons*)

- Reproduction: marsh-bog; temporary pools (partially flooded fields, roadside ditches, flooded dugouts, shallow temperate wetlands in fallow fields, nature prairie, oxbow lakes, meandering streams);
- All Life Requisites: grass-forb, associated with sandy soil & prairie habitat types;
- Hibernation: burrow below frost line; and
- Reproduction sites to be within 1.6 km from all life requisites habitats.

Wood Frog (*Lithobates sylvaticus*)

- Reproduction: marsh-bog;

- Feeding: treed-muskeg, hardwoods, deciduous-dominated mixedwoods; mainly wooded areas, occasionally shrubs & grass; combo forest canopy with small pools;
- Hibernation: under leaf litter, logs or stones;
- Reproduction, feeding and hibernation habitats to be within 300 m of each other;
- Minimal fragmentation between breeding ponds & summering habitats (e.g. clearcuts 2-11yrs old); and
- Associated with wider forested habitats.

Northern Leopard Frog (*Lithobates pipiens*)

- Reproduction: marsh-bog; waterbodies: marshes, sloughs, dugouts, borrow pits, oxbows, beaver ponds, shallow bays & lake margins, quiet stream & river backwaters, slow flowing creeks, roadside ditches & springs;
- Feeding: treed-muskeg, grass-forb;
- Hibernation: well oxygenated lake bottom, that does not freeze solid; e.g., Lake Manitoba, & perhaps deep ponds, rivers & creeks too; as far as 18 km from shore, as deep as 7 m, with silty bottom;
- Breeding habitat to be within 1.6 km of over-wintering habitat; and
- Breeding and feeding to be within 500 m of each other.

The reproduction, feeding and overwintering models that were generated by Joro Geomatics, as based on the habitat requirements of the three VEC species listed above, are presented in Appendix Table A1-1.

In total, 429 sample sites were randomly generated by Joro Geomatics within the resultant model polygons within the Project Study Area in the identification of anuran call survey habitats for field survey purposes. These sites were re-examined manually in order to obtain an adequate sample size for the three VEC species and eliminate sites where access issues occurred. In total, 170 sites were chosen for survey purposes based on the initial models. Call survey methods are described in Section 3.3 below.

3.2.3 Reptiles

A habitat model for the northern prairie skink (*Plestiodon septentrionalis septentrionalis*) was built based on habitat requirements obtained from literature. The Joro Geomatics prairie skink model was used to identify locations for field investigations, including coverboard surveys and visual encounter surveys.

The following habitat requirements were used in building a model for the northern prairie skink:

- Mixed-grass prairies associated with sandy soils.

The model generated for the prairie skink habitat by Joro Geomatics, as based on the above requirements, is presented in Appendix Table A1-1.

A garter snake model was built by Joro Geomatics based on habitat requirements for both feeding/summering and overwintering life stages of the red-sided garter snake, with information obtained from literature.

The following criteria were used in generating the garter snake models:

- Modeled for red-sided garter snake (*Thamnophis sirtalis parietalis*);
- Over-wintering habitat: limestone sinks/bedrock (e.g., interlake);
- Rock quarries in Granitic bedrock of Canadian shield, eroding shale outcrops;
- Feeding habitat (=summering range): near marshes, shallow lakes & poor drainage areas (mesic vegetation, absent from grasslands); near marshes of aspen forest; and
- Summering/feeding habitat to be within 15 km of overwintering habitat (as much as 17.7 km).

The feeding and overwintering models that were generated by Joro Geomatics, based on the habitat requirements listed above are presented in Appendix Table A1-1. The overwintering component of the model was used to identify hibernacula habitat within the Local Study Area for field survey purposes.

3.3 Field Work

Field work was conducted where modeled habitats overlapped the Project Study Area, in an effort to aid in model verification and help determine the presence of VEC species. Habitat polygons were created for each species using habitat models generated by Joro Geomatics (see Section 3.2 above, Map Series 200-600). Where a habitat polygon intersected the Bipole III Study Area RoW polygon, the two polygons were intersected in Arc GIS and a transect shapefile was created. This shapefile was converted to a GPX file and downloaded to Mapsource™ for use with a handheld Garmin eTrex™ GPS. These transects were used for surveying purposes within the Local Study Area. For anuran surveys, only crown lands were used as survey sites. In the case of skippers, skinks and garter snakes, surveys were conducted only on crown lands or where access to private land was granted by landowners. Private land access requests were completed by MMM Group Limited.

3.3.1 Terrestrial Invertebrates

Investigations consisted of meandering sweep-net surveys, visual encounter surveys and incidental observations. Sweep-net surveys were conducted throughout July and August 2010 at sites with suitable skipper habitat, as based on models described in Section 3.2 above (Map Series 200 and 300). The sweep-net method involved the use of a net with a hoop diameter of approximately 32 cm and a handle approximately 95 cm long. Muslin fabric was sewn over the hoop and extended into a bag approximately 90 cm long. When a butterfly was seen at rest or in flight, the net was used in a sweeping motion to catch the specimen. Two field personnel surveyed simultaneously for approximately 20 minutes each, for a total survey time of 40 minutes at each transect. Survey time per field personnel varied from 12 to 30 minutes. Air temperature, wind speed, general weather conditions, and start and end time for each sweep-net was recorded. Start and end location and tracks of the sweep-net survey were also recorded as waypoints, using a handheld Garmin eTrex GPS.

All species caught or seen during the course of the surveys were recorded and pictures were taken where possible. Dorsal and ventral surfaces of unidentified individuals were photographed for further identification in the lab. Individuals were identified to family or genus using The Butterflies of Manitoba (Klassen et al. 1989) identification guide. As our target VEC species were all from the family Hesperiidae, further taxonomic identification was not required when individuals collected were not the target family.

In the event that habitat was not deemed suitable for the species of concern during field investigations, sweep-net surveys were not conducted.

3.3.2 Anurans

Over 600 sample sites randomly generated by Joro Geomatics were examined for accessibility, of which 429 sites were selected for further consideration. The habitat model polygons were overlaid as a shapefile over Google Earth™ maps to determine accessibility. Those sites that appeared to be on Crown land and were easily accessible by vehicle were left in; additional sites were manually added based on the information provided by the model and accessibility.

Two rounds of field surveys were conducted for anurans at call survey sites; the first survey focused on the early spring breeders, while the second focused on late spring breeders, with a focus on VEC species. Non-VEC anurans heard during the course of surveys were also recorded.

In total, 170 anuran call survey were examined during the course of both surveys (Map 3, Map Series 700-2200). For our purposes, the two most northernmost ecozones (Taiga Shield and Hudson Plain) were not taken into consideration when allocating sample sites to ecozones due to negligible overlap of these with the overall Study Area. To this effect, effort was made to have sample sites distributed equally between the three major ecozones within the Study Area.

Sites were ranked Low, Moderate and High based on the number of anuran species having suitable habitat at any given site in relation to the number of anuran species with distributions overlapping that site. Field reconnaissance further eliminated some sample sites, due to new private lands at survey sites or distance from road too great to effectively sample multiple sites within a given night. Additional sites were added ad hoc in the field to supplement those that were eliminated and to maximize sample size for VEC species. To this effect, added effort was made to include all road-accessible plains spadefoot polygons available for anuran call surveys within their limited distribution range within the Local Study Area in the vicinity of Dauphin Lake.

Site Reconnaissance

Anuran call survey sites were visited during the day to determine if and how best to access them, as well as to collect visual information (i.e., photographs) difficult to collect during night-time call surveys. Maps of the sites were made using Google Earth™ and verified using a 'Backroads' Manitoba map. The sites were accessed by truck where possible and walking or ATVs were used when there was no suitable road access. It was necessary to be able to get within 200 m of the site, with a preference of within 100 m.

Once at the site, the distance and direction of the accessed site, in relation to the actual site, were recorded (e.g. 30 m S of site), and a waypoint was taken using a handheld Garmin eTrex GPS. Directions from the vehicle to the site were also recorded where necessary. Photographs were taken of the site and the direction of each picture was noted (e.g. north). If there were any surrounding wetlands or other potential anuran habitat, pictures were taken of these as well. Ecological information was recorded, including type of habitat (e.g. wetland, ditch), vegetation type (e.g. cattail, rushes, sedges, red osier dogwood, trembling aspen etc.), land use (e.g. pasture, cropland etc.), water level (e.g. dry, open water, or inundated) and species and call rank of any anurans heard.

Call Surveys

Anuran call surveys began 30 minutes after sunset, and continued until approximately 1:00 am. Call surveys were conducted for 5 minutes, during which time the species and call rank of the calls heard was recorded. Call intensity was ranked based on the following call rank system (Kendell 2002):

1 = one individual calling;

2 = calls not overlapping, and distinguishable (several individuals);

3 = calls overlapping but still distinguishable (several + individuals calling); and

4 = calls overlapping and indistinguishable (full chorus).

The number of individuals of each species calling was estimated and their relative location was recorded if possible. If anuran calls were heard outside of the site/wetland, this was recorded as well. Other information recorded included the time of survey, wind speed and air temperature. A GPS waypoint was taken and recorded at the spot where the call survey was conducted. Distance and direction from the actual site and any additional useful information was also recorded. If wind speed exceeded 15 km/h, or temperature was below 5ºC, call surveys were not conducted, as these are not optimal conditions for anuran calling (Kendell 2002).

3.3.3 Reptiles

3.3.3.1 Skinks

Coverboards were placed in a diverse set of habitats along transects (Map Series 200 and 300), including in what appeared to be suitable microhabitat; near sandy areas and creeping juniper where present. Coverboards were constructed of 30X60cm pieces of weathered plywood.

Private land access was not obtained in time for peak breeding activity in the spring, but was obtained in time for possible juvenile movements and summering peak activity in August. In total, 85 coverboards were placed among the three areas and were examined on a weekly basis until September 24, 2010 (Table 1). Thirty coverboards were placed among the sandy prairie complex #1 (Track 1-4, SE-11-008-08-W1) July 6, 2010. Twenty coverboards were placed in the sandy prairie complex #2 (Track 8, NE-09-009-08-W1) July 16, 2010 with additional coverboards placed July 23 and July 26, 2010, for a total of 35 coverboards. Twenty coverboards were placed in sandy prairie complex #3 (Tracks 9 and 10, NW-26-008-0-W1) August 5, 2010 once private land access was granted.

Coverboards were checked in the early morning or during the evening, taking care to avoid peak daytime temperatures (Alison Krause-Danielson, pers. comm.).Waypoints were taken at each coverboard location using a handheld Garmin eTrex GPS and surrounding habitat was photographed. Prior to the start of each coverboard survey, time, air temperature, cloud cover, and general weather conditions were recorded.

3.3.3.2 Garter Snakes

Field investigations involved the examination of modeled hibernacula polygons during fall migration to overwintering sites (Map Series 500). Surveys were made to coincide with fall activity at Narcisse Wildlife Management Area (Government of Manitoba 2010). Land access was not granted at the time of the spring emergence and so surveys were not conducted at that time.

Habitat transects were examined for suitable garter snake hibernacula using orthophotos and meandering visual encounter surveys within suitable habitat polygons. Start and end waypoints were recorded and survey tracks were saved using a Garmin eTrex handheld GPS.

When suitable habitat was located, a waypoint was taken using a handheld Garmin eTrex GPS and photographs were taken. In addition to locating possible suitable habitat within our polygon based on orthophotos, local knowledge was also used in identifying additional areas where high concentrations of snakes were thought to occur. At these locations, a waypoint was recorded at possible hibernacula habitats and photographs were again taken.

3.3.4 Incidental Observations

Incidental TIAR species observations made during the course of coverboard, sweep-net and call surveys were also recorded. Waypoints and photographs were taken where available.

Incidental amphibian and reptile observations were also obtained from other disciplines on an opportunistic basis. Garter snake hibernacula locations were obtained from CDC, which was provided by Manitoba Hydro as part of a data sharing agreement. Additional garter snake hibernacula locations and other amphibian and reptile observations were obtained from Wildlife Resource Consulting Services MB Inc. (WRCS) during the course of their field studies for other biophysical components of the Bipole III Transmission Project. Amphibian observations were also obtained from Calyx Consulting during the course of their Bipole III Transmission Project field studies.

Incidental bird and mammal observations recorded during the course of our field studies were directed to WRCS. Any pertinent plant observations were recorded and sent to Calyx Consulting.

3.4 Aboriginal Traditional Knowledge

Aboriginal Traditional Knowledge (ATK) workshops were held with Aboriginal communities, Metis communities, and communities with Mayor and Council within the Bipole III Transmission Project Study Area (Bipole III EIS Technical Report, Aboriginal Traditional Knowledge). Oral history and mapping interviews were conducted based on a series of questions that were developed to include aspects of the biophysical and socio-economic environment associated with the Project. The intent of the interviews was to assist in the characterization of the existing biophysical and socio-economic environment for the purposes of evaluating alternative routes to select the preliminary preferred route and the overall assessment of biophysical and socio-economic components along the preferred route. Potential constraints within the Study Area were identified on a series of 1:50,000 NTS maps and the knowledge gathered incorporated into all aspects of the Environmental Assessment process. This ATK survey data was reviewed for species location information, species composition, and important features pertaining to TIAR species and associated VECs.

Aboriginal and First Nation communities who participated in the ATK studies within the Study Area included: Barrows, Camperville, Chemawawin First Nation, Cormorant, Dakota Plains First Nation, Dakota Tipi First Nation, Dawson Bay, Duck Bay, Easterville, Herb Lake Landing, Pelican Rapids, Pikwitonei, Pine Creek, Thicket Portage, and Waywayseecappo First Nation.

3.5 Model Verification

Following the completion of anuran call surveys, wood frog and northern leopard frog models were re-examined and best predictors were identified based on call survey results. To this effect, potentially important breeding habitat was identified for both species. Specific objectives included:

- The identification of habitat and anthropogenic factors associated with frog occurrence;
- The prediction of potential distribution based on relationships established with a number of habitat and anthropogenic variables defined *a priori*; and
- The quantification of the amount of potentially important habitat within the Bipole III Local Study Area.

For modeling purposes, the highest recorded call rank for either species was selected for each of the 170 sites surveyed. Sites where a frog species maximum call rank was greater than zero (i.e., 1-4) were classified as "detected", while those with a maximum call rank of zero were classified as "not detected". Habitat variables were selected based on presence/absence, using the LCCEB database and life history requirements (see Section 3.2.2). Prior to model development, co-linearity between variables was analyzed using simple correlations. In total, 10 variables were included in data analyses and model development, including two anthropogenic factors (i.e., roads and agriculture) shown to partially explain frog occurrence (see Houlahan and Findlay 2003) (Appendix Table A2-1). Proportion of each variable within the 200 m buffer of each survey site was calculated.

Similar to what was done by Wall et al. (2004), Analysis of Variance (ANOVA) and Chi-square analysis were used to 1) compare land cover variables between ecozones (equal or not equal); and 2) determine if there was an association between anuran occurrence and each predictive habitat variable (association or no association). This analysis was undertaken to decide whether observations could be pooled to estimate one predictive model for the entire Study Area (i.e., no differences among ecozones), or whether individual models had to be developed for each ecozone (i.e., differences in available habitat among ecozones).

Once the scale of the analysis (ecozone or entire Study Area) was determined, logistic regression and model selection using Akaike's Information Criterion (AIC, Burnham and Anderson 2002) were employed to evaluate the importance of each habitat variable. Additional details of tests used are found in Appendix Table A2-2. Logistic regression models were fit for all habitat variables deemed biologically relevant to each individual frog species. In addition, a null model with an intercept only was also fit to assess how well each predictor variable performed in comparison to random chance.

To develop a predictive model for estimating the probability of wood frog and northern leopard frog occurrence, logistic regression analysis employing a backwards stepwise logistic model was employed ($p=0.15$). The final model from this procedure was then used to estimate the probability of occurrence for each frog species by ecodistrict within the Bipole III Local Study Area.

Overall model fit was assessed using an unweighted sum-of-squares goodness of fit test (Hosmer et al. 1997), and parameter values for each predictor variable were estimated and evaluated by calculating their associated odds ratio and 95% confidence interval. Model predictive ability was assessed using a plot of model sensitivity (ability of the model to predict occurrence) on the *y* axis against 1-specificity (ability of the model to predict not detected) on the *x* axis (Zweig & Campbell 1993).

All graphing and data analyses were conducted using R 2.12.0 (R Core Development Team, 2010), the rms package for R, Version 3.1-0 (Harrell 2010), and SYSTAT 12 (Systat Software, Inc. 2007).

3.6 Environmental Assessment

The assessment of the Bipole III Transmission Project as it relates to the TIAR species, focused on selected VECs (Section 5.2.3 below). VECs were selected and evaluated using information from the literature, habitat models, field surveys and incidental observations. Current and historical distributions of VECs were taken into account and distributions of suitable habitat for each VEC along the HVdc transmission line RoW in relation to the Local Study Area were evaluated using intercept analysis and relative areas. Where applicable, availability of suitable habitat was also evaluated for VEC species within the converter station sites, ground electrode sites, and their associated component footprint areas.

The significance approach framework is guided by the Reference Guide for the Canadian Environmental Assessment Act (CEAA 1994) and includes the identification of adverse environmental effects, followed by the determination of the significance and likelihood of the residual adverse effects. The potential effect of each project component on each VEC was evaluated following criteria described in CEAA (1994) (e.g., direction of effect, magnitude, etc.). Following the consideration on prescribed mitigation, the residual effect was then assessed. This approach relied on the results of VEC studies, expected effects based on the project description, prescribed mitigation with the assessment of effects and significance based on professional judgment and consistency with contemporary environmental assessments of similar projects.

4.0 Project Information

A detailed description of the Bipole III Transmission Project is provided in MMM (2010). Specific project components and activities likely to affect TIAR species are discussed below.

4.1.1 Transmission Line

The primary issues of concern with regard to transmission line development and TIAR species environments relate to construction in sensitive areas. This includes installation of permanent towers and clearing of habitat as described below:

- Accidental spills, leaks, and contamination from substances (e.g., fuels and lubricants) during the construction phase of the Project;
- Workforce presence and improved access to sensitive habitat during the construction and operation phases of the Project;
- Improper use or storage of herbicides or hazardous materials during transmission line RoW maintenance, resulting in chemical spillage and run-off affecting breeding and overwintering habitats during both construction and operation phases of the Project; and
- Permanent habitat loss from structure foundations and installations, and continual vegetation maintenance along the HVdc transmission line RoW.

4.1.2 Ground Electrodes

The configuration of each of the two ground electrodes is assumed to be one of two configurations:

1. A buried iron ring approximately 400-800 m in diameter requiring a site area of approximately 2.5 km^2; and
2. A vertical well electrode to a depth of approximately 40 m.

Aspects of the buried ring ground electrode option that have the potential to impact the TIAR species environment are related to habitat alterations and include:

- Clearing of vegetation/habitat loss;
- Contamination of habitat from leaching of embedded coke or increase in sedimentation at anuran breeding sites;
- Accidental spills and leaks of substances harmful to the TIAR environment (e.g., fuels, lubricants or other hazardous materials); and
- Workforce presence and improved access to sensitive habitat.

Aspects of the vertical well ground electrode option that have the potential to impact the TIAR species environment are related to anuran breeding sites where the electrode will be within a water course or immediately adjacent, and would include:

- Contamination of a anuran breeding habitat from leaching of embedded coke, or improper construction practices causing increased sedimentation;
- Accidental spills and leaks of substances harmful to the anuran breeding habitat (e.g., fuels, lubricants or other hazardous materials); and
- Workforce presence and improved access to sensitive habitat.

4.1.3 Converter Station

Construction of the Keewatinoow Converter Station will require the development of the station site. This will include clearing of all vegetation and site preparation for converter station infrastructure. It is assumed that the site will be maintained free of vegetation. Aspects of the converter station that may impact the TIAR species environment are similar to Ground Electrode effects above. The Riel Converter Station will be located at the existing Riel Station.

4.1.4 Construction Camp

Construction of a construction camp at the proposed future Conawapa Generating Station site will include the clearing of all vegetation and site preparation for camp infrastructure. It is assumed that the site will be maintained free of vegetation. Aspects of the construction camp that may impact the TIAR species environment are similar to Ground Electrode effects above.

4.1.5 Borrow Areas

The primary issues of concern with regard to borrow area excavation and deposition relate to the possibility of such activity occurring within identified sensitive areas, where destruction of suitable habitat may occur.

5.0 Existing Environment

5.1 Data/Information Sources

5.1.1 Major Sources

The existing environment was described for terrestrial invertebrates within the Bipole III Project Study Area based on existing published information and 2010 field studies. Data on the terrestrial invertebrate component were obtained from published literature, grey literature and government online databases. A strong emphasis was made on COSEWIC reports for VEC species at risk.

A review of information on amphibian and reptile biology and distributions was collected from published literature, grey literature, and various government resources. Additional historical distribution information was obtained from CDC, provided by Manitoba Hydro as part of a data sharing agreement. Anuran call survey, skink coverboard, and garter snake hibernacula visual encounter survey data were collected during the course of field studies conducted from April through October 2010. Additional incidental observational data were also obtained internally as well as from WRCS and Calyx Consulting during the course of 2009 and 2010 field studies, and information collected during ATK interviews was also used (Bipole III EIS Technical Report, Aboriginal Traditional Knowledge).

5.1.2 Data/Information Limitations

Environment Canada (2009) has identified several knowledge gaps relative to wildlife and petroleum industry effects, as identified from a literature review. These knowledge gaps can be applied to RoW development and include:

- Information on the overwintering sites of amphibians and reptiles and the potential effects of exposing these sites during ground disturbance in winter;
- Distances of roads from reptile hibernacula that result in lower mortality;
- Effects of petroleum specific disturbances (*e.g.*, seismic testing, trails, pipeline construction, etc.) on reproductive success of species at risk;
- Effects of habitat fragmentation on species at risk;
- Effects of disturbances on species time budgets and individual fitness of species at risk; and
- Success or failure of setback distances, timing restrictions and mitigation.

With regards to TIAR field studies, conclusions based on TIAR species habitat models, in relation to the Bipole III Transmission Project, were dependent on accuracy of cover class information received, and the suitability of such cover class information for use with the species of interest. As such, where outdated or inappropriate cover class information exists, models may not reflect true habitat use.

Data sets used for modeling frog species, for example, were not designed for amphibians. As such, data were insufficient to allow for a more descriptive evaluation of the northern leopard and wood frog models and although model results using wetlands to identify breeding sites may act as an adequate identifier of suitable breeding habitat, they must be recognized as being generous and precautionary. Additionally, the FRI and LCCEB cover class databases do not have the ability to differentiate between remnant native prairie habitat and sub-optimal pasture lands. Field investigations found four out of six Dakota skipper field sites investigated did not contain appropriate Dakota skipper prairie habitat (Photos 1-9); none appeared to have all four plant species associated with the presence of the Dakota skipper. Information on historical grasslands and prairies was also not available from CDC.

As such, it is extremely difficult to identify any potential native-prairie remnants associated with the Dakota skipper that may be affected by the Project, should they exist, and consequently the Dakota skipper model likely overestimated the amount of suitable habitat available within the HVdc transmission line RoW. Although Dakota skipper field studies were conducted and described in this report, and the importance of maintaining native prairie remnants is noted, the summary results of suitable Dakota skipper modeled habitat could not be included in the final identification of environmentally sensitive sites (ESSs) within the Project Study Area.

The delayed timing of private land access request acquisitions resulted in a delay in the onset of some surveys conducted, including skipper sweep-net surveys, skink coverboard surveys, and garter snake hibernacula surveys.

Although the timing of sweep-net surveys coincided with the peak flight season of the Ottoe and Dakota skippers, sweep-net surveys did not commence in time for the Uncas skipper flight season. Flight time for the skippers differs per species, with start times ranging from late June to late July (Table 2). Sweep-net surveys commenced early July, 2010 and continued through to early August, 2010. However, an examination of the sandy-soil prairie habitat which the Uncas skipper inhabits still occurred during the Ottoe skipper sweep-net surveys, and valuable information was gathered at this time with respect to suitable habitat.

The prairie skink and garter snake both have two peak activity periods, including a spring emergence/breeding period and a fall migration period back to overwintering dens. Although visual encounter surveys for garter snake hibernacula did not occur during the first peak activity period, surveys were conducted the first week of October to correspond with migration activity at Narcisse Wildlife Management Area, under the assumption that peak activity periods were similar.

Although no target species were found during surveys such as coverboards and sweep-net surveys, this does not necessarily indicate that none occur in the area. Although prairie skink surveys did not result in the identification of prairie skink populations along the HVdc transmission line RoW for example, ATK interviews noted skink observations in the area (see Section 6.1.1.3.3). Additionally, information on the presence of possible garter snake hibernacula was still obtained at these sites where geographical formations suggested possible garter snake use, regardless of snake presence.

Timing of surveys may also be affected on an annual basis. Field studies for anuran VECs were confined to one breeding season. Considering annual variability of populations, weather and calling chronology, multi-year call-survey results are required to more accurately identify species distribution and habitat use patterns (Pechmann et al., 1991).

5.2 Existing Environment Description

5.2.1 Overview

The existing environment was described here in reference to the Bipole III Transmission Project. General description provides an overview of species that may be found within the Project Study Area. Evaluation of the Bipole III Transmission Project was based on VECs only and on an ecodistrict level where applicable. It should be noted that although several VEC species discussed here have distribution ranges outside of the Local Study Area, their ranges are in close proximity to the HVdc transmission line RoW and suitable habitat may exist within the RoW, warranting investigation and discussion in this report.

5.2.2 Environmental Components

5.2.2.1 General Descriptions

The Study Area for the Bipole III Transmission Project spans five of Manitoba's terrestrial ecozones, extending from the Hudson Plain and Taiga Shield Ecozones in the north to the Prairie Ecozone in the south. The majority of the Study Area is divided evenly between the Prairie, Boreal Plain, and Boreal Shield Ecozones. Eight ecoregions and 28 ecodistricts are intersected by the Bipole III Project Study Area. Within these ecozones, TIAR species are distributed accordingly with respect to their individual niches, from prairie species residing in the sandy soil prairies of southwestern Manitoba to boreal species overwintering under forest leaf litter. Although some species are specialized within a particular ecozone or ecoregion, other species have distributions throughout most ecozones within Manitoba. TIAR species are discussed in their respective sections below.

5.2.2.1.1 Terrestrial Invertebrates

Terrestrial invertebrates are animals without vertebrae (backbones or notochords), occupying terrestrial habitats. Over a million species of animals have been described by biologists, 95% of which represent invertebrates (Barnes 1980). Terrestrial invertebrates are extremely diverse, ranging from primitive earthworms to highly evolved insects.

In terms of biomass and species diversity, invertebrates are the largest animal group. Nearly 34,000 species of terrestrial arthropods have been reported in Canada (Biological Survey of Canada 1988). An estimated 22,000 insect species occur in the boreal ecozone of Canada alone (Danks and Foottit 1989). In Manitoba, there are hundreds of species within each terrestrial invertebrate taxon, including 483 species of spiders (Aitchison-Bennell & Dondale 2007) 208 species of dragonflies (NatureNorth 2006), 136 butterflies and 18 species of tiger beetles (Gibson et al. 1997).

Invertebrate species composition varies between Canadian ecozones. Arctic species predominantly include diptera, hymenoptera, and lepidoptera, some ectoparasites of warm-blooded vertebrates, as well as mites and collembola. Boreal forest species include advanced holometabolous orders such as lepidoptera, hymenoptera, diptera and coleoptera, as well as some economically important species such as moths, sawflies as well as scolytid and cerambycid beetles (Danks and Foottit 1989). Grasslands see more herbivorous groups, such as hemiptera, lepidoptera, orthoptera, and many coleoptera (Hayes 1927, Biological Survey of Canada 1988). Invertebrates play a variety of roles in Canada's and Manitoba's landscape, from being major contributors to forest diseases (Hall 1996), to being crucial players in decomposition and nutrient circulation (Peterson & Luxton 1982).

Currently there are eleven terrestrial invertebrate species within Manitoba that are identified as at-risk by COSEWIC, under SARA, or under MBESA (Table 3). All but one species have restricted to fragmented populations or population centres within the southern third of the province; eight of these have associations with fragmented sandy soil prairies and two of which require mesic tall-grass prairie habitat. Only the monarch butterfly (*Danaus plexippus*) has a large distribution range, associated with the plants species such as milkweed that are widespread throughout southern Manitoba.

Although, with the exception of the monarch, none of the at-risk species have populations overlapping the Bipole III Local Study Area, known and historic populations exist throughout the Prairie Ecozone and are in close proximity to the Local Study Area (Figure 1). Additionally, fragmented sandy soil prairies and mesic prairie habitat patches do exist within the PR, warranting investigations.

5.2.2.1.2 Amphibians

There are 15 amphibian species with distribution ranges within Manitoba, 12 of which are anurans (Table 4). COSEWIC (2009b) lists two Manitoba amphibian species, one of which, the northern leopard frog, can be found in the Bipole III Project Study Area.

The Manitoba northern leopard frog population has recently been identified as two populations in order to accurately portray its status in Canada (COSEWIC 2009a, Figure 2). The western boreal/prairie population, approximately west of the Canadian Shield, is deemed of Special Concern by SARA, and overlaps the Bipole III Project and Local Study Area. The Eastern population overlapping the Canadian Shield, on the eastern half of the province, is not considered at risk (COSEWIC 2009a).It is not listed under MBESA.

The plains spadefoot is found within the Local Study Area and is listed as protected under Division 6 of the Wildlife Act (Govt. of MB 1987, Table 4). It is not listed under COSEWIC or MBESA.

Nine of the twelve Manitoba anuran species have ranges overlapping the Bipole III Local Study Area (Table 4). Northernmost species, with distributions extending into the Taiga Shield and Hudson Plain Ecozones, include the wood frog and the boreal chorus frog (*Pseudacris maculata*). Within the Bipole III Local Study Areas' Boreal Shield Ecozone the wood frog and boreal chorus frog are again present, as are the northern leopard frog and the spring peeper (*Pseudacris crucifer*), at its western-most extent. The Boreal Plain Ecozone has greater amphibian diversity, with the wood frog, the boreal chorus frog, the northern leopard frog, the Canadian toad (*Anaxyrus hemiophrys*), the western-most distribution of the blue spotted salamander (*Ambystoma laterale*), and the gray treefrog (*Hyla versicolor*) in the southern regions of the ecozone. The Study Area within the Prairie Ecozone has the greatest number of amphibian species within all Manitoba ecozones, including the boreal chorus frog, wood frog, northern leopard frog, Canadian toad, gray treefrog, American toad (*Anaxyrus americanus*), Cope's gray treefrog (*Hyla chrysoscelis*), gray tiger salamander (*Ambystoma mavortium diaboli*), common mudpuppy (*Necturus maculosus maculosus*), and the plains spadefoot. Approximately14% (i.e., 127, 200,000 ha) of Canada is covered in wetlands, with Manitoba boasting the most extensive wetland concentration, with 41% of its land area (i.e., 22,470,000 ha) defined as wetland (National Wetlands Working Group 1988). Wetlands are essential for the breeding stage of all Manitoban amphibian species, and are found throughout the Bipole III Project Study Area (Table 5).

5.2.2.1.3 Reptiles

There are eight reptile species found within Manitoba, including two turtle species, one skink species, and five species of snake (Table 4). All but two have distribution ranges overlapping the Bipole III Transmission Local Study Area; both the prairie skink and the hognose snake (*Heterodon nasicus nasicus*) are associated with isolated sandy soil prairie habitats in close proximity to the Bipole III HVdc transmission line RoW but population ranges do not overlap the RoW itself.

Four of the species with distribution ranges overlapping the Bipole III Local Study Area are found within the Boreal Plain Ecozone: the common snapping turtle (*Chelydra serpentina serpentina*) and western painted turtle (*Chrysemys picta bellii*), the red-sided garter snake, and the northern redbelly snake (*Storeria occipitomaculata occipitomaculata*). The northern redbelly snake is found in the southernmost extent of the Boreal Plain Ecozone. Within the Prairie Ecozone, the above species are found, as are the smooth green snake (*Opheodrys vernalis*) and western plains garter snake (*Thamnophis radix*). Although the distribution range of the prairie skink does not overlap the Bipole III Local Study Area, it too has a distribution within the Prairie Ecozone, in close proximity to the HVdc transmission line RoW. Garter snake hibernacula can be found throughout both the Boreal Plain and Prairie Ecozones, wherever garter snakes and suitable habitat is found.

COSEWIC (2009b) lists two Manitoba reptile species as at-risk; the northern prairie skink and the common snapping turtle (Table 4). The northern prairie skink is also listed as Protected under Division 6 of the Manitoba Wildlife Act (Govt. of MB 1987). Neither species is listed under the Manitoba Endangered Species Act (MBESA). Additionally, the plains hognose snake (*Heterodon nasicus nasicus*) is listed as protected under Division 6 of the Wildlife Act (Govt. of MB 1987). It is not listed under COSEWIC or MBESA. Of these species, only the common snapping turtle has a distribution range overlapping the Bipole III Local Study Area. Although the distribution range of the prairie skink does not overlap the Bipole III Local Study Area, known distribution is in close proximity to the HVdc transmission line RoW and fragmented sandy soil prairies do exist within the RoW, warranting investigations.

5.2.2.2 Specific Aspects of Importance

One of the most important aspects in the evaluation of the Bipole III Transmission Project from a TIAR perspective is the availability of habitat associated with species of concern. Where such habitat types are isolated or fragmented, and therefore limiting, habitat alteration can have detrimental consequences on associated populations; this dependency on such limiting habitats can leave populations vulnerable to disturbance, degradation and local extirpation (Kendell 1998). Where distance between limiting habitat patches continues to increase due to fragmentation, progressively more widely dispersed remnants of suitable habitats make associated species of concern especially susceptible to habitat degradation (COSEWIC 2005).

Limiting habitat types are associated with some species of concern during all life stages. These include undisturbed prairie remnants, necessary for species such as the Dakota skipper, Ottoe skipper, Uncas skipper, prairie skink, and plains spadefoot. Other limiting habitats associated with species of concern are specific to only one life stage. Examples include water bodies that do not freeze to the bottom for hibernating northern leopard frogs, and denning sites for overwintering red-sided garter snakes.

5.2.3 Valued Environmental Components

5.2.3.1 Descriptions

While all components of the environment are important, it is not feasible to assess potential impacts on every component. Assessment therefore focused on the components that had the greatest relevance in terms of value and sensitivity to the particular circumstances of the project and that had a real potential to be affected by the project. With this in mind, terrestrial invertebrate, amphibian, and reptile VECs were selected based on federal and provincial listings, distribution, habitat preference, connectivity of populations and associated habitats, and professional judgment. Information on potential VEC species was gathered using existing literature, habitat classification data, habitat models, field surveys and opportunistic observations. VEC criteria are outlined in Table 6. Although some VEC species discussed have distribution ranges outside of the Local Study Area, their ranges are in close proximity to the HVdc transmission line RoW and suitable habitat is present within the Local Study Area, warranting investigation and discussion.

5.2.3.1.1 Terrestrial Invertebrates

Three terrestrial invertebrate species have been selected as VECs for the Bipole III Project, including the Dakota skipper, the Ottoe skipper, and the Uncas skipper. These species have current or historical distribution ranges in close proximity to the

Bipole III HVdc transmission line RoW (Figure 1). Although known populations do not overlap the Bipole III Local Study Area, suitable habitat exists for these species within the Local Study Area.

Two terrestrial invertebrate species, the Dakota skipper and the Ottoe skipper, received the highest VEC score with respect to VEC criteria, warranting inclusion as a VEC. The Dakota and Ottoe skippers are restricted to fragmented populations or population centres within the Prairie Ecozone and therefor may be sensitive to habitat loss and population changes; the Dakota skipper an associate of mesic tall-grass prairies and the Ottoe skipper an associate of sandy soil prairies, both of which are limiting habitat types.

The Dakota skipper is currently listed as Threatened by COSEWIC and under SARA and MBESA (Table 3). Historically, the Dakota skipper has been found in seven isolated populations or population centres in Manitoba. Field studies in 2002, as part of a COSEWIC status assessment, found the Dakota skipper at only two of these centres, including the Inwood and Lundar area in the inter-lake region between Lake Winnipeg and Lake Manitoba, and southwestern Manitoba near Griswold (COSEWIC 2003, Figure 1). Historical records exist for Miniota, Brandon, Stuartburn, Tolstoi, and the Winnipeg area. Extant populations do not fall within the Bipole III Local Study Area. There has been a historical sighting recorded for the Winnipeg area, which is in the proximity of the study boundaries (Figure 1). However, this record is from the 1930s with an unknown exact location, and no recent records are available from the Winnipeg area (COSEWIC 2003).

An obligate resident of native prairies, all extant populations of the Dakota skipper within Manitoba are associated specifically with wet-to-mesic tall-grass prairies. Currently, less than 1% (i.e., 3 km^2) of Manitoba's tall-grass prairie remains (Hamilton 2005, Samson and Knopf 1994). Plant species associated with the presence of the Dakota skipper include the wood lily (*Lilium philadelphium*), smooth camas (*Zigadenus elegans*), harebell (*Campanulata rotundifolia*), and black-eyed susan (*Rudbeckia hirta*) (Klassen et al. 1989, COSEWIC 2003). Flight times for the Dakota skipper are late June to mid-July (Table 2). The Dakota skipper is very sensitive to the conversion of remnants of prairie to cropland, spring and summer haying, heavy grazing, controlled burns, and drainage of natural sites (COSEWIC 2003).

The Ottoe Skipper is found in upland, dry, mixed-grass (bluegrass) prairies and sand prairies (COSEWIC 2005). Flight time for this species is typically late June through early August (Table 2). Manitoba is the only province in Canada where the species has been found. Currently, it is listed as Endangered by COSEWIC and under SARA, and as Threatened under MBESA (Table 3). Historical populations include Spruce Woods Provincial Park, Aweme (10 km north of Wawanesa), and Rounthwaithe (COSEWIC 2005, Figure 1). No historical populations are known within the Bipole III Local Study Area. The last documented occurrence of the Ottoe skipper was in the late 1980s and it is possible that the species may be extirpated in Canada (COSEWIC 2005).

Although the species has not been documented in recent years, intact sand prairie habitats in Spruce Woods Provincial Park could potentially support a population of Ottoe skipper (COSEWIC 2005). Outside of the park, there is little suitable habitat due to overgrazing and invasion of exotic plants (COSEWIC 2005). Light rotational grazing can be beneficial for the Ottoe skipper, creating or maintaining preferred prairie-plant structure (Dana 1991). Agricultural habitats are unsuitable for the survival of the Ottoe skipper; many mixed-grass and sandy-soil prairie remnants likely have survived because poor soils (sandy) or steep terrain make them unsuitable for row-crop agriculture (COSEWIC 2005). Where suitable remnant sandy-soil prairie habitat does occur, alteration of plant communities may result in the loss of suitable resources for the Ottoe skipper.

The Uncas skipper was also selected as a VEC species. This potentially extirpated species has a historical population within the Prairie Ecozone near the Bipole III HVDC transmission line RoW, around Westbourne, Manitoba (Figure 1). Additionally, suitable sandy soil prairie habitat was found within the Bipole III Study Area, warranting inclusion as a VEC.

The Uncas skipper is a Great Plains species, with a distribution range extending into the southern part of the three Prairie Provinces. It is listed as Endangered under MBESA (Table 3). It is not listed by COSEWIC or under SARA. Habitat includes dry sandy prairie hillsides and pastures with a flight season of late June through early July (Klassen et al. 1989, Table 2). The Uncas skipper appears to be declining as a result of habitat loss, rare or uncommon in the northern part of its range. There are no recent records from Manitoba and it may no longer occur here (ITIS 2009). Historically, Manitoba records have included Beulah, Brandon, Carberry, Glenboro and the vicinity of Westbourne, Manitoba (Klassen et al. 1989, Figure 1). A historical record is also available for the vicinity of Winnipeg (Canadian Biodiversity Information Facility 2009).

5.2.3.1.2 Amphibians

Four amphibian species, including the plains spadefoot, boreal chorus frog, wood frog, and northern leopard frog received VEC scores of eight or greater, warranting inclusion as VECs (Table 6). During the course of field studies, it was decided to exclude the boreal chorus frog as a VEC. The boreal chorus frog is a ubiquitous anuran species, found throughout the Project and Local Study Area from forested areas to city ditches and seemed unlikely in providing valuable information with respect to habitat preferences. In total, three amphibian species were thus selected as VECs in the evaluation of the Bipole III Project.

The plains spadefoot is a nocturnal toad confined to more arid regions of North America. In Manitoba, the plains spadefoot is restricted to the southwest region, where sandy soils occur, with an isolated population occurring north of Riding Mountain National Park near Dauphin (Preston 1982, Cook 1984, Berger pers. comm.) overlapping the Bipole III Local Study Area (Figure 2). Habitat associations include sand dunes, upland prairie, and short and mixed-grass prairie, overall strongly correlated with sandy soil habitats (Lauzon 1999), resulting in limited breeding opportunities. Within the Bipole III Local Study Area, the availability of these habitats is limiting (Map Series 400). Breeding occurs after heavy rains, from June through to early August, and breeding may not occur every year (Preston and Hatch 1986). Breeding sites on the prairies consist of ephemeral pools, including partially flooded fields, ditches, flooded dugouts, and shallow temporary wetlands in fallow fields (Preston and Hatch 1986, Lauzon 1999). During winter, the spadefoot burrows deeply to avoid freezing and desiccation (Baxter and Stone 1980). Overall, basic information on the ecology of this species is limited, but preliminary speculations suggest that the most important factor for the plains spadefoot is alteration and destruction of its habitat (Lauzon 1999).

The wood frog is primarily forest-dwelling, utilizing small ephemeral ponds for breeding and using terrestrial habitats for overwintering. It breeds after the boreal chorus frog by mid-April. Breeding of this species is explosive (Seale 1982) and eggs are laid in large communal egg mass clusters in small ephemeral ponds with females depositing up to 3,000 eggs, again on submergent vegetation (Preston 1982). While six Manitoba species occur north of Lake Winnipeg, only the wood frog can be found throughout Manitoba, extending as far north as the Northwest Territories (Figure 2). This species is a good representative of forest-dwelling anurans throughout the Bipole III Project Study Area and their respective habitat requirements. Furthermore, studies have found the wood frog sensitive to fragmentation effects (deMaynadier and Hunter 1999).

The northern leopard frog is widely distributed in Manitoba, inhabiting the southern two thirds of the province, with northern distribution limits in the northernmost reaches of the Bipole III Project Study Area (Figure 2). The northern leopard frog is the only federally or provincially listed at-risk anuran species within Manitoba; it has a population overlapping the Bipole III Project and Local Study Area and is deemed by COSEWIC and under SARA as of Special Concern (Table 4, Figure 2).

Shortly after spring thaw, the northern leopard frog emerges from hibernation. Breeding occurs in April through May in a variety of habitats, including ponds, quiet backwaters of streams (Merrell 1977, COSEWIC 2000), marshes, roadside ditches, borrow pits, channels and permanently flooded meadows (Eddy 1976). Eggs are deposited beneath the water surface, either attached to submergent vegetation or on pond bottoms. Northern leopard frogs lay eggs in large communal egg mass clusters of up to 5,000 eggs. Tadpoles transform into adults two to three months after oviposition (Preston 1982). After the breeding season, the northern leopard frog moves to its summering range, widely dispersed in a variety of terrestrial habitats, including grasslands and wet woods (Preston 1982). Hibernation occurs at the bottom of lakes and other permanent water bodies that are well-oxygenated and do not freeze solid, such as rivers and the bottom of Lake Manitoba (Eddy 1976), limiting overwintering opportunities. Overwintering sites tend to be within 1.6 km of breeding ponds (Hine et al. 1981).

5.2.3.1.3 Reptiles

Two reptiles received VEC scores of eight or greater, warranting inclusion as VECs (Table 6); the red-sided garter snake and the prairie skink.

The prairie skink, listed as Endangered by SARA and as a Protected Species under the Wildlife Act (Govt. of MB 1987), is Manitoba's only true lizard, and Manitoba's only endangered or threatened herptile. There is at present no critical habitat identified federally for the prairie skink, but a GIS protocol is currently being developed to identify proposed critical habitat and recovery habitat (Rutherford 2010) and a national recovery strategy is currently being proposed (Prairie Skink Recovery Team 2006).

The prairie skink is limited to a small area (less than 1770 km^2) in southwestern Manitoba (Figure 3), and requires sandy soils for nesting, overwintering and for summering burrows (COSEWIC 2004). The primary conservation issue for the prairie skink is habitat loss. The amount of prairie habitat has decline as a result of numerous factors, including succession of prairie to Aspen Parkland, invasion by the exotic leafy spurge (*Euphorbia esula*), cultivation, tree planting programs, and construction (COSEWIC 2004), as well as urbanization and fire suppression (Rutherford 2010). The northern prairie skink hibernates underground up to 66 cm below the surface, for over seven months in the northern part of its range (Nelson 1963) and will return to the same site year after year (COSEWIC 2004), making this species vulnerable to ground disturbance. Nelson (1963) noted the abandonment of several nests after disturbance at the nest site.

Emergence from hibernation sites occurs from late April well into May (Breckenridge 1943, Nelson 1963, Bredin 1981), with individuals migrating to summer ranges at this time (Nelson 1963), and generally within 25 m of overwintering sites (COSEWIC 2004). Breeding occurs mid-May to mid-June in Manitoba (Scott 2004). Nests occur under logs, rocks and boards in small hollows, with an average clutch size of 9 eggs (Taylor 1935, Breckenridge 1943). Incubation is approximately 35 days, with hatching occurring at the end of July in Manitoba (Scott 2004), with a short forage period before initiation of hibernation. Overall, skink movements are very limited, with maximum distance of home ranges rarely exceeding 100m (COSEWIC 2004). The dependency on such a limiting and fragmented habitat type and its reliance on underground habitat leave the prairie skink vulnerable to disturbance and habitat alterations. This species range or known occurrence does not fall within the Bipole III Local Study Area, but known populations inhabit areas in close proximity to the HVdc transmission line RoW. Additionally, both the RoW and the Local Study Area contain suitable sand prairie habitat.

The red-sided garter snake inhabits the southern half of the province (Figure 3), associated with grasslands and mesic vegetation, often at margins of ponds or further upland, most likely dictated by the presence of food in these areas (Preston 1982). In the fall, red-sided garter snakes congregate in the thousands in suitable hibernation sites such as limestone sinks (Preston 1982, Gregory 1977). Today, garter snakes of Manitoba provide a unique opportunity in the tourist industry. The Narcisse Snake

Dens of Manitoba attract crowds annually to witness the largest congregate of snakes in the world during mating season (Manitoba Conservation 2011). The dependency of garter snakes on overwintering den sites leaves snake populations vulnerable to disturbance, degradation and local extirpation (Kendell 1998); such underground caves, dens and fissures make the area more fragile and therefore more vulnerable to cave-ins by heavy equipment.

Populations are greatest in the Interlake (Figure 3) where an abundance of marshes, shallow lakes and poor drainage result in ideal summering habitat and abundant limestone bedrock that provide denning sites (Koonz 1991). Courtship occurs in spring as soon as snakes emerge from hibernacula. Garter snake emergence from hibernacula generally occurs in late April in the Study Area, depending on weather. Males remain at the emergence site for approximately a month and a half to re-mate with other available females (Preston 1982). Individuals regularly move from about 4 km to as much as 18 km when dispersing from hibernacula to summering habitat (Gregory and Stewart 1975). Females are ovoviparous, giving birth to 10-40 young between late July and October, 2-3 months after mating (Zimmerman 2002). A mean brood size of 16.4 individuals has been reported in a Manitoba population (Gregory 1977). Garter snakes return to their dens in late summer and fall (Gregory and Stewart 1975). The western plains garter snake is found in the agricultural areas of the southwestern third of Manitoba, overlapping the range of the red-sided garter snake over much of its provincial distribution range. Western plains garter snakes have been found hibernating in ant mounds (Preston 1982) but will also share denning sites with red-sided garter snakes in northern-most population ranges (i.e., central Manitoba), where availability of suitable hibernacula becomes limited (Shine et al. 2004a).

5.2.3.2 Environmental Indicators

5.2.3.2.1 Terrestrial Invertebrates

The Dakota, Ottoe, and Uncas skipper inhabit isolated and fragmented habitat for all life stages; the Dakota skipper utilizes native prairie and the Ottoe and Uncas skippers utilize sandy soil prairies, as outlined in the models defined in Section 3.2. This dependency on fragmented habitat types that are limited in distribution and extent leave these species vulnerable to disturbance and habitat alterations. Habitat models are therefor used for each of these three species to identify the presence of possible suitable habitat within the Bipole III Project Study Area.

5.2.3.2.2 Amphibians

The plains spadefoot has an isolated distribution range within the Bipole III Local Study Area, limited to the Dauphin Lake area. Its’ strong affinity for sandy soils presents this species with limited breeding opportunities. Preliminary speculations suggest that the most important factor for the plains spadefoot is alteration and destruction of its habitat (Lauzon 1999). A habitat model is used here to identify plains spadefoot habitat within the Bipole III Project Study Area.

The wood frog and northern leopard frog both have distribution ranges overlapping most of the Bipole III Local and Project Study Area. Studies have found the wood frog sensitive to fragmentation effects (deMaynadier and Hunter 1999). For both of these species, survey results were used to identify suitable breeding habitat within the Bipole III Project Study Area.

5.2.3.2.3 Reptiles

As with the Ottoe and Uncas skippers, the prairie skink inhabits isolated sandy soil prairie habitat for all its life stages. This species hibernates below the surface (Nelson 1963) and will return to the same site year after year (COSEWIC 2004), making this species vulnerable to ground disturbance. The dependency on such a limiting and fragmented habitat type and its reliance on underground habitat leave the prairie skink vulnerable to disturbance and habitat alterations. A habitat model outlining habitat requirements for the prairie skink is used to identify suitable prairie skink habitat within the Bipole III Project Study Area.

In the fall, red-sided garter snakes congregate in the thousands, in suitable hibernation sites such as limestone sinks (Preston 1982, Gregory 1977). The dependency on overwintering den sites leaves snake populations vulnerable to disturbance, degradation and local extirpation (Kendell 1998). A habitat model identifying overwintering habitat for the red-sided garter snake is used to identify possible locations of garter snake hibernation sites within the Bipole III Project Study Area.

5.2.3.3 Measurable Parameters

5.2.3.3.1 Terrestrial Invertebrates

For the Dakota, Ottoe, and Uncas skippers, habitat models were used to define and evaluate the total area and proportion of suitable habitat within the Project Study Area, including the 66 m-wide HVdc transmission line RoW in relation to the Local Study Area. Models were ran on the entire Study Area in the identification of possible suitable habitat and were not limited to known distribution ranges, as known current or historic populations do not overlap the Study Area. Results were examined on a case by case basis, taking into consideration proximity to known current and historic populations. For the evaluation of habitat models, the proportion of suitable habitat available within the 66 m HVdc transmission line RoW was compared to that available within the Local Study Area. Presence of suitable habitat along the RoW was evaluated per ecozone, and further per ecoregion and ecodistrict.

5.2.3.3.2 Amphibians

A habitat model, as outlined in Section 3.2 above, was used to identify availability of suitable plains spadefoot breeding habitat within the Bipole III Local Study Area and 66 m HVdc transmission line RoW in the vicinity of the current known distribution range. Presence of suitable habitat within this area was examined on an ecozone basis, and further per ecoregion and ecodistrict.

For both the wood frog and the northern leopard frog, habitat features that had a strong correlation with breeding activity were identified within both the Project HVdc transmission line RoW and the Local Study Area. Proportion of these cover classes within the Projects' RoW in relation to the Local Study Area were used to evaluate suitable breeding habitat use within the Local Study Area. Presence of suitable habitat within the Local Study Area was evaluated per ecozone, and further per ecoregion and ecodistrict. The availability of suitable wood frog and northern leopard frog habitat within the converter station site and ground electrode site footprints and associated ROWs and borrow areas was also identified.

5.2.3.3.3 Reptiles

For the prairie skink, models defined in Section 3.2 above were used to define and evaluate the total area and proportion of suitable skink habitat within the Project Study Area, including the 66 m HVdc transmission line RoW in relation to the Local Study Area. As with the skippers in Section 5.2.3.1, models were ran on the entire Study Area in the identification of possible suitable habitat and were not limited to known distribution ranges, as known current or historic populations do not overlap the Study Area. Results were examined on a case by case basis, taking into consideration proximity to known current and historic populations. Presence of suitable modeled habitat within the Local Study Area was evaluated per ecozone, and further per ecoregion and ecodistrict.

A habitat model was used to identify potential overwintering hibernation sites for the red-sided garter snake within the 66 m HVdc transmission line RoW and the Local Study Area, and Project converter station site and ground electrode site footprints, wherever the Study Area overlapped known distribution range. Proportion of modeled hibernation habitat within the RoW and Local Study Area, examined per ecozone, ecoregion and ecodistrict was used to evaluate suitable habitat.

5.3 Environmentally Sensitive Sites

Environmentally sensitive sites, or ESSs, have been identified based on results of VEC suitable habitat modeling. A complete list of ESSs is presented in Appendix Table A3.

5.3.1 Locations

5.3.1.1 Terrestrial Invertebrates

The Dakota skipper relies on native prairie remnants for all life-stages. Although extant populations of the Dakota skipper were not identified within the Bipole III Local Study Area, habitat models indicated suitable habitat exists along the HVdc transmission line RoW in the Boreal Shield, Boreal Plain, and Prairie Ecozones (Table 7). Within the Prairie Ecozone, with which the Dakota skipper distribution range overlaps (Figure 1), suitable modeled habitat was present within nine ecodistricts along the Bipole III Local Study Area, including the Stockton ecodistrict within the Aspen Parkland Ecoregion, and the Dauphin, Alonsa, St. Rose, Gladstone, Langruth, Winnipeg, MacGregor, Portage, and Winkler Ecodistricts within the Lake Manitoba Plain Ecoregion (Table 7, Map Series 200). Suitable model habitat was present within five of these ecodistricts when only the HVdc transmission line RoW was considered (Table 7).

Within the areas noted above, there is a possibility that native prairie habitat suitable for Dakota skipper may be present. However, true suitable tall grass habitat is rare in Manitoba and its identification, as based on models, is difficult. Field surveys found selected Dakota skipper study sites sub-optimal habitat. Little to no high-grade prairie habitat appears to exist within the Local Study Area (Critical Wildlife Habitat Program 2010). Furthermore, information on possible prairie locations was not available from CDC. As such, Dakota skipper suitable habitat identified using models was not included as an ESS.

Sandy-soil prairies are considered sensitive areas due to their isolated nature and suitability for several at-risk terrestrial invertebrate species, including the following VEC species: Ottoe skipper and Uncas skipper. Habitat suitability models indicated sandy soil prairies were present within both the Boreal Plain and Prairie Ecozones of the Bipole III Local Study Area (Appendix Table A3). The sandy-soil prairie habitat within the Boreal Plain Ecozone is in the Dauphin Lake area. It is not in close proximity to historical populations of either the Ottoe or the Uncas skipper and was not deemed a sensitive area from this perspective. The sandy-soil prairie complexes which fall within the Prairie Ecozone of the Bipole III Study Area are concentrated within the area between St. Claude and the Assiniboine River and are in close proximity to historical populations of both of these species. Any suitable sandy-soil habitat polygon identified within the Prairie Ecozone was thus deemed an ESS in the context of the Bipole III Project (Appendix Table A3).

Sandy-soil prairie complexes within the St. Claude/Assiniboine River area overlap the Stockton Ecodistrict of the Aspen Parkland Ecoregion and both the Alonsa and MacGregor Ecodistricts of the Lake Manitoba Plain Ecoregion within the Local Study Area, and the Alonsa and MacGregor ecodistricts along the RoW (Table 8). Locations of these sandy-soil complexes are shown in Map Series 300.

5.3.1.2 Amphibians

The plains spadefoot has an isolated distribution range within the Bipole III Local Study Area, limited to the vicinity of Dauphin Lake where suitable sandy-soil habitat is present (Figure 2, Map Series 600). Habitat overlaps both the Boreal Plain and Prairie Ecozones, including the Waterhen Ecodistrict of the Interlake Plain Ecoregion, and both the Dauphin and Alonsa Ecodistricts within the Lake Manitoba Plain Ecoregion (Table 9). Due to the isolated nature of this population and the limited amount of areas identified as suitable reproductive spadefoot habitat, these areas were considered ESSs in the context of the Bipole III Project. ESSs are identified in Appendix Table A3.

Both the northern leopard frog and the wood frog have wide-ranging distributions, overlapping most of the Bipole III Project Study Area (Figure 2). Wetlands throughout the Local Study Area were identified as ESSs in the context of both the wood frog and the northern leopard frog (Table 5, Map Series 2300). Wetlands were identified along the HVdc transmission line RoW, as well as at both north and south electrode candidate sites, at collector line RoWs, at the north Converter station site, at the construction camp footprint, as well as the borrow areas (Table 5, Table 10). For the northern leopard frog, sensitive areas were also evaluated based on predictive models, as discussed in Section 5.3.2.2 (Table 11). Using this model, which focused on the presence of agricultural lands and shrub wetlands in the Prairie Ecozone, and grasslands in the Boreal Plains Ecozone, northern leopard frog habitat was identified along the HVdc transmission line RoW and south electrode sites (Table 11). The latter model was not used in the identification of ESS polygons for mitigation recommendations.

5.3.1.3 Reptiles

As with the Uncas and Ottoe skippers discussed above, the prairie skink relies on sandy-soil prairie habitat for all life stages. Of the sandy-soil prairies present within both the Dauphin Lake area of the Boreal Plain Ecozone, and the St. Claude/Assiniboine River area in the Prairie Ecozone, only the latter were deemed to be ESSs due to proximity to current skink distribution range; the sandy-soil prairies within the Boreal Plain Ecozone are located 100 or more kilometres from the current known skink distribution range (Figure 3). Sandy-soil prairie complexes present within the Local Study Area overlap the Stockton Ecodistrict of the Aspen Parkland Ecoregion, and both the Alonsa and MacGregor Ecodistricts of the Lake Manitoba Plain Ecoregion (Table 8, Map Series 400, Appendix Table A3).

Garter snake hibernacula habitat was found in all three major ecozones within the Bipole III Local Study Area, starting from the Dauphin Lake area in the south and ending approximately 160 km north of The Pas at its northern distribution range limit (Table 12, Figure 3, Map Series 500, and Appendix Table A3). No suitable habitat was identified at other Project Footprint Areas. In the Prairie Ecozone, both the Dauphin and Alonsa Ecodistricts of the Lake Manitoba Plain Ecoregion contain suitable habitat. Within the Boreal Plain Ecozone, suitable habitat is present within five of the eight ecodistricts, including Swan Lake and Waterhen Ecodistricts of the Interlake Plains Ecoregion, and the Cormorant Lake, Summerberry, and Overflowing River Ecodistricts of the Mid-Boreal Lowland Ecoregion (Table 12). Within the Boreal Shield, suitable garter snake hibernacula habitat is present within the Three Point Lake Ecodistrict of the Churchill River Upland Ecoregion. Due to the seasonal dependency of garter snakes on this fragmented, site-specific habitat, any areas identified as suitable garter snake hibernacula within the Bipole III Local Study Area were considered ESSs (Appendix Table A3).

5.3.2 Descriptions

5.3.2.1 Terrestrial Invertebrates

The Bipole III Local Study Area contains a total of 182.88 km^2 of Dakota skipper modeled suitable habitat within the skippers' Prairie Ecozone distribution range (Table 7).

Nearly all Dakota skipper suitable modeled habitat found within the Prairie Ecozone was located within the Alonsa Ecodistrict of the Lake Manitoba Plain Ecoregion; the HVdc transmission line RoW within this ecodistrict contains 2.11 km^2 (i.e., 71.98%) of the available 2.93 km^2 suitable habitat present, and the Local Study Area within this ecodistrict contains 165.38 km^2 of the 227.24 km^2 (i.e., 72.78%) available suitable habitat present (Table 7, Map Series 200). Sweep-net surveys conducted at selected suitable habitat sites along the HVdc transmission line RoW in the St. Claude/Assiniboine River area did not find any Dakota skippers (Hesperiidae, Table 13). Furthermore, only two of six survey sites contained any of the plant species associated with the presence of the Dakota skipper (Photos 1-9). Sweep-net survey results can be found in Appendix Table A4-1.

In total, the entire Hvdc transmission line RoW contains 1.29% of the available suitable Dakota skipper modeled habitat found within the Bipole III Local Study Area. Within the Prairie Ecozone, the RoW contains 1.30% of the suitable Dakota skipper modeled habitat found within the Local Study Area (Table 7). Within this Prairie Ecozone, the proportion of suitable modeled habitat found within the RoW ranges from 0% to 2.27% of that found within the Local Study Area at a given ecodistrict.

Due to their reliance on sandy-soil habitats, the models generated for the Ottoe and Uncas skippers were indistinguishable (Table 8, Map Series 300). In total, the Bipole III Local Study Area contains 4.40 km^2 of modeled suitable habitat for either species, 84% of which is located within the Prairie Ecozone and 16% of which is located within the Boreal Plain Ecozone. No known current or historical populations are known to occur within the Boreal Plain Ecozone.

Although suitable habitat is present within the Local Study Area of both the Boreal Plain and Prairie Ecozones, only the Prairie Ecozone contains suitable habitat within the HVdc transmission line RoW. Habitat within the RoW is restricted to the Lake Manitoba Plain Ecoregion, and Alonsa and MacGregor Ecodistricts; the RoW within the Alonsa Ecodistrict contains 0.02 km^2 of available suitable habitat, representing 2.22% of that found within the ecodistricts’ Local Study Area. Similarly, the RoW within the MacGregor Ecodistrict contains 0.07 km^2 of suitable habitat, representing 2.75% of that available within the ecodistricts’ Local Study Area (Table 8). In total, the HVdc transmission line RoW within the Prairie Ecozone contains 0.09 km^2 of suitable sandy-soil habitat, 2.51% of the overall suitable habitat present within the ecozones’ Local Study Area.

Sweep-net surveys conducted at selected suitable habitat sites within the Bipole III Local Study Area did not find any Ottoe or Uncas skippers (Hesperiidae, Table 13).

5.3.2.2 Amphibians

The Bipole III Local Study Area contains a total of 20.51 km^2 of plains spadefoot modeled suitable breeding habitat of which 0.28 km^2 (1.38%) is located within the HVdc transmission line RoW (Table 9). Suitable breeding habitat is present in the Local Study Area within both the Boreal Plain and Prairie Ecozones; the majority (82.74%) is located within the Prairie Ecozone, concentrated within the Alonsa

Ecodistrict of the Lake Manitoba Plain Ecoregion (Table 9). The Dauphin Lake area, where an isolated population of the plains spadefoot exists, overlaps both the Boreal Plain and Prairie Ecozone (Map Series 600). The proportion of suitable breeding habitat within the HVdc transmission line RoW ranges per ecodistrict from 0% to 1.51% of that found within the Local Study Area at that given ecodistrict (Table 9).

Call survey results can be found in Appendix Table A4-2. Call surveys in 2010 did not find any plains spadefoot individuals at survey sites. As this species does not breed every year, it is possible that no breeding occurred in 2010. Incidental observations by WRCS during the course of their 2009 field studies have identified the presence of the plains spadefoot in the vicinity of Dauphin Lake (Map Series 2400, Appendix Table A4-3). No incidental observation data was received on this species from WRCS during the course of their 2010 field surveys.

Northern leopard frogs were detected at 23 of 170 (i.e., 13.5%) sites surveyed, most of which were in the Boreal Plain Ecozone (Appendix Table A2-3). In the Prairie Ecozone, northern leopard frogs were detected at only five sites, while no northern leopard frogs were detected in the Boreal Shield Ecozone (Appendix Table A2-3). Northern leopard frog occurrence was associated with shrubbed wetland (WETLAND_SHRUB) and agricultural land (AG) in the Prairie Ecozone, and grassland (GRASS) in the Boreal Plain Ecozone (Appendix Table A2-7). In total, the Bipole III Local Study Area contains 1572.53 km^2 of suitable northern leopard frog habitat, 19.61 km^2 of which is found within the HVdc transmission line RoW (Table 11). The RoW within any ecodistrict contained between 0% and 4.99 % of the suitable northern leopard frog habitat available within the Local Study Area.

Wood frogs were detected at 122 of 170 (i.e., 71.8%) sites surveyed, most of which were in the Boreal Plain and Boreal Shield Ecozones (Appendix Table A2-3). Wood frog was associated with mixed (MIXED) and broadleaf (BROAD) forest in the Boreal Shield Ecozone ($p<0.1$, Appendix Table A2-5). Herb wetland (WETLAND_HERB), agricultural lands, broadleaf forest, and developed areas were associated with wood frog occurrence in the Prairie Ecozone ($p<0.1$). No predictor variables were related to wood frog occurrence in the Boreal Plain Ecozone (Appendix Table A2-5).

ANOVA analyses indicated that habitat variables differed between ecozone and between species. In the Boreal Shield Ecozone, agricultural, grassland, or developed land cover was not found within 200 m of the survey sites (Appendix Table A2-6). In the Prairie Ecozone, treed wetland, conifer (CONIFER), or mixed forest was not found at survey sites (Appendix Table A2-6). Results from both the ANOVA and Chi-square analyses supported fitting a predictive model for each ecozone.

5.3.2.2.1 *Habitat Variable Assessment and Predictive Models*

Results from the habitat variable assessment using logistic regression and AIC were similar to those using Chi-square analysis (Appendix Tables A2-4, A2-5, and A2-7).

For both AIC analysis and stepwise logistic regression, northern leopard frog occurrence was best predicted by the presence of grassland within the Boreal Plain Ecozone, and the presence of shrub wetland and agricultural land within the Prairie Ecozone (Appendix Tables A2-4 and A2-7).

Both AIC analysis and stepwise logistic regression indicated that the absence of broadleaf forest was the “best” model for predicting wood frog occurrence in the Boreal Shield Ecozone (Appendix Tables A2-4 and A2-7, respectively). AIC analysis additionally found the presence of herb wetland and water bodies (i.e., lakes, rivers and streams; WATER) to be relatively good predictors. In the Boreal Plain Ecozone, the stepwise logistic regression selected model included conifer and mixed forest, developed area, and agricultural land, all of which were negatively associated with wood frog occurrence. None of these variables were found to be related to wood frog occurrence in the Chi-square analysis (Appendix Table A2-5), and support for only developed area (-) and broadleaf forest (-) was found in the individual predictor analysis using AIC (Appendix Table A2-4). The fact that Akaike weights were quite low for all models in this group suggests that no single variable in this ecozone is an exceedingly excellent predictor of wood frog occurrence. Stepwise logistic regression results suggest that relationships between variables may be at least partially responsible for the inclusion of conifer forest and agricultural lands in this model. For the Prairie Ecozone, wood frog occurrence was best explained by the presence of herb wetland using AIC analysis. Both herb wetland and developed areas were included in the Prairie Ecozone model using stepwise regression. From the individual predictor analyses, herb wetland was found to be a potentially good predictor of wood frog occurrence within the Prairie Ecozone. Overall stepwise regression model fit for the wood frog, as assessed with the unweighted sum-of-squares goodness of fit test (Hosmer et al. 1997), was adequate for each ecozone model, while the overall predictive ability of each model was very good (Appendix Table A2-7).

5.3.2.2.2 *Defining Anuran Habitat within the Bipole III Local Study Area*

The ability to adequately predict occurrence was common to northern leopard frog models in both the Boreal Plain and Prairie Ecozones. For this reason, and because all included predictor variables were positively associated with frog occurrence, grassland was chosen as important habitat within the Boreal Plain Ecozone, and shrub wetland and agricultural land as important in the Prairie Ecozone. The frequency of occurrence was very low for the northern leopard frog in the Prairie Ecozone (frequency of occurrence = 9%). In this case, the selected model (WETLAND_SHRUB+AG) did an adequate job of predicting the classification of sites where northern leopard frogs were detected and where they were not detected. The amount and proportion of northern leopard frog habitat within the BPIII Local Study Area and HVdc transmission line RoW by ecodistrict can be found in Table 11.

In total, there is 1572.53 km^2 of suitable northern leopard frog habitat present within the Bipole III Local Study Area. Of this, less than 1 km^2 is present within the Boreal Plain HVdc transmission line RoW and the majority (i.e., 16.29 km^2) is present within the Prairie Ecozone transmission line RoW (Table 11); the Prairie Ecozone contains 75.60% of all suitable habitat present within the Local Study Area, and 83.07% of all available suitable habitat within the transmission line RoW. Additional Study Area components that include northern leopard frog suitable habitat include both SES1c and alternate SES3 south electrode sites, at 2.20 km^2 and 0.24 km^2, respectively (Table 11).

The high frequency of occurrence of wood frogs in the Boreal Shield Ecozone (92% probability of occurrence at sites surveyed (Appendix Table A2-3) suggests the original criteria established for site selection (see Section 3.2.2) may be a good determinant of wood frog occurrence in the Boreal Shield. One important observation from the Boreal Shield Ecozone, however, that may explain the extremely high prevalence of wood frogs is the absence of roads and agricultural development within the 200 m buffers of call survey sites in this ecozone. Given that: (a) proportion developed area (includes roads) was included as a predictor of wood frog occurrence in the Boreal Plain and Prairie Ecozones, and proportion agriculture in the Prairie Ecozone; and (b) previous authors have found road development to negatively affect wood frogs (i.e., Findlay et al. 2001); this suggests roads (and potentially agricultural development) may be important predictors of wood frog presence/absence, and potentially in this case important to determining where this species might not occur. For the Prairie Ecozone, every predictor included in the wood frog predictive models was negatively associated with occurrence, with the exception of herb wetland. A strong weight of evidence (w_i = 0.9984, Appendix Table A2-4) suggests wood frogs may utilize herb wetland in this ecozone. The probability of finding a wood frog in this ecozone, however, was quite low, with the maximum probability being calculated at 0.57 in the Alonsa Ecodistrict (Appendix Table A2-8). This indicates that the model does not predict presence or absence particularly well, which is often the case when frequency of occurrence nears 50% (in this case wood frog frequency of occurrence = 53%) (Olden et al. 2002). In consideration of the fact that wood frogs were so prevalent at all wetland survey sites, the presence of wetlands along the HVdc transmission line RoW may act as a good indicator of wood frog presence (Table 5, Map Series 2300). Wetland habitat is found throughout all five ecozones intercepted by the Local Study Area. There is 1698.16 km^2 of wetlands present within the Local Study Area, 20.69 km^2 of which is found within the HVdc transmission line RoW. Wetlands are also present within the collector line footprints, the construction camp footprint, the northern Converter Station footprint, at both north electrode sites, and alternate south electrode site SES3, as well as at borrow areas (Table 5, Table 10).

5.3.2.3 Reptiles

As with the Ottoe and Uncas skippers, the prairie skink habitat model is shaped by the availability of sandy soil prairies within the Bipole III Local Study Area (Table 8). As such, the generated model was the same as the skipper models. The Bipole III Local

Study Area contains 4.40 km^2 of modeled suitable skink habitat, of which 0.09 km^2 (i.e., 2.11%) is contained within the HVdc transmission line RoW. Suitable skink habitat is restricted to the Local Study Areas' Prairie (84.26%) and the Boreal Plain (15.74%) Ecozones (Table 8). Prairie skink distribution does not extend into the Boreal Plain Ecozone. Suitable habitat within the RoWs' Prairie Ecozone is restricted to the Lake Manitoba Plain Ecoregion; the RoW within the Alonsa Ecodistrict contains 0.02 km^2 (i.e., 20.54%) and the MacGregor Ecodistrict contains the remaining 0.07 km^2 (i.e., 79.46%) of available suitable habitat. The RoW within the Alonsa Ecodistrict contains 2.22% of available habitat present within the ecodistricts' Local Study Area. Similarly, the RoW within the MacGregor Ecodistrict contains 2.75% of that available within the ecodistricts' Local Study Area (Table 8).

Skink coverboard surveys conducted at selected suitable habitat sites within the St. Claude/Assiniboine River area of the Bipole III Transmission Local Study Area did not find any prairie skinks (Table 1). However, a possible skink track was observed at one of the sites (NE-09-009-08W1, Track 08, Appendix Table A4-4).

The Bipole III Local Study Area contains 56.86 km^2 of suitable garter snake hibernacula habitat, of which 1.24 km^2, or 2.18%, is located within the HVdc transmission line RoW (Table 12). Suitable hibernation habitat is found in the Local Study Area at all three major ecozones, with the greatest concentration (88.26%) occurring within the Boreal Plain Ecozone, in the Mid-Boreal Lowland and Interlake Plain Ecoregions. With the exception of the Summerberry and Overflowing River Ecodistricts, the proportion of suitable habitat within the transmission line RoW ranges per ecodistrict from 0% to 2.99% of that found within the Local Study Area at a given ecodistrict; the RoW within the Summerberry Ecodistrict contains 8.72% and the Overflowing River Ecodistrict contains 9.23% of the suitable habitat available within the Local Study Area (Table 12).

Field validation of models at selected survey sites found possible hibernacula habitat to be present (Table 14). Survey results can be found in Appendix Table A4-5. Incidental observations and historical data for garter snake hibernacula and individuals are presented in Map Series 2400 and Appendix Table A4-3, obtained from CDC as provided by Manitoba Hydro as part of a data sharing agreement, and from WRCS during the course of their field studies. In the case of historical data, present use of hibernacula is unknown.

6.0 Environmental Effects Assessment

6.1 Environmental Effects Identification

This section outlines potential impacts on TIAR species resulting from specific Project activities during the construction, operation, and decommissioning of the Bipole III Transmission Project.

The significance approach framework is guided by the Reference Guide for the Canadian Environmental Assessment Act (CEAA, Federal Environmental

Assessment Review Office 1994) and includes the identification of adverse environmental effects, followed by the determination of the significance and likelihood of the residual adverse effects.

Project-related activities that may affect TIAR species include:

- Clearing and maintenance of habitat along the HVdc transmission line, Collector Line and Construction Power Line RoWs;
- Installation of permanent transmission line towers;
- Clearing of habitat at electrode sites;
- Construction of a northern converter station;
- Development and operation of the construction camp;
- Increased vehicular traffic during the construction and operation phases of the Project, along the HVdc transmission line RoW and seasonal access trails; and
- Accumulation of waste materials on-site during construction and decommissioning of the Project.

Effects of all project-related activities can generally be divided into two broad categories:

1) Alteration of habitat resulting from transmission line RoW, collector lines, construction power lines, and electrode site clearing, installation of permanent towers and construction of a converter station; and

2) Effects of construction vehicles, increased use of seasonal access trails and transmission line RoW, and other traffic and machinery-related effects.

All environmental effects are discussed below in their respective TIAR species sections, under these two broad effect categories. Summaries of environmental assessment effects of Project-related activities including construction, operation, and decommissioning as related to TIAR VEC species are presented in Table 15.

Habitat alteration is perhaps the single predominant project-related activity affecting TIAR species. Such alteration will occur throughout most construction phases of the Project, including clearing of habitat along the transmission and collector line RoWs, at electrode sites, at the construction camp, and at the converter station. Additional habitat alteration will occur during the installation of permanent towers along the HVdc transmission line RoW, and during the operation phase of the Project during vegetation management along the RoWs.

The increased use of both seasonal access trails and the RoWs, and vehicle-related effects incurred during the Bipole III Transmission Project can have multiple primary and secondary effects on TIAR species. Vehicular traffic will increase during the construction and decommissioning phases of the project, and intermittent traffic will be ongoing throughout the operation phase of the Project. Use of both seasonal access trails and the RoWs will increase traffic-use effects in areas where access was previously limited. Lastly, accumulation of waste materials resulting from machinery and construction may occur during the construction and decommissioning phases of the Project.

Effects at north and south ground electrode sites include alteration of habitat, vehicle-related effects, and leaching of imbedded coke. A lack of information exists relating the effects of stray electrical currents from ground electrodes to aquatic amphibians. Brouard et al. (1996) examined effects of stray voltage on hatchery raised rainbow trout and highlighted the potential for impacts to embryonic development, growth rate, and survival. Potential effects from stray electrical currents can also be gleaned from literature evaluating the impacts of electrical currents within a waterbody to fish, notably through electroshocking. Similar to those reported by Brouard et al. (1996), effects include spinal injuries, stunted growth and decreased survival (Ainslie et al. 1998, Dalbey et al. 1996). Laboratory exposures of animals to electrical fields have found decreases in melatonin level (Anderson et al. 1988 *in* Lee et al. 1989) and inconsistent effects on reproduction in mice (Batelle Pacific Northwest Studies, *reported in* Lee et al. 1989). In general, modeling analysis of ground potential rise from Bipole III ground electrodes along nearby water courses concluded that electrical fields would not reach levels that will affect aquatic biota (Exponent 2011).Consequently, effects resulting from ground potential rise to aquatic-dwelling amphibians at the ground electrode sites are not expected to occur, and are not discussed further in this section.

Petroleum coke, a solid, carbonaceous material placed around the ground electrode rod to increase its conductive surface, has the potential to leach various hazardous substances, such as metals and polycyclic aromatic hydrocarbons (PAHs). Information on general coke leachate was gathered from research articles and other documents investigating the use of coke in oil sand wetland remediation. It should be noted that these studies looked at the effects of an entire layer of coke under a wetland, as opposed to the relatively discrete use of coke in ground electrodes. These studies found that coke leachate can potentially contain levels of cobalt, copper, manganese, vanadium, nickel, cadmium, zinc, and molybdenum exceeding Canadian Water Quality guidelines for the protection of aquatic life (Squires 2005). Coke leachate was also found to decrease survival and reproduction of an invertebrate (*Ceriodaphnia dubia*) within the lab (Puttaswamy and Liber 2007). However, within *in-situ* experiments, metal concentrations were often not found to be significantly elevated, likely due to the metals being taken up by organic and inorganic constituents (peat, naphthenic acids and other dissolved organic carbon species) (Squires 2005, Baker et al. 2007, Baker et al. 2008), and minute to no levels of PAHs were found in coke leachate (Squires 2005). Coke leachate from ground electrodes may enter surface waters through introduction to groundwater or subsurface water (in saturated soil conditions) and subsequent transfer to surface waters. Coke may also directly enter surface waters from accidental spills during ground electrode construction. Direct entry of the actual coke may cause detrimental effects through physical effects of coke particulate matter on respiratory membranes (US EPA 2008), or decreased growth and survival of benthic organisms due to coke's unsuitability as a biological substrate (Alberta Environment 2008, Squires 2005), but overall, coke is considered to have a low potential to cause adverse effects on the aquatic environment (US EPA 2008). The potential of coke leachate to enter surface water depends on groundwater and surface water movements at the ground electrode site. Field studies conducted during Bipole III aquatic investigations (*Bipole III Aquatic Environment Technical Report*) found surface water to be the most likely source of water in the tributary of the Nelson River within the northern ground electrode site. Although perched groundwater tables and permafrost in the area are not well mapped out, resulting in the possibility that groundwater enters this tributary (N. Sidenko, Stantec, pers. comm.), it is unlikely that coke leachate enters this tributary along with groundwater. The southern ground electrode site (SES1c) exhibits minimal upward groundwater flow, and groundwater likely contributes negligible amounts to surficial drainage (N. Sidenko, Stantec, pers. comm.). Therefore, although it is possible that coke leachate could enter the nearby roadside ditches along with groundwater, it is not likely. The soil within both the northern and southern electrode sites are described as well-drained, and consequently coke leachate travelling from subsurface water under saturated soil conditions to surface water is also unlikely. In general, based on the oil sands wetland remediation study, the EPA (US EPA 2008), and the fact that minimal subsurface water movement is expected at the electrode sites, no acute effects of coke leachate are expected on aquatic organisms, and consequently aquatic-dwelling TIAR species, and coke leachate is not discussed further in this section.

6.1.1.1 Terrestrial Invertebrates

6.1.1.1.1 Habitat Alteration Effects

Some of the strongest effects of habitat alteration and fragmentation on ecological processes likely occur within the invertebrate community (Meffe and Carroll 1997). Habitat alteration is, for example, among the key factors frequently cited when describing the declines observed among many Lepidopteran species (Thomas 1984). Terrestrial invertebrates also play an important role in the functioning of ecological systems, including as pollinators, seed dispersers, herbivores and predators. As such, effects of habitat alteration and fragmentation on terrestrial invertebrates filter through the trophic web, causing subsequent disturbances in other taxa (Didham et al. 1996).

The isolation of populations is a common effect resulting from habitat fragmentation; flightless species and poor dispersers such as carabid beetles (Niemalä et al. 1998, de Vries and den Boer 1990) and spiders (Hopkins and Webb 1984) are especially vulnerable. The Ottoe skipper likely existed as a single population throughout much of the historically continuous mixed-grass prairies in the north- and south-central plains of North America. Presently, only one isolated population may still exist in Canada, with sites no closer than 150 km from population centres in the United States (COSEWIC 2005). Such small isolated populations are at a greater risk than larger populations in contiguous habitat of becoming extirpated by unusual weather events or other accidental events (Hanski et al. 1996), as well as by further habitat alterations.

In general, large invertebrate populations generally have high reproductive capabilities. As such, generalist species are not as likely to be affected by project-related habitat alteration effects as specialist species. Populations of species that have more specialized distributions associated with isolated habitat types, such as native prairie and sandy-soil prairie habitat present within the Prairie Ecozone, are at greater risk of population declines related to project-related habitat alteration, as isolated populations are unlikely to be re-founded by natural dispersal following population declines (COSEWIC 2003). Specialist species such as the Dakota skipper, for example, are generally very sensitive to the conversion of prairie remnants to cropland, spring and summer haying, heavy grazing, controlled burns, and drainage of natural sites (COSEWIC 2003).

For specialist species, habitat alterations may result in the loss of key adult and larval food resources. Species such as the Ottoe and Dakota skipper require nectar as adults and host plants as larvae. The Ottoe skipper, for example, prefers bunch grasses such as little bluestem (*Andropogon scoparius*) and side oats grama (*Bouteloua curtipenda*) during its larval stage (Dana 1991). The larval Dakota skipper prefers bunch grasses such as little bluestem and prairie dropseed (*Sporobolus heterolepis*). Adult Dakota skipper nectar sources include purple coneflower (*Echinacea angustifolia*), black-eyed susan (*Rudbeckia. serotina*), wood lily (*Lilium philadelphicum*) and harebell (*Campanula rotundifolia*) (COSEWIC 2003). Indicator species for the presence of the Dakota skipper include the wood lily, smooth camas, harebell, and black-eyed susan. All of the above species are characteristic of undisturbed native prairie habitats. Since the 1850s, over 99% of native prairie habitat has been loss in Manitoba due to habitat alterations, including conversion to agricultural row crops and hay fields, or degradation by overgrazing; only 3 km^2 of Manitoba tall-grass prairie remains (Samson and Knopf 1994). Maintenance of desired low plant-cover resistant to tree invasion along the transmission line RoW may aid in preserving desired key adult and larval food resources. Studies show clearing and maintenance of a RoW can occur in several ways with minimal effect on some Lepidopteran populations; in a 2-year study of butterfly populations conducted on the State Game Lands 33 RoW, researchers found no discernible adverse effects of herbicide spray maintenance in comparison with mechanical methods (handcutting) on either number of species, or individuals of the RoW butterfly population (Bramble et al. 1997, Bramble et al. 1999). In addition to the RoW, habitat alteration will also occur at permanent tower locations, at an estimated 7.8 m^2 footprint. During the installation of permanent towers, excavation into soil will result in habitat loss at tower footprints where overlapping suitable modeled habitat occurs.

The construction of roads results in fragmentation of habitat and subsequent development of barriers and edge effects for terrestrial invertebrates (Haskell 2000, Strong et al. 2002). It has been shown that dispersal and other movement patterns of beetles and spiders are disrupted by linear barriers such as roads (Mader et al. 1990). Due to small home ranges, relatively low mobility, and use of microhabitats, the alteration of habitats and subsequent edge effects and changes in microclimate affects invertebrate species at a more local scale than other taxa (Klein 1989, Didham et al. 1996). Edge effects can inhibit movement and dispersal patterns and reduce population sizes (Holmquist 1998, Strong et al. 2002); loss or changes in understory plant composition and abundance can also occur (Samways 1994, Danks and Foottit 1989). Alterations in microhabitat include surface litter, abundance of dead wood, soil composition, and the availability of water (Danks and Foottit 1989). Changes in microclimate can include temperature, humidity, level of evaporation, and increases in salinity (Danks and Foottit 1989).

Although the effects of road construction are well documented in the literature, habitat alteration effects as a result of RoW construction will have lesser effects than that of roads, as the transmission line RoW is structurally more comparable to a trail than to an all-weather road.

6.1.1.1.2 Traffic and Machinery-Related Effects

Traffic and machinery-related effects can have both primary and secondary effects, ranging from direct mortality to sensory disturbances. Vehicular traffic and machinery may crush and cause mortality of a small number of individuals. Secondary effects resulting in sensory disturbance effects are also associated with vehicular traffic and machinery use. Such secondary effects include exhaust emissions, noise, dust, headlight illumination, as well as spills and leaks.

As stated in the previous section, effects as a result of RoW construction will have lesser effects than that of roads, as the transmission line RoW is structurally more comparable to a trail than to a paved road. Traffic levels on the HVdc transmission line RoW, for example, will be relatively low during construction and decommissioning and negligible during the maintenance phase of the Project.

6.1.1.1.3 Field Study Results

All extant populations of the Dakota skipper within Manitoba are associated with wet-to-mesic tall-grass native prairies (COSEWIC 2003); neither of the two extant population centres present within Manitoba overlap the Bipole III Local Study Area. It is difficult to identify good native prairie habitat within cultivated agricultural lands, pasturelands and annual croplands using spatial databases such as the LCCEB, as this habitat type tends to be uncommon and fragmented; only 3 km^2 of Manitoba tall-grass prairie, for example, still remains in the Province (Samson and Knopf 1994). In total, six Dakota skipper habitat polygons present along the Bipole III HVdc transmission line RoW were investigated within the Prairie Ecozone for verification purposes (Photos 1-9), and most were found to be sub-optimal Dakota skipper habitat. Only two of the polygons examined contained any of the plant species associated with the presence of the Dakota skipper; black-eyed susan was observed at Polygon Track 5 and 13 (Photos 3 and 5, respectively); none of the sites surveyed contained all four plant species associated with the presence of the Dakota skipper. Of the five historical Manitoba populations, only the Winnipeg area record is in proximity to study boundaries (Figure 1). The CDC has no mapped records of Dakota skipper in the Winnipeg area (Jason Greenall, pers. comm.). An examination of our habitat suitability model indicates there is no suitable Dakota skipper habitat present within 35 km of the city centre (Figure 1). Without an exact location identified for the Winnipeg record, it is difficult to determine the origins of this record, and associated changes to habitat over time. As it is often difficult to assign a location to historical records that may have sites described in the most general of terms, it is often difficult to map such locations with any degree of certainty (Jason Greenall pers. comm.). In general, little to no high-grade prairie habitat appears to exist within the Local Study Area (Critical Wildlife Habitat Program 2010). Furthermore, information on possible prairie locations was not available from CDC. Although potential environmental effects may occur during construction activities for the Dakota skipper where suitable habitat occurs, optimal undisturbed native prairie habitat was not identified within the Bipole III Local Study Area. As such, no ESSs were identified at modeled suitable Dakota skipper habitat within the Project Study Area and environmental effects of the Project on the Dakota skipper were considered to be negligible.

The Ottoe and Uncas skippers are restricted to fragmented populations or population centres within sandy-soil habitats of the Prairie Ecozone. Uncas skipper historical records in the vicinity of Winnipeg are likely from Birds Hill Park or the St. Charles Rifle Range (R. Westwood pers. comm.), both of which fall outside of the HVdc transmission line RoW. Although no known population centres of either species overlap the Bipole III Local Study Area, models indicate 3.71 km^2 of suitable sandy-soil prairie remnants do occur within the Local Study Area's Prairie Ecozone. This isolated and fragmented sandy-soil habitat is extremely limiting and could be important for population movements, should this species occur in the area. A total of 0.09 km^2 of this habitat is present within the HVdc transmission line RoW, concentrated in the St. Claude/Assiniboine River area (Stockton, Alonsa, and MacGregor ecodistricts). Field studies found all sites investigated under the model to be adequate suitable habitat on a landscape scale. Where this limiting habitat occurs along the transmission line RoW, habitat alteration (i.e., change in plant communities) and vehicle-related activities resulting from the Project, as discussed above, can result in the loss of suitable resources and habitat for the Ottoe and Uncas skippers, should they occur.

6.1.1.2 Amphibians

6.1.1.2.1 Habitat Alteration Effects

Amphibians rely on high quality water and land environments and can act as bio-indicators of environment condition, habitat change, and ecosystem imbalance (Barinaga 1990, Blaustein & Wake 1990, Wake 1991). Varying breeding, summering, and overwintering habitat requirements make amphibians particularly susceptible to anthropogenic habitat change; habitat loss, habitat fragmentation, environmental contamination and increased incidence and severity of drought are all threats (COSEWIC 2009a).

Alterations in forest gap dynamics and overall habitat composition may result during forestry activities or RoW clearing during transmission line construction. Such habitat alterations have the ability to change the distribution, movement patterns, and overall abundance of amphibian species. Forest fragmentation has been known to impede amphibian juvenile dispersal rates between local populations (Rothermal and Semlitsch 2002) and has been identified as one of the many possible causes of amphibian declines. The loss of wetlands is also important to amphibians dependent on such habitats for breeding (Seburn and Seburn 2000). Loss of wetlands increases the average distance between breeding ponds, and together with the development of adjacent land or the creation of roads separating wetlands, this can result in isolated populations (Seburn and Seburn 2000). Percent wetland within Manitoba has changed through the years. Of the approximately 2,000 km^2 of prairie wetlands present in Manitoba in the 1950s, 20% has been lost by 1990 (Seburn and Seburn 1998).

Undisturbed buffer zones of riparian vegetation along wetlands and streams are important in providing cover and breeding habitat for anurans (Seburn and Seburn 2000). Such buffers are often zones of variable environmental conditions and high biodiversity. These buffers (as little as 10 m wide) are important in both undisturbed forests as well as in cleared RoWs (Bélisle 2002). The loss or alteration of such buffer habitat would have a strong negative effect on stream and pond-breeding anurans, reducing connectivity to breeding pools, woody debris, and cover, and overall amphibian persistence (Semlitsch 2000).

The loss of forest cover can result in habitat fragmentation, reducing the amount of amphibian movements between suitable habitats. Because of their small body size, permeable skin, and resultant need for adequate moisture, newly metamorphosed juvenile amphibians dispersing through dry, open canopy areas are at risk of dehydration and desiccation (Graeter et al. 2008, McLeod and Gates 1998, Semlitsch 1981). For amphibians that breed in temporary pools, juvenile emigration is an important life-history movement linking the aquatic habitat of larvae to the surrounding upland habitats occupied by mature adults (deMaynadier and Hunter 1999).

Vegetation in both the understory and overstory vegetative layers contributes greatly to forest canopy closure. Such canopy closure is an important structural element of anuran forest habitat (deMaynadier and Hunter 1999) such as in adult wood frogs (Kamstra et al. 1995). The opening of a canopy (such as that which occurs through the removal of large trees during RoW clearing) results in changes in microclimate, including a greater fluctuation in air and soil temperature, relative humidity, light intensity and wind speed (Blymyer and McGinnes 1977, Bury 1983, Enge and Marion 1986, Welsh and Lind 1988). Additionally, such changes also reduce or remove amphibian microhabitat produced by leaf litter and coarse woody debris (Bury 1983, Corn and Bury 1990). Retaining at least $15m^2$/ha of live tree basal area during forest harvesting appears to be important in maintaining salamander relative abundance and species (Ross et al. 2000). The relative abundance of anurans and some salamander species also increases with the creation and retention of woody debris within harvested stands. (Ross et al. 2000). Such woody debris is used as general refugia, as well as for overwintering by forest species such as the boreal chorus frog and wood frog. It should be noted that although the retention of some logs, snags, and other coarse woody debris and slash piles on the forest floor following the removal of forest cover may be beneficial to amphibians, the importance of dead woody debris and slash pile removal is highlighted in forestry practices. Such removal minimizes the attraction of sawyer beetles, the potential spread of Dutch Elm disease, and the risk of wildfires (Bipole III Transmission Project Forestry Technical Report).

Recently metamorphosed juvenile amphibians (American toads, small-mouthed salamanders, and wood frogs) have been found to orient towards areas of greater forest habitat surrounding emergence ponds, indicating a preference for greater canopy cover (Rothermal and Semlitsch 2002, Walston and Mullin 2007). Juvenile wood frogs have been found to move into closed-canopy habitat immediately upon metamorphosis, with the highest capture rates occurring in microhabitats characterized by dense foliage in both the understory and canopy layers (deMaynadier and Hunter 1999). The abundance of juveniles and adults of wood frogs and spotted salamanders (*Ambystoma maculatum*) declined sharply across a gradient running from relatively mature forest-interior habitat (70-90 years old) to recently clearcut habitat (2-11 years old) (DeMaynadier and Hunter 1999).

The drying of ponds is also accelerated in these open areas, resulting in a potential loss of anuran breeding sites such as wetlands. Loss of small, temporary wetlands (<4.0 ha) has been found to be detrimental to amphibians as it can severely impair completion of larval metamorphosis (Semlitsch 2000). Wetland loss also increases the distance between neighboring wetlands necessary to immigration and emigration within metapopulations (Semlitsch 2000).

Wetlands are also vulnerable to chemical application run-off. Atrazine, the most commonly used herbicide in the U.S. and probably the world, and present in agricultural runoff, has been found to induce hermaphroditism, demasculinization of larynges in exposed males at metamorphosis, and decrease in testosterone levels in mature males (Hayes et al. 2002). Similarly, glyphosate (Roundup) had been found to result in a decline in species richness of tadpoles (Relyea 2005). In general, improper application or accidental spills could harm or cause mortality in amphibians.

Some amphibian species do not seem to be significantly impacted by construction activity such as the clearing of a RoW; salamanders have been shown to use surrounding forest areas and RoWs equally (Yahner et al. 2001a, 2001b); American toad has likewise been found in both the RoW (Yahner 2001b) and in surrounding forested habitat (Yahner 2001a). Bélisle et al. (2002) found spring peepers, wood frogs, and American toads to be present in stream buffers within both the RoW and in the adjacent undisturbed forest habitat. Thibodeau and Nickerson (1986) found no long-term negative effects of power utility RoWs on wooded wetlands, such as those that may be used by wood frogs and other forest-dwelling amphibians.

6.1.1.2.2 Traffic and Machinery-Related Effects

Fragmentation of movement corridors resulting from the construction of roads has been associated with reduced migration between suitable habitats (Eigenbrod et al. 2009, Gibbs 1998, Jaeger et al. 2005). The increased use of seasonal access trails associated with a Transmission Project and the RoW may result in reduced habitat quality for amphibians. As such, changes in distribution and movement patterns may occur.

Traffic, such as that associated with seasonal access trails, construction, and increased use of a developed transmission line RoW, has long been known to have negative effects on anuran populations, with greater traffic volumes resulting in greater negative effects (Ashley and Robinson 1996, Aresco 2005). Noise from vehicles has been shown to change anuran call behaviour (Barrass 1985, Sun and Narins 2005), and to decrease mating (Barrass 1985). Traffic associated with clearing of a transmission line, installation of towers, installation of electrode rings, construction of a converter station, and the utilization of seasonal access trails will be less than that of roads, but may still result in direct mortality of a small number of amphibians (Fahrig et al. 1995). Active anuran species and those with longer dispersal and migration distances, such as the northern leopard frog, have been found to be more vulnerable to road mortality than less active species (Carr and Fahrig 2001). During northern leopard frog migrations, road mortality can be particularly high when roads with traffic intersect such migrations (Palis 1994, Linck 2000). Traffic density within 1.5 km of ponds has been found to have a significant negative effect on northern leopard frog abundance (Carr and Fahrig 2001). Similarly, a significant positive relationship was observed with northern leopard frog abundance and increasing distance from a major highway, with this relationship extending beyond 1000m (Eigenbrod et al. 2009). High-traffic roads have higher anuran mortality rates than low-traffic roads (Hels and Buchwald 2001) and forestry roads with very low traffic have found to have no effect on anuran movements (deMaynadier and Hunter 2000). The construction, operation, and decommissioning of the HVdc transmission line RoW and associated infrastructure will result in traffic levels comparable to trails and forestry roads. As such, road effects on amphibians resulting from Project activities will be minimal.

In addition to direct mortality, traffic and machinery-related activity may play a secondary role; densities of amphibians have been found to be significantly lower in streams impacted by road construction sediment than in unaffected streams (Welsh and Ollivier 1998). Additional secondary effects include alterations in vehicular noise, light pollution, traffic volume, dust, spills and leaks, exhaust fumes and vehicle emissions.

Anurans depend upon a specific range of illumination as visual cues for activities such as foraging (Jaeger and Hailman 1981, Hailman 1984, Buchanan 1993) and possibly mating. Excess illumination or noise at breeding ponds, as that resulting from traffic-related activity, may therefor impact amphibian reproductive success. Studies have shown that pollution from vehicle emissions and road runoff containing toxic chemicals, petroleum, salts and sediments can have an adverse effect on amphibian populations (Mahaney 1994, Lefcort et al. 1998, Welsh & Ollivier 1998). Accidental spillage or leaks of petroleum products such as gasoline, diesel or heating oil which may occur during construction-related activities have the potential to contaminate waterbodies and soils in areas used by amphibians as breeding, summering, or over-wintering habitat.

6.1.1.2.3 *Field Study Results*

Although none were heard during 2010 call surveys, plains spadefoot observations made within the vicinity of suitable modeled habitat as incidental observations by WRCS in 2009 (Map Series 2400) aided in validating the plains spadefoot habitat model. Based on modeled habitat within its distribution range, construction and operation-related environmental effects, as they relate to plains spadefoot, are limited to the HVdc transmission line RoW within sandy-soil areas of the Waterhen, Dauphin, and Alonsa Ecodistricts.

Local information regarding amphibians in the Bipole III Project Study Area (Bipole III EIS Technical Report, Aboriginal Traditional Knowledge) found that few respondents indicated prior knowledge of amphibian locations. Community members in Camperville noted an increase in frogs (Billy Flett. ATK KPI, 2009; ATK Group Workshop, 2009), while in other communities, declines were noted (Thicket Portage. ATK Group Interview, 2010; Waywayseecappo First Nation. ATK Group Workshop, 2009). With regards to incidental observations, all amphibians observed were frogs; northern spring peepers and unidentified species. A historical population of northern spring peepers was noted on the south shore of Mawdesly Lake in the Cormorant area (Cormorant, ATK NTS Map 63F15, Bipole III Transmission Project). Unidentified frog observations were noted at the south end of the town of Pelican Rapids (Pelican Rapids, ATK NTS Map 63C10, Bipole III Transmission Project). Little more was mentioned other than that a large frog population is known to occur in this area. Additional frog observations were made on the southeast shore of Red Deer Lake (Barrows, ATK NTS Map 63C14, Bipole III Transmission Project). Other responses which loosely related to frogs regarded a couple of large ponds, which were deemed “too marshy for good fishing” (Unnamed Lake, Cormorant, ATK NTS Map 63F15, Bipole III Transmission Project), or “swampy marshy shore” (White Sand Lake, Camperville, ATK NTS Map 63C02, Bipole III Transmission Project). These ponds may be potentially good frog habitat. Additionally, salamanders have been noted by Dakota Tipi community members near Lavenham north of the Assiniboine River, and from Portage la Prairie south to Assiniboine River (Dakota Tipi, ATK NTS Maps 62G15 and 62G16, Bipole III Transmission Project. It should be noted that the differentiation between particular skink, lizard and salamander observations was not made by community members.

Since 2004, only one amphibian/reptile dealer license has been issued annually by Manitoba Conservation, for the collection of northern leopard frogs (Ledieu, pers. comm.). Manitoba Conservation also sells several Family and Individual Licenses to Catch and Sell Amphibians; these harvests are sold to the dealer (Ledieu, pers. comm.). Although harvest locations are unknown, harvesters from 2007-2009 resided in the communities of St. Laurent, Crane River, Vogar and Ebb and Flow. It is probable most of the harvesting would have occurred in and around these communities. Of these communities, Ebb and Flow and Crane River are located near the Bipole III Local Study Area, west of Lake Manitoba shores.

Wood frog and northern leopard frog (i.e., wetland) habitat was found to be available throughout the HVdc transmission line RoW, as well as at the preferred and candidate north electrode sites, the candidate south electrode site, collector line footprints, construction camp footprint, and the converter station site (Map Series 2300). As such, Project-related construction and operation effects include changes in breeding habitat throughout the Project Study Area, as well as the vehicle-related effects as discussed with the plains spadefoot above.

6.1.1.3 Reptiles

6.1.1.3.1 Habitat Alteration Effects

Changes in forest gap dynamics and overall habitat type composition that may occur during activities such as forestry and clearing of a transmission line RoW, may cause changes in the distribution, movement and overall abundance of some reptile species.

Effects of forest cover loss, as through logging practices, has been found to produce mixed responses in reptile species, dependent on species diversity and habitat preferences (McLeod and Gates 1998). The alteration or loss of limiting habitat, such as sandy-soil prairie habitat, can result in population declines of associated reptile species, such as the prairie skink (COSEWIC 2004). In addition to the transmission line RoW, habitat alteration will also occur at permanent tower locations, at an estimated 7.8 m^2 footprint. During the installation of permanent towers, excavation into soil will result in habitat loss at tower footprints where overlapping suitable modeled habitat occurs. The decommissioning phase of a project can also lead to detrimental habitat alteration effects for skinks; re-growth of vegetation along a cleared RoW may increase encroachment of invasive plant species such as leafy spurge, a plant which is known for invading ridges of suitable skink habitat and displacing individuals (COSEWIC 2004). There is at present no critical habitat identified federally for the prairie skink, but a GIS protocol is currently being developed to identify proposed critical habitat and recovery habitat (Rutherford 2010) and a national recovery strategy is currently being proposed (Prairie Skink Recovery Team 2006).

Snake species abundances and richness has been found to increase significantly with increasing removal of tree basal area, possibly offering greater opportunities for thermoregulation in these open areas than in closed canopy stands (Ross et al. 2000). The creation of a cleared transmission line RoW may be beneficial for garter snake populations using these areas for migration and movement between feeding and hibernation sites. Yahner (2001a, 2001b) has found that snakes, including eastern smooth green snake, northern redbelly snake, and garter snakes, among others, used the transmission line RoW exclusively, compared to surrounding forest habitat. Installation of permanent towers, however, may have detrimental effects on garter snake hibernacula habitat, particularly where blasting of sloping bedrock is required.

Although there is limited data examining potential effects of herbicides on reptiles, use of aquatic vegetation herbicides, some of which contain ingredients such as 2,4-D, glyphosate, and surfactants also used in tree control have been found not to produce acute adverse effects in garter snakes (Hosea et al. 2004).

It is possible that the increased use of these more open-area RoWs as movement corridors may result in a direct increased predation effect. Additionally, increased recreational use of the transmission line RoW by ATVs may result in an increase in mortalities of migrating individuals. However, continued use of these RoWs suggests these effects do not appear to play a significant role in garter snake avoidance of such areas.

6.1.1.3.2 Traffic and Machinery-Related Effects

Studies have shown that traffic can have a negative effect on reptile populations (Aresco 2005). Traffic and mechanical activities associated with clearing of a transmission line, installation of towers, installation of electrode rings, construction of a converter station, and the utilization of seasonal access trails may result in direct mortality or injury of individuals, as well as changes in distribution and movement patterns on a long-term basis.

Turtle populations have been shown to develop a skewed sex ratio as a result of road mortality, most likely caused by the disproportionate mortality of females during nesting migrations (Steen & Gibbs 2004). In studies conducted by Sine et al. (2004b), garter snakes avoided gravel roads altogether, typically changing directions when encountering roads. When garter snakes did cross roads, they took the shortest possible route. Additionally, mate-searching males were less likely to follow pheromone trails left by females if those trails crossed a road when surrounded by grasslands (Shine et al. 2004b). In general, the construction, operation, and decommissioning of the HVdc transmission line RoW and associated infrastructure will result in traffic levels comparable to trails and forestry roads. As such, road effects on amphibians resulting from Project activities will be minimal.

Sensory disturbances associated with vehicular traffic and machinery use during all phases of the Project include vehicular noise, exhaust fumes, vehicular emissions, dust, spills, leaks, and vibrations. Some of these effects, such as vehicular pollution and vibrations may also occur during the installation of permanent RoW towers, such as that occurring during the drilling of tower anchors or the blasting prior to tower installation where bedrock/limestone is sloping. Species within the snake family Colubridae, as well as Crotalidae and Boidae, have an auditory system that is very sensitive to head vibration (Hartline 1971). Information about the effects of such vibrations is lacking, but potential consequences may include disorientation of prey and predator locations by summering individuals, and incurred stress or disruption of hibernation during the overwintering phase. Similarly, prairie skinks, which can hibernate as deep as 66 cm below the surface (Nelson 1863) spend the majority of the year underground making them vulnerable to ground disturbances in suitable habitat (Environment Canada 2009). The abandonment of several prairie skink nests has been observed following disturbances at the nest site (Nelson 1963).

During the overwintering phase, installation of towers along the HVdc transmission line RoW where limestone bedrock exists may negatively affect garter snake populations through mortality and destruction of hibernacula sites in areas where suitable overwintering habitat has been identified by the model. These hibernacula are vulnerable to cave-ins, especially in spring and fall, resulting from traffic and activity of heavy equipment.

6.1.1.3.3 Field Study Results

Environmental effects are described in Section 6.1.1.3 above. Such effects, as related to this Project and garter snake hibernacula, are limited to the HVdc transmission line RoW, as suitable habitat was not identified near electrode sites or converter stations.

Garter snake hibernacula site investigations within areas immediately north of Dauphin found adequate limestone bedrock habitat to be present within sites identified by our habitat models. Although no garter snakes were observed (likely due to the early migration back to hibernation sites), potential hibernacula sites existed within these habitat polygons (Table 14). Potential habitat was verified by a local landowner, who identified specific areas of high garter snake concentrations in the area during spring and fall migration season.

Incidental observations were examined in their relation to the HVdc transmission line RoW; none were found within 200 m of the RoW.

The identification of locations of garter snake individuals and hibernacula is extremely valuable as locating them is not always a simple exercise. Local information regarding reptiles in the Bipole III Study Area noted garter snakes and hibernacula in the Barrows, Camperville, Cormorant, Dawson Bay, Herb Lake, and Pelican Rapids areas. In the Barrows and Camperville communities, general increases in snake observations were noted (Barrows. ATK Group Workshop 2010; Billy Flett. ATK KPI. Camperville 2009; William Beauchamp. ATK KPI. Camperville 2009). Some respondents commented on the presence of garter snakes and potential hibernacula along a long stretch of Hwy 10 between Red Deer Lake and Dawson Bay (Barrows, Pelican Rapids, and Dawson Bay, ATK NTS Map 63C14, Bipole III Transmission Project). Garter snakes and hibernacula were also observed near this area along the southeast corner/shore of Red Deer Lake near its confluence with the Red Deer River (Barrows Community ATK NTS Map 63C14, Bipole III Transmission Project). Other records of garter snakes/hibernacula included near Camperville on the east side of Highway 20 (Camperville, ATK NTS Map 62N16, Bipole III Transmission Project), three sites just off PR 287 (Cormorant Community, ATK NTS Map 63K02, Bipole III Transmission Project), and one site north of the Wekusko train point near Snow Lake (Herb Lake, ATK NTS Map 63J12, Bipole III Transmission Project). The remaining snake/lake sites included the west shore of Lake Winnipegosis (“The Big Rock”, Barrows, ATK NTS Map 63C15, Bipole III Transmission Project), the north shore of Overflow Bay – Lake Winnipegosis (Dawson Community, ATK NTS Map 63F03, Bipole III Transmission Project), and the south shore of Pelican Lake (Duck Bay Community, ATK NTS Map 63C08, Bipole III Transmission Project). Turtles were noted during ATK interviews by both Dakota Plains and Dakota Tipi community members (Dakota Plains and Dakota Tipi, ATK NTS Map 62G16, Bipole III Transmission Project). Spring melt-water ponds have been noted along the Assiniboine River where many young-of-year are found (Dakota Plains, ATK NTS Map 62G16, Bipole III Transmission Project).

Additionally, turtles have been noted along the Assiniboine River just south-west of Portage la Prairie (Dakota Tipi, ATK NTS Map 62G16, Bipole III Transmission Project).

Prairie skink coverboard investigations in areas where land access permission was granted did not result in any skinks observations within suitable habitat along the transmission line RoW. However, potential prairie skink tracks were observed at the sandy-soil habitat polygon located at NE-09-009-08W1 (Track 08: Map Series 400, Photo 10). Additionally, incidental observations from WRCS included a potential skink track in a sandy-soil habitat polygon approximately 500 m south-west of the transmission line RoW at Track 04 (Map Series 2400, Photo 11). Both of these potential skink tracks are outside of the known distribution range of the prairie skink, and if confirmed, would denote an east-ward range extension of the Manitoba population. Finally, along with salamanders, Aboriginal Traditional Knowledge interviews noted skinks/lizards (Dakota Tipi, ATK NTS Map 62Ga6, Bipole III Transmission Project), near Lavenham north of the Assiniboine River, and from Portage la Prairie south to Assiniboine River. Skinks/lizards were noted in dry, sandy areas, less frequently than in the past in some locations. It should be noted that the differentiation between particular skink, lizard and salamander observations was not made by community members. Regardless, further investigations will be needed where the HVdc transmission line RoW overlaps the area where incidental skink observations have been made.

As with the Ottoe and Uncas skippers, environmental effects of the Project, as related to the prairie skink, are currently limited to the 0.09 km^2 of sandy-soil habitat present within the HVdc transmission line RoW within the St. Claude/Assiniboine River area (two ecodistricts within the Lake Manitoba Plain Ecoregion, Map Series 400). Where this limiting habitat occurs along the RoW, alteration of plant communities and ground disturbance as a result of Project construction and operation can result in the loss of suitable habitat for the prairie skink. Furthermore, vehicle-related effects, such as vehicular noise, light pollution, traffic volume, dust, spills and leaks, exhaust fumes and vehicle emissions, as well as ground vibrations, can further negatively impact potential populations.

6.2 Mitigation Measures

Habitat alteration is perhaps the single-most project-related activity that can affect TIAR species on a long-term basis. Such alteration can occur throughout the construction phase (i.e., clearing of habitat along the RoWs, at electrode sites, converter station, and installation of transmission line towers along the HVdc transmission line RoW), as well as the operation phase (i.e., periodic vegetation management within the RoW) of the Project. All environmental effects and recommended mitigation measures are summarized in Table 15.

Many construction-related activities will be occurring in areas where infrastructure is already in place (i.e., where existing disturbance and habitat fragmentation is high, such as human-impacted, urban or developed areas, or along existing linear features). As such, construction-related activities in such areas are expected to have a minimal effect. The use of existing linear features, for example, is anticipated where seasonal trails are needed for access to the HVdc transmission line RoW. Use of seasonal access trails will therefore not result in habitat alteration effects to the same extent as other construction activity. Where habitat is relatively undisturbed, habitat alteration and fragmentation will have a more substantial effect.

Accumulation of waste material on-site, spills, and leaks during Project construction, operation, and decommissioning is expected to be minimized through the implementation of mitigation efforts such as the removal of building materials off-site or to suitable landfill or recycling facilities, as well as the removal of any hazardous materials or contaminants offsite to suitable receiving facilities. Specific mitigation recommendations include:

- Construction crews will be adequately trained in spill prevention and clean up procedures;
- Harmful substances, such as fuels, chemicals and herbicides will be stored greater than 100 m from all modelled TIAR suitable habitat polygons;
- Emergency spill clean-up kits will be on site at all times;
- Hazardous materials or contaminants will be removed from site as soon as is feasible following a spill or leak, and all waste or hazardous material will be deposited to a suitable receiving facility; and
- Only clean construction materials and equipment will be used.

6.2.1 Terrestrial Invertebrates

In general, the VEC skippers are very sensitive to loss of remnants of native and sandy-soil prairie (COSEWIC 2003). Loss of any of these prairie remnants present within the Bipole III Study Area footprint during the construction and operation phase of the Bipole III Project would further limit the availability of this isolated, fragmented habitat type necessary for the survival of several VEC skipper species.

As prairie habitat consists predominantly of low-growth vegetation, clearing of overhead vegetation is not extensively required at such areas. To this effect, any native and sandy-soil prairie remnants within known modelled skipper habitat will likely remain relatively unaffected along the transmission line RoW during the construction and operation phases of the Project. Where removal of high-growth vegetation is required, it is recommended that methods used minimize ground disturbance.

There are no species-specific mitigation recommendations for the Dakota skipper, as ESSs representing modeled suitable Dakota skipper habitat were not identified within the Bipole III Study Area footprint.

Sandy-soil prairie within Manitoba is largely unsuitable for row-crop agriculture. As such, many existing remnant sandy-soil prairies are being utilized as grazing pastures, such as the ones examined along the Bipole III HVdc transmission line RoW.

Because suitable Ottoe and Uncas skipper sandy-soil habitat is already likely located on such grazed (and therefor disturbed) land, the construction and operation of a transmission line overhead of such areas will likely result in minimal habitat alteration and vehicle/machinery-related effects. As sandy-soil prairie habitat consists predominantly of low-growth vegetation, complete clearing of the RoW is likely not required at these sites. Manitoba forest management guidelines recommend year-round buffers around native grass meadows (Manitoba Conservation 2010). Similarly, a 30 m set-back distance is recommended for plant species at risk, wherever activity is repeated to create a visible and lasting track-trail, as well as at above-ground transmission lines (Henderson 2009). In the context of the Bipole III Project, mitigation recommendations include:

- Where feasible, minimize disturbance and clearing along the RoW where suitable habitat occur;
- A 30 m vegetation buffer will be maintained around suitable sandy-soil prairie habitat wherever intercepted by the HVdc transmission line RoW and related construction activity. Within these 30 m habitat buffers, ground disturbance, vegetation removal, and vehicular traffic will be limited; and
- Where taller cover types require removal within these 30 m buffers, methods that best minimize disturbance to soil are recommended.

For the skipper VECs, key larval and nectar host plants are herbaceous, and will likely not be affected to any great extent by overhead vegetation maintenance of the transmission line RoW during the operation phase of the Project. With respect to tower placements, however, construction activities at tower footprints may result in disturbance of suitable habitat; avoidance of modeled habitat is recommended where feasible. Linear lengths of suitable habitat polygons along the RoW range from 36 m to 163 m; the distance between towers is expected to be approximately 480 m. As such, polygons may be feasibly avoided during tower installations and tower placement outside of buffered suitable habitat will be reviewed by Manitoba Hydro at the final design stage:

- As suitable, buffered sandy-soil habitat spans less than the distance between towers (i.e., less than 480 m), avoidance of disturbance at habitat polygons and associated buffers is recommended during tower installation, where feasible; and
- Tower placement outside of buffered suitable sandy-soil habitat will be reviewed by Manitoba Hydro at the final design stage.

6.2.2 Amphibians

Peak breeding times for anurans range from the beginning of April through to mid-August, depending on the species. At these times, disruption to breeding sites (i.e., wetlands) may impact survival of eggs, hatching, and metamorphosis of tadpoles. In order to minimize impacts on local anurans, mitigation measures must assist in prevention or reversal of any habitat alteration effects that may occur during Project activities. Such mitigation measures include strategic timing of construction, as well as retention of microhabitats and stream and wetland buffers.

Within the Prairie and Boreal Plains Ecozones, the distribution of wetlands can be isolated and fragmented, and avoidance of such wetlands is important in minimizing impacts of Project activities. In general, it is recommended that construction and maintenance at wetland habitats occurs outside of peak anuran breeding periods, wherever feasible. Specific VEC species breeding times include:

- Wood Frog: April 1 through the end of May;
- Northern leopard frog: April 1-May 31; and
- Plains Spadefoot: June 1 - August 15.

In forestry practice, Machine-Free Zones are required adjacent to any wetland riparian areas (Manitoba Conservation 2008). Within these zones, no ground disturbance (i.e., harvesters, skidders, site preparation or scarification) can take place, other that by reaching in with harvesting equipment, at an approximate reach of 7 m. Additionally, a 30 m No-Harvest Zone is required adjacent to lake, stream and river riparian areas (Manitoba Conservation 2008). Although such forest management guidelines are specific to the forest industry, 30 m buffer guidelines can also be applied to any construction and maintenance-related activity near wetlands and water-bodies, including construction and maintenance of a RoW and associated component footprint areas. Such buffers help minimize impacts to microhabitat, sensory disturbance, cover and anuran breeding habitat (Seburn and Seburn 2000). Effect pathways include rutting, ground disturbance, and changes in vegetation composition during spring and summer growth.

For the plains spadefoot toad, 14 suitable habitat polygons are identified that have a linear length, including recommended buffer widths, longer than the distance between transmission line towers. At these sites, it is not possible to avoid the habitat during tower installation. As such, placement of towers to best minimize disturbance is recommended. In all remaining plains spadefoot toad habitat polygons, linear length is shorter than the length of line between two towers and the placement of towers outside of habitat polygons is possible. If RoWs can maintain natural habitat attributes along water bodies and wetlands necessary for breeding and migrating amphibians, potential negative effects could be minimized.

In Saskatchewan, year-round setback distances have been recommended for the plains spadefoot at ponds used for breeding, living, or hibernating (Saskatchewan Environment 2003). A setback distance of 90 m is recommended for both medium and high activity levels; no setback distances are recommended for low activity levels.

For the northern leopard frog, year-round setback distances have been recommended for breeding ponds and wintering sites in the petroleum industry. Recommended distances for low, medium, and high activity are 50, 200, and 400 m, respectively (Environment Canada 2009). Year-round provincial setback distances for northern leopard frog ponds include 50 m (low and medium activity levels) and 100 m (high activity levels) for Alberta, and 10 m, 200 m, and 500 m for low, medium, and high activity levels in Saskatchewan (Environment Canada 2009).

At suitable anuran VEC habitat within the Prairie and Boreal Plains Ecozones, the following mitigation measures are recommended in the context of the Bipole III Transmission Project:

- Construction and maintenance at suitable anuran habitats will occur in fall or winter, outside of peak VEC anuran breeding periods, i.e., outside of April 1-August 15;
- A vegetation buffer of 30 m will be retained around plains spadefoot breeding habitat that occurs along the Project HVdc transmission line RoW, within which ground disturbance, vegetation removal, and vehicular traffic will be limited;
- Where possible, it is recommended riparian buffers of 30 m be retained around northern leopard frog and wood frog suitable habitat (i.e., wetland polygons), lakes, streams, and other suitable anuran breeding habitat within the Bipole III Local Study Area footprint, within which ground disturbance, vegetation removal, and vehicular traffic be limited;
- Where overstory/tall-growth vegetation (i.e., trees) needs to be removed from buffers for transmission line clearance, removal methods that best minimize disturbance to soil and ground cover are recommended; and
- Where feasible, HVdc transmission line RoW tower installation in buffered suitable plains spadefoot and wetland habitat will be avoided.

Where avoidance of suitable habitat is not feasible during tower installation, construction activity methods that best minimize habitat disturbance are recommended, or that summer field investigations are conducted prior to tower placement to aid in tower location adjustments in the case of plains spadefoot habitat. Within more northern portions of the Local Study Area footprint (i.e., the Boreal Shield, Taiga Shield, and Hudson Plain Ecozones), breeding areas become less localized as wetted areas become more abundant, and it is difficult to recommend mitigation actions for avoidance of these abundant wetland habitats during construction and maintenance activity. In these ecozones, conducting construction and maintenance activities in the winter is a good mitigation measure to help avoid detrimental effects on breeding anurans that have distributions in the area, including the northern leopard frog and wood frog:

- Where the Bipole III Transmission Project footprint overlaps the Boreal Shield, Taiga Shield, and Hudson Plain Ecozones, it is recommended that construction and maintenance at wetland habitats occurs in fall and winter (i.e., Aug.16 to March 31), outside of peak anuran breeding periods.

The retention of some logs, snags, and other coarse woody debris and slash piles on the forest floor following the removal of forest cover on RoWs may minimize changes in microclimate for amphibians during Project construction and associated RoW clearing. However, due to the importance of woody debris and slash pile removal in forestry practices (see Section 6.1.1.2) recommendation of the retention of such logs, snags, and other coarse woody debris is limited here to the recommended buffer zones described above.

6.2.3 Reptiles

As with the Ottoe and Uncas skipper, the construction and operation of a transmission line overhead of prairie skink sandy-soil prairie habitat will likely result in minimal habitat alteration and vehicle/machinery-related effects. Due to the low-growth nature of vegetation within sandy-soil habitat, complete clearing of the HVdc transmission line RoW is likely not required at these sites. Manitoba forest management guidelines recommend year-round buffers around native grass meadows (Manitoba Conservation 2010). Similarly, a 30 m set-back distance is recommended for plant species at risk, wherever activity is repeated to create a visible and lasting track-trail, as well as at above-ground transmission lines (Henderson 2009). For petroleum industry activity, setback distances of 50 m, 100 m, and 200 m are recommended, at low, medium, and high activity levels, respectively, at skink burrows (Environment Canada 2009).

Construction activities at tower footprints may result in disturbance of suitable skink habitat. As such, avoidance of modeled habitat during tower installation is recommended where feasible. There are 10 skink habitat polygons that have a linear length, including recommended buffers, of less than the distance between two towers. At these habitat polygons, avoidance of sandy-soil habitat during tower installation is possible. For the remainder of the habitat polygons, where polygons plus associated buffers span greater than the distance between two towers, avoidance of polygons is not feasible, and site-specific spring/summer field surveys are recommended prior to permanent tower placements. Such field investigations will help with recommendations for tower location adjustments, based on sand prairie quality, where needed. Additionally, surveys will help determine if possible nesting/burrowing sites exist.

Within the context of the northern prairie skinks as they relate to the Bipole III Project, the following mitigation actions are recommended:

- A 100 m buffer is recommended around suitable sandy-soil prairie habitat polygons where intercepted by the Project transmission line RoW, in which ground disturbance, vegetation removal, and vehicular traffic will be limited wherever feasible;
- As the installation of permanent structures is considered a high level activity, it is recommended that towers be located 200 m from any observed or located skink nests, should they occur.;

- Where habitat polygons span less than the distance between towers (i.e., less than 480 m), avoidance of polygons during tower installation is feasible and recommended; and

- Where avoidance of sandy-soil habitat is not feasible during tower installation, site-specific spring/summer field surveys are recommended prior to tower placements to aid with identification of high quality skink habitat, and tower location adjustment recommendations, where needed.

During the decommissioning phase of the Project, it is recommended that the transmission line RoW be returned to a natural (i.e., native) re-vegetated state in sandy-soil areas where clearing had occurred. Additionally it is recommended that surveys be conducted for the presence of invasive plant species such as leafy spurge in these areas, where encroachment of native vegetation by invasive species may occur during clearing of vegetation.

In total, 1.24 km^2 of suitable garter snake hibernacula habitat was identified within the Project HVdc transmission line RoW. Any RoW construction in the vicinity of such garter snake hibernacula habitat and the installation of permanent transmission line towers at such sites may prove detrimental to possible garter snake populations. This may be particularly true within the Summerberry and Overflowing River Ecodistricts, where 8.72% and 9.23% of suitable habitat within the Local Study Area is found within the RoW, respectively.

Manitoba Conservation (2010) recommends that a year-round buffer of 200 m be maintained from any disturbance activity around garter snake hibernacula habitat (Manitoba Conservation 2010). Hibernacula setback distances of 200 m are listed for Saskatchewan for any activity occurring during spring and fall migration of various not-at-risk snake species (April 15-May 30, September 1-October 15, respectively; Saskatchewan Environment 2003), assuming a moderate level of activity during construction. The objective of such a buffer is to protect garter snakes from sensory disturbance and physical harm caused by machinery, vibrations from drilling, and blasting activity, as well as to protect hibernacula and maintain the integrity of surrounding habitat.

There are three polygons that span a linear length, with recommended buffers, less than the distance between two towers (i.e., 480 m). At these habitat polygons, tower avoidance is possible. For the remainder of the habitat polygons, where polygons plus associated buffers span greater than 480 m along the HVdc transmission line RoW and thus avoidance of polygons is not feasible, site-specific field surveys are recommended at garter snake hibernacula habitat polygons prior to permanent tower placements. Such field investigations will help with recommendations for tower placement adjustments, based on garter snake hibernacula habitat quality, where needed.

Within the context of the Bipole III Transmission Project, the following mitigation recommendations are presented for garter snakes and their hibernacula:

- A buffer of 200 m is recommended around garter snake hibernacula habitat during peak hibernacula activity, including hibernation and emergence. Peak activity periods include September 1 - May 31. Within this buffer, ground disturbance, vegetation removal and vehicular traffic will be limited during Project construction and maintenance. No blasting is to occur within this buffer;

- Where overstory/tall-growth vegetation (i.e., trees) requires removal for transmission line clearance at suitable garter snake habitat, methods that best minimize disturbance to soil and ground cover are recommended;

- Where suitable garter snake hibernacula habitat and associated buffers fall between two permanent tower sites, avoidance of disturbance at habitat polygons during tower installation is feasible and recommended; and

- If avoidance of suitable hibernacula habitat is not possible during tower installation, it is recommended that tower installation occur during the summer months (June 1-August 31), outside of the hibernacula activity period, or that summer field investigations occur, prior to tower placement.

6.3 Residual Effects

Negative residual impacts for all VEC species are associated with the following:

- Alteration/disturbance and associated fragmentation of suitable habitat from clearing and maintenance of the HVdc transmission line RoW and tower installation; and

- Mortality and vehicle-related effects associated with increased use of seasonal access trails and the RoWs during the life of the project and for a period of time following decommissioning, until access is limited by successional growth.

The preservation of existing low-growth vegetation along the transmission line RoW and the maintenance of buffers around ESSs is expected to minimize and mitigate any effects incurred by habitat degradation in VEC habitats. Additionally, careful storage and removal of any hazardous materials and the infrequent use of seasonal access trails and the RoWs will further alleviate impacts on TIAR populations. Summaries of residual effects assessments are presented in Table 16.

6.3.1 Terrestrial Invertebrates

As ESSs representing modeled suitable Dakota skipper habitat were not identified within the Bipole III Study Area footprint, no species-specific mitigation measures were recommended for the Dakota skipper. Assuming prairie habitat within the Project Study Area is suboptimal, there are no residual environmental effects of the

Bipole III Project on the Dakota skipper. In general, the retention of desired low-growth plant-cover resistant to tree invasion within prairie habitat along the HVdc transmission line RoW may aid in preserving desired key adult and larval food resources for potential Dakota skipper populations.

Residual environmental effects of the Bipole III Project on the Ottoe and Uncas skippers include habitat alteration and disturbance as a result of construction and maintenance activity. These effects are limited to the right-of way, and are associated with the clearing and maintenance of the HVdc transmission line RoW, and the installation of permanent transmission towers. If minimal RoW clearing is expected at sandy-soil prairie habitats associated with suitable skipper habitat, residual effects will be restricted to permanent tower footprints within suitable habitat and where tall-growth vegetation is cleared and maintained. In general, with the application of mitigation measures that will aid in minimizing environmental disturbances, as discussed in Section 6.2.1, residual effects are expected to be small to medium in magnitude, negative and not significant.

6.3.2 Amphibians

The Bipole III Transmission Project Study Area, as it relates to amphibian VECs, is expected to have small to medium, negative residual effects with the application of mitigation measures as outlined in Section 6.2.2 above. Negative residual impacts to amphibian populations are predominantly expected to be associated with the following:

- Fragmentation of some anuran breeding habitat along the HVdc transmission line and collector line RoWs as a result of habitat alteration/disturbance, at the preferred north and candidate north and south electrode sites, at the construction camp footprint, the northern converter station, and at borrow areas, resulting in disruption to connectivity between metapopulations; and

- Mortality and vehicle-related effects associated with increased use of seasonal access trails and RoWs during the life of the project and for a period of time following decommissioning, until access is limited by successional growth in the case of the RoW.

For the plains spadefoot, residual environmental effects of the Project are limited to the right-of way, and are associated with the clearing and maintenance of the HVdc transmission line RoW, and the installation of permanent transmission towers. Residual environmental effects of the Project on the northern leopard frog and wood frog are associated with the clearing and maintenance of the HVdc transmission line RoW, the installation of permanent transmission towers, the construction and operation of the Keewatinoow Converter Station and the construction of the north electrode site. In general, the preservation of existing low-growth vegetation and the maintenance of buffers around ESSs along the HVdc transmission line RoW is expected to minimize and mitigate any effects incurred by habitat degradation in VEC habitats.

6.3.3 Reptiles

Residual effects, as they relate to reptile VECs within the Bipole III Transmission Project Study Area, are expected to be negative but of small to medium magnitude with the application of mitigation measures as outlined in Section 6.2.3 above. The negative residual impacts to reptile populations are predominantly expected to be associated with the following:

- Alteration/disturbance and associated fragmentation of suitable habitat resulting from clearing and maintenance of the HVdc transmission line RoW and tower installation; and
- Mortality and vehicle-related effects associated with increased use of seasonal access trails and the HVdc transmission line RoW during the life of the project and for a period of time following decommissioning, until access is limited by successional growth.

For the garter snake and associated hibernacula, residual environmental effects of the Project are limited to the RoW, and are associated with the clearing and maintenance of the HVdc transmission line, and the installation of permanent transmission towers. As discussed in Section 6.2.3 above, small positive effects are also possible for garter snakes where clearing of the transmission line RoW occurs within forest habitat. Residual environmental effects of the Project on the northern prairie skink are limited to the HVdc transmission line, and are associated with the clearing and maintenance of the RoW, and the installation of permanent transmission towers.

6.4 Follow-up/Monitoring

6.4.1 Terrestrial Invertebrates

A monitoring program is not anticipated for terrestrial invertebrates. As Dakota, Ottoe, or Uncas skipper individuals were not found, nor were they expected during 2010 field surveys, no reference is available for follow-up monitoring.

Field studies at sandy-soil prairie habitats are recommended prior to tower installation as part of the post-construction monitoring for the prairie skink. At this time, observations will be made to determine whether recommendations for mitigation measures were adhered to for terrestrial invertebrates.

6.4.2 Amphibians

No follow-up anuran habitat surveys are expected. Standard inspection and effects monitoring will be sufficient to ensure wetland mitigation recommendations are adhered to, such as the retention of adequate lake, stream, river and wetland buffers.

6.4.3 Reptiles

It is recommended that pre-construction spring or summer-time surveys be conducted at permanent tower installation sites where tower placement may overlap suitable habitat to aid in determining the possible presence of skinks along the HVdc transmission line RoW and both prairie skink habitat and garter snake hibernacula habitat. Such surveys would help with recommendations for tower placement adjustments, based on garter snake hibernacula and prairie skink habitat quality, where needed.

Follow-up monitoring, such as environmental auditing and standard inspection and effects monitoring, will be used to determine whether recommended mitigation measures were followed for both potential garter snake hibernacula habitat and prairie skink habitat polygons. Monitoring is recommended following initial construction and subsequent vegetation management.

6.5 Potential Cumulative Effects

Cumulative environmental effects can result when the environmental effects of a project combine with the effects of other past, present and foreseeable future projects or activities. Cumulative effects typically occur over a large area that may cross spatial and temporal boundaries, and can act at least additively and at most synergistically. A series of seemingly insignificant environmental effects over space and time, for example, may ultimately result in a significant effect when an ecological or legal threshold is exceeded.

The cumulative effects assessment (CEA) was carried out by combining potential environmental impacts of the proposed action with the impacts of projects that have occurred in the past, are currently occurring, or are proposed in the future within the Project Study Area and proximate vicinity, emphasizing the use of the same environmental indicators and measurable parameters or variables as the Bipole III Project environmental effects.

The proposed Bipole III Transmission Project is a very large, complex project with many project components including transmission lines, converter stations, ground electrode facilities, construction camps and power, and marshaling yards. Each project component may have environmental effects that may act cumulatively with the effects of other components as well as other projects and activities in the assessment area. Here, potential cumulative effects for the Bipole III Project are considered in the context of selected TIAR VECs. Where future actions are taken into account, potential cumulative effects are considered for those projects and activities planned to occur within the next 20 years. Summary of cumulative environmental effects are presented in Table 17.

6.5.1 Power Generation

6.5.1.1 Past and existing projects

Several existing RoWs and GS projects exist within the Bipole III Study Area and surrounding areas. These include:

- Wuskwatim Transmission Project;
- Henday Converter Station;
- Radisson Converter Station; and
- Riel Converter Station.

In addition to habitat alteration and fragmentation, increased seasonal recreational use of the transmission line RoW may occur for activities such as snowmobiling. Portions of the Wuskwatim Transmission Project parallel the Bipole III Project but are outside the transmission line RoW.

With respect to the converter stations, residual effects include the physical presence of the facilities, access, as well as changes in productive forest land and standing timber volumes for the northern facilities. Adverse effects of these projects are expected to be not significant following mitigation recommendations; the risk of related adverse contingency effects such as oil spills and fires are expected to be mitigated through design, use of monitoring and alarm systems, compliance with relevant government regulations, and institution of appropriate environmental protection measures, operating procedures and emergency response plans, as well as a Project-specific Environmental Protection Plan (EnvPP) adhered to by both Manitoba Hydro staff and contractors.

6.5.1.2 Foreseeable Future Projects

Future hydro-electric projects that may overlap the Bipole III Project study are and surrounding areas include:

- Conawapa Generating Station; and
- Keeyask Generating Station.

Flooding of uplands and change in flow regime may occur as a result of the operation of future GS projects. Additionally, increased waste-water from construction camps may result in decreases in water quality.

6.5.2 Resource Harvest

6.5.2.1 Past and existing projects

Several forestry activities currently exist along the Bipole III Project Study Area, including:

- Tolko operations; and
- Louisiana Pacific operations.

Forestry operations and associated activities such as road development result in habitat fragmentations, alterations of microhabitat, and machinery-related activity effects. Specific adverse environmental effects may include changes in water quality, loss of old-growth or late-seral forest and associated availability of microhabitat such as downed woody debris.

In general, timber harvesting activities within areas such as Tolko's FML Area No. 2 are not expected to result in any significant impacts to air quality. Moreover, the operation of heavy equipment will have very localized effects. One activity that may have a wide-ranging effect, depending on intensity and location, is the burning of debris within a cut block.

Overall, potential impacts of forest management practices on wildlife, including TIAR species, are expected to be mitigated by adherence to the practices and strategies set out for these species, and furthermore by compliance to federal and provincial statues, regulations, guidelines and policies.

In addition to forest harvesting, agricultural harvesting and development may also play an important role within the Bipole III Study Area. Since the 1850s, over 99% of native prairie habitat has been loss in Manitoba due to habitat alterations, including conversion to agricultural row crops and hay fields, or degradation by overgrazing; only 3 km^2 of Manitoba tall-grass prairie remains (Samson and Knopf 1994). Such tall-grass prairie is important as suitable habitat for several at-risk species, including Bipole III VEC species. In addition to reduction of suitable VEC habitat, agricultural development may result in herbicide (or fungicide, as in the case of potatoes) run-off and may contribute to infilling of wetlands.

The loss of wetlands is also important to amphibians dependent on such habitats for breeding (Seburn and Seburn 2000). Percent wetland within Manitoba has changed through the years. Of the approximately 2,000 km^2 of prairie wetlands present in Manitoba in the 1950s, 20% has been lost by 1990 (Seburn and Seburn 1998). Loss of wetlands increases the average distance between breeding ponds, and together with the development of adjacent land or the creation of roads separating wetlands, this can result in isolated populations (Seburn and Seburn 2000). Wetland loss also increases the distance between neighboring wetlands necessary to immigration and emigration within metapopulations (Semlitsch 2000).

6.5.2.2 Foreseeable Future Projects

Future potential forest management practices are expected to have similar adverse effects to current practices, minimized by adherence to the practices and strategies set out for species of concern, and furthermore by compliance to federal and provincial statues, regulations, guidelines and policies.

Agricultural development has decreased over time and with proper wetland management practices and landowner conservation agreements and education, residual effects of agricultural development on key VEC habitats are expected to be reduced in future development.

6.5.3 Resource Extraction

6.5.3.1 Past and Existing Projects

Within the Bipole III Local Study Area, multiple existing (utility) corridors, such as water pipelines, fibre optics line, and ethanol plants, serve local and regional needs. Such corridors may result in habitat disruption and fragmentation effects. Mining companies around the nickelbelt, such as Vale-Inco, Pure Nickel, Crowflight minerals, as well as the Hudson Bay Exploration and Development Company may cause adverse environmental effects to both aquatic and terrestrial systems. Run-off may result in decreases in water quality in surrounding aquatic systems. Mining exploration may result in ground disturbances where such investigations occur.

Additional resource extraction activities include oil pipelines, with negligible effects expected with compliance to proper mitigation efforts.

6.5.3.2 Foreseeable Future Projects

Any foreseeable future mining, pipeline or corridor projects will likely have similar adverse environmental effects to existing projects, including changes in water quality and ground disturbances.

6.5.4 Infrastructure

6.5.4.1 Past and Existing Projects

The Bipole III Project corridor parallel or intersect multiple existing (utility) corridors that serve local and regional needs, including numerous transportation projects such as highways, railroads, and winter roads. Such corridors not only result in habitat fragmentation and edge effects, but also contribute to direct mortality of VEC individuals and increase access to adjacent areas by recreational users such as snowmobilers.

6.5.4.2 Foreseeable Future Projects

Future roadways and highways paralleling or intersecting the Bipole III Project HVdc transmission line RoW may further result in greater access to areas by recreational users, habitat fragmentation and edge effects, and also contribute to direct mortality of VEC individuals.

6.5.5 Miscellaneous

6.5.5.1 Past and Existing Projects

Additional activities that may result in adverse environmental effects on selected VEC species includes harvesting of wildlife such as northern leopard frogs for biological supply houses, and site-specific activities such as the presence of established gravel pits and previously established contaminated sites from past developments. Any further activities in such areas may act cumulatively on selected VEC species found in such areas.

6.5.5.2 Foreseeable Future Projects

Future natural events that may result in adverse environmental effects parallel to or intersecting the Bipole III Study Area include floods, fire, wind, tornadoes, as well as an overall increase in the frequency of such extreme weather events and changes in future climate trends as a result of climate change. Such natural events may be unpredictable in spatial or temporal extent as well as in severity, and may result in cumulative effects for VEC species.

6.5.6 Climate Change

Climate change effects are expected to vary geographically. In general projections include earlier, wetter springs, warmer, drier summers, and shorter, milder winters for Manitoba (MMM Group 2011). Although increases in rainfall are projected in some areas, these may be offset by higher temperatures, resulting in increased evaporation and transpiration from plants. VEC species effects, as a result of climate change, include changes in suitable habitat for various life stage needs, based on changes in spatial and temporal availability of resources. Specifically, changes may include the following:

<u>Dakota Skipper</u>

- Distribution and range of prairie plant species associated with the Dakota skipper will change;
- Distribution of tall-grass prairie habitat will change; and
- Length and duration of flight-time may change, as a result of changes in plant life cycles.

<u>Ottoe Skipper</u>

- Distribution and range of sandy-soil prairie habitat may increase; and
- Length and duration of flight-time may change, as a result of changes in plant life cycles.

<u>Uncas Skipper</u>

- Distribution and range of sandy-soil prairie habitat may increase; and
- Length and duration of flight-time may change, as a result of changes in plant life cycles.

<u>Plains Spadefoot</u>

- Distribution and range of suitable sandy-soil habitat may increase; and
- Reduced water levels in summer may decrease availability of breeding habitat within suitable sandy soil habitat.

Wood Frog

- Increase spring flood events may increase availability of suitable spring breeding habitat;
- In northern wetland communities, melting of permafrost may potentially create additional breeding habitats; and
- Changes in tree species and soil structure may result in changes in overwintering habitat (i.e., leaf litter composition and depth, and microhabitat conditions).

Northern Leopard Frog

- Reduced water levels in summer may decrease availability of breeding habitat; and
- Summering grassland habitat may expand in range as temperature increases.

Red-sided Garter Snake

- Summering grassland habitat may expand in range as temperature increases.

Northern Prairie Skink

- Distribution and range of sandy-soil prairie habitat may increase.

Overall, climate change is one of the major factors causing global amphibian population declines (Semlitsch 20000). However, climate change effects will likely not have the potential to act cumulatively with the Bipole III Project on VECs. Recommended mitigation measures will minimize potential effects of the Bipole III Project on VEC species, resulting in non-significant residual effects. Furthermore, effects of climate change may have a greater long-term effect on these VEC species than those caused by the Project; cumulative residual effects are assessed based on a 20 year foreseeable future. As climate change effects are seen on a much longer time scale, climate change effects identified above are not likely to act cumulatively on VEC species in conjunction with residual and cumulative effects of the Project.

6.5.7 Cumulative Impacts

6.5.7.1 Terrestrial Invertebrates

The operation of heavy equipment has a very localized and short-term effect. As such, no residual effects are expected from other projects with respect to machinery and traffic-related activity.

Fires, where they occur, generally result in a high mortality rate in soil invertebrates. However, such events may result in positive effects for some VEC species, in particular in sandy-soil prairies, as fire aids in the suppression of invasive and shrubby species and allows for the persistence of such sensitive habitat.

Although agricultural habitats are unsuitable for such species as the Ottoe skipper, light rotational grazing can be beneficial as such activity creates or maintains preferred prairie-plant structure (Dana 1991); many mixed-grass and sandy-soil prairie remnants likely have survived only because poor soils (sandy) or steep terrain make them unsuitable for row-crop agriculture (COSEWIC 2005). Similarly, the Dakota skipper is very sensitive to the conversion of remnants of prairie to cropland, spring and summer haying, heavy grazing, controlled burns, and drainage of natural sites (COSEWIC 2003). The Uncas skipper, which is rare or uncommon in the northern part of its range, appears to be declining as a result of habitat loss. In general, cumulative effects may occur where adverse residual effects incurred from the Bipole III Project overlap agricultural or other land development in sandy-soil habitat within the vicinity of the Bipole III Study Area.

6.5.7.2 Amphibians

Cumulative impacts on wetlands may occur in locations where any of the Bipole III Project components overlap other construction projects in and around wetlands. Amphibian breeding populations, and consequently larval populations, naturally undergo wide fluctuations in numbers making them especially sensitive to stochastic events (Pechmann et al 1991). Furthermore, there is general agreement that factors can act synergistically, allowing subtle or undetectable effects of any single factor to be exacerbated to harmful levels by another factor (Semlitch 2000). Within the Bipole III Study Area, natural events that may result in adverse environmental effects include floods, fire, wind, tornadoes, as well as an overall increase in the frequency of such extreme weather events and changes in future climate trends as a result of climate change . These natural events may be unpredictable in spatial or temporal extent, as well as in severity. Events such as climate change, however, have a more long-term effect than that caused by the Project and are therefore not likely to act cumulatively on amphibian VECs in conjunction with Project residual effects.

Due to the variability in populations, it is important to maintain a natural array of isolated wetlands connected by appropriate terrestrial habitats in order to maintain healthy amphibian metapopulations. The construction of linear features such as the Wuskwatim transmission line may impact connectivity of anuran metapopulations between ponds. Overall, fragmentation of natural habitats from such transmission lines as well as from timber harvesting, agriculture, roads, drainage canals, or urban development impedes or prevents dispersal and decreases the probability of wetland recolonization (Semlitch 2000). The addition of the Bipole III Project HVdc transmission line RoW will therefore have cumulative implications on metapopulations within the Study Area. For species such as the plains spadefoot, alteration and destruction of its habitat is also an important factor (Lauzon 1999). Consequently, the Bipole III Project may have cumulative effects on the plains spadefoot population where agricultural and forest harvest development occurs in the sandy-soils surrounding Dauphin Lake.

Upland flooding resulting from future hydroelectric projects may cause changes in quality and quantity of anuran breeding habitat. With the flooding of uplands, an increase in the amount of open water may reduce availability of wetland habitat. It is possible, however, that such upland flooding may aid in connecting metapopulations, depending on range and extent.

Although the number of harvesting licenses has declined over the years, harvesting of northern leopard frogs for biological supply houses still occurs. In areas where such permits are held, the combination of transmission line effects and harvesting may cumulatively affect populations.

6.5.7.3 Reptiles

Today, garter snakes of Manitoba provide a unique opportunity in the tourist industry. The Narcisse Snake Dens of Manitoba attract crowds annually to witness the largest congregate of snakes in the world during mating season (Manitoba Conservation 2011). The dependency of garter snakes on overwintering den sites leaves snake populations vulnerable to disturbance, degradation and local extirpation (Kendell 1998); such underground caves, dens and fissures make the area more fragile and therefore more vulnerable to cave-ins by heavy equipment. Where the Bipole III Project overlaps current or future resource exploration or mining activity, small cumulative effects may occur where garter snake hibernacula overlap such areas.

The construction of linear features such as transmission line and access corridors will result in increased use of RoWs by garter snakes for movement corridors. Direct mortality of garter snakes along these RoWs may also occur, but is not expected to be a residual effect.

For the prairie skink , similar to the sandy-soil terrestrial invertebrate VEC species, habitat loss results from succession of prairie to Aspen Parkland, invasion by the exotic leafy spurge (*Euphorbia esula*), cultivation, tree planting programs, and construction (COSEWIC 2004). The prairie skink is vulnerable to ground disturbance, and has been noted to abandon the nest after disturbance at the nest site (Nelson 1963). As such, the operation of heavy equipment has a very localized but medium-magnitude effect. In general, adverse residual effects incurred from the Bipole III Project will likely have cumulative effects only where agricultural or other land development occurs in sandy-soil habitat within the vicinity of the Bipole III Study Area.

7.0 Conclusions

7.1 Data Sources/Limitations

Information on TIAR species biology and distributions was collected from the following sources:

- Published literature, grey literature, and various government resources, including COSEWIC reports;
- Historical distribution information from the CDC, provided by Manitoba Hydro as part of a data sharing agreement;

- Field work, including sweep net surveys, anuran call surveys, skink coverboards, and garter snake hibernacula visual encounter surveys; and

- Incidental observational data from other disciplines during the course of their field studies and ATK interviews.

Several limitations exist with respect to information on TIAR VEC species, including knowledge gaps in potential effects of ground disturbance on overwintering sites of amphibians and reptiles, threshold distances of disturbances from hibernacula; effects of disturbances such as trails etc. on reproductive success of species at risk, effects of habitat fragmentation on species at risk, effects of disturbances on species time budgets and individual fitness of species at risk, and success or failure of setback distances, timing restrictions and mitigation.

Limitations of field investigations include:

- Accuracy and suitability of cover class information; where outdated or inappropriate cover class information exists, models may not reflect true habitat use, or were generous and precautionary;

- Delayed timing of private land access request resulted in a delay in the onset of some field surveys, including skipper sweep-net surveys, skink coverboard surveys, and garter snake hibernacula surveys; and

- Field studies for anuran VECs were confined to one breeding season, which can be confounded by annual variability and weather, and data sets used for modeling frog species were not designed for amphibians.

7.2 Environmentally Sensitive Sites

Key environmentally sensitive areas, or ESSs, include sandy soil habitats, anuran breeding habitats (i.e., wetlands) and garter snake hibernacula.

7.2.1 Terrestrial Invertebrates

Habitat models indicate suitable Dakota skipper habitat is present within the Study Area footprint in its Prairie Ecozone distribution range. Only a fraction of this habitat, if any, may be true suitable Dakota skipper prairie remnant habitat and the identification of suitable Dakota skipper modeled habitat as an ESS was not possible.

The sandy-soil prairie complexes which fall within the Bipole III Study Area footprint within the Prairie Ecozone, concentrated in the St. Claude/Assiniboine River area, are in close proximity to historical populations of both the Ottoe and Uncas skippers and are deemed sensitive areas in the context of the Bipole III Project. Sandy-soil prairie complexes in this area overlap the Stockton, Alonsa, and MacGregor Ecodistricts, totaling 4.40 km^2 within the Local Study Area and 0.09 km^2 within the HVdc transmission line RoW.

7.2.2 Amphibians

The plains spadefoot has an isolated distribution range within the Bipole III Study Area, limited to the vicinity of Dauphin Lake where suitable sandy-soil habitat is present. Habitat overlaps both the Boreal Plain and Prairie Ecozones, including the Waterhen, Dauphin and Alonsa Ecodistricts. A total of 20.51 km^2 of habitat is found within the Local Study Area, 0.28 km^2 of which is contained within the HVdc transmission line RoW. The majority of the suitable habitat is concentrated within the Alonsa Ecodistrict. Due to the isolated nature of this population and the limited amount of areas identified as suitable reproductive spadefoot habitat, these areas are considered ESSs in the context of the Bipole III Project.

Northern leopard frogs were detected at 23 of 170 sites surveyed, most of which were in the Boreal Plain Ecozone. In the Prairie Ecozone, northern leopard frogs were detected at only five sites; no northern leopard frogs were detected in the Boreal Shield Ecozone. Wood frogs were detected at 122 of 170 sites surveyed, most of which were in the Boreal Plain and Boreal Shield Ecozones. Wetland habitat is found throughout all five ecozones intercepted by the Project Study Area. There is 1698.16 km^2 of wetlands present within the Local Study Area, 20.69 km^2 of which is found along the HVdc transmission line RoW. Wetlands are also present within the collector lines footprints, the construction camp footprint, the northern Converter Station footprint, at both north electrode sites, and south electrode site SES3, and at borrow areas.

7.2.3 Reptiles

The sandy-soil prairie complexes which fall within the Bipole III Study Areas' Prairie Ecozone, concentrated in the St. Claude/Assiniboine River area, are in close proximity to the current distribution range of the prairie skink and are deemed sensitive areas in the context of the Bipole III Project. Sandy-soil prairie complexes found in this area overlap the Stockton, Alonsa, and MacGregor Ecodistricts, totaling 4.40 km^2 within the Local Study Area and 0.09 km^2 within the HVdc transmission line RoW.

Garter snake hibernacula habitat is found in all three major Ecozones along the Bipole III Study Area footprint. A total of 56.86 km^2 of suitable garter snake habitat is present in the Local Study Area, of which 1.24 km^2 is located within the HVdc transmission line RoW. Within the Summerberry and Overflowing River Ecodistricts, 8.72% and 9.23% of the suitable habitat available within the Local Study Area, respectively, is found within the transmission line RoW. Due to the dependency of garter snakes on this fragmented, site-specific habitat, any areas identified as suitable garter snake hibernacula within the Bipole III Local Study Area are considered sensitive areas.

7.3 Environmental Effects/Mitigation Measures

Environmental effects are generally related to habitat alteration, including fragmentation, and traffic and machinery-related activity. Habitat alteration can occur throughout the construction phase (i.e., clearing of habitat along the RoWs, at electrode sites, converter station, as well as installation of transmission line towers along the HVdc transmission line RoW), as well as the operation phase (i.e., periodic vegetation management within the RoW) of the Project. Short-term environmental effects may result from traffic and machinery-related activity, including spills, leaks and vehicular pollution, as well as through the increased use of access trails and RoWs for recreational activity; all of which may result in potential mortality and/or sensory disturbance. All environmental effects and recommended mitigation measures are summarized in Table 15.

7.3.1 Terrestrial Invertebrates

Mitigation recommendations for terrestrial invertebrate VECs focus around modeled suitable sandy-soil habitat and identified habitat polygons. The following are recommended mitigation actions for terrestrial invertebrate VECs:

- Where feasible, minimize disturbance and clearing along the RoW where suitable habitat occur;
- A 30 m vegetation buffer will be maintained around suitable sandy-soil prairie habitat wherever intercepted by the HVdc transmission line RoW and related construction activity. Within these 30 m habitat buffers, ground disturbance, vegetation removal, and vehicle traffic will be limited;
- Where taller cover types require removal within these 30 m buffers, methods that best minimize disturbance to soil are recommended;
- Where suitable buffered sandy-soil habitat spans less than the distance between towers (i.e., less than 480 m), avoidance of disturbance at habitat polygons and associated buffers is recommended during tower installation, where feasible; and
- Tower placement outside of buffered suitable sandy-soil habitat will be reviewed by Manitoba Hydro at the final design stage.

7.3.2 Amphibians

Mitigation recommendations for amphibians within the Bipole III Project footprint focus on suitable models wetland habitat used during anuran breeding activity. Mitigation actions are recommended based on spatial distribution of suitable breeding wetland habitat.

At suitable anuran VEC habitat within the Prairie and Boreal Plains Ecozones, the following mitigation measures are recommended:

- Construction and maintenance at suitable anuran habitats will occur in fall or winter, outside of peak VEC anuran breeding periods, i.e., outside of April 1-August 15;

- A vegetation buffer of 30 m will be retained around plains spadefoot breeding habitat that occurs along the Project HVdc transmission line RoW, within which ground disturbance, vegetation removal, and vehicular traffic will be limited;
- Where possible, it is recommended riparian buffers of 30 m be retained around northern leopard frog and wood frog suitable habitat (i.e., wetland polygons), lakes, streams, and other suitable anuran breeding habitat within the Bipole III Local Study Area footprint, within which ground disturbance, vegetation removal, and vehicular traffic be limited;
- Where overstory/tall-growth vegetation (i.e., trees) needs to be removed from buffers for transmission line clearance, removal methods that best minimize disturbance to soil and ground cover are recommended; and
- Where feasible, HVdc transmission line RoW tower installation in buffered suitable plains spadefoot and wetland habitat will be avoided.

Where the Bipole III Transmission Project footprint overlaps the Boreal Shield, Taiga Shield, and Hudson Plain Ecozones, it is recommended that construction and maintenance at wetland habitats occurs in fall and winter (i.e., Aug.16 to March 31), outside of peak anuran breeding periods.

7.3.3 Reptiles

Within the context of the northern prairie skinks as they relate to the Bipole III Project, the following mitigation actions are recommended:

- A 100 m buffer is recommended around suitable sandy-soil prairie habitat polygons where intercepted by the Project transmission line RoW, in which ground disturbance, vegetation removal, and vehicle traffic will be limited wherever feasible;
- As the installation of permanent structures is considered a high level activity, it is recommended that towers be located 200 m from any observed or located skink nests, should they occur;
- Where habitat polygons span less than the distance between towers (i.e., less than 480 m), avoidance of polygons during tower installation is feasible and recommended; and
- Where avoidance of sandy-soil habitat is not feasible during tower installation, site-specific spring/summer field surveys are recommended prior to tower placement to aid with identification of high quality skink habitat, and tower location adjustments, where needed.

Within the context of the Bipole III Transmission Project, the following mitigation recommendations are presented for garter snakes and their hibernacula:

- A buffer of 200 m is recommended around garter snake hibernacula habitat during peak hibernacula activity, including hibernation and emergence. Peak activity periods include September 1 - May 31. Within this buffer, ground disturbance, vegetation removal and vehicle traffic will be limited during Project construction and maintenance. No blasting is to occur within this buffer;

- Where overstory/tall-growth vegetation (i.e., trees) requires removal for transmission line clearance at suitable garter snake habitat, methods that best minimize disturbance to soil and ground cover are recommended;

- Where suitable garter snake hibernacula habitat and associated buffers fall between two permanent tower sites, avoidance of disturbance at habitat polygons during tower installation is feasible and recommended; and

- If avoidance of suitable hibernacula habitat is not possible during tower installation, it is recommended that tower installation occur during the summer months (June 1-August 31), outside of the hibernacula activity period, or that summer field investigations occur, prior to tower placement.

7.4 Residual Effects

Negative residual impacts are associated with the habitat alteration along the Project RoW, as well as traffic-related mortalities and pollution associated with increased use of seasonal access trails and RoWs. In general, the preservation of existing low-growth vegetation along the HVdc transmission line RoW and the maintenance of buffers around ESSs is expected to minimize and mitigate any effects incurred by habitat degradation in VEC habitat. Additionally, careful storage and removal of any hazardous materials and the infrequent use of seasonal access trails and the RoWs will further alleviate impacts on TIAR populations. Summaries of residual effects assessments are presented in Table 16.

7.4.1 Terrestrial Invertebrates

Assuming prairie habitat within the Project Study Area is suboptimal, there are no residual environmental effects of the Bipole III Project on the Dakota skipper. Residual environmental effects on the Ottoe and Uncas skippers are limited to the right-of way and include habitat alteration and disturbance as a result of construction and maintenance activity. As minimal transmission line RoW clearing is expected in areas with low-growth vegetation, residual effects will be restricted to permanent tower footprints within suitable habitat and where tall-growth vegetation is cleared and maintained, preserving suitable habitat and key adult and larval food resources.

In general, with the application of mitigation measures that will aid in minimizing environmental disturbances, as discussed in Section 6.2.1, residual effects are expected to be small to medium in magnitude, negative and not significant.

7.4.2 Amphibians

The Bipole III Transmission Project Study Area, as it relates to amphibian VECs, is expected to have small to medium, negative residual effects, with the application of mitigation measures. Negative residual impacts to amphibian populations are predominantly associated with fragmentation of breeding habitat as a result of habitat alteration/disturbance, and mortality and vehicle-related effects associated with increased use of seasonal access trails and RoWs.

For the plains spadefoot, residual environmental effects of the Project are limited to the right-of way, and are associated with the clearing and maintenance of the HVdc transmission line RoW, and the installation of permanent transmission towers. Residual environmental effects of the Project on the northern leopard frog and wood frog are associated with the clearing and maintenance of the HVdc transmission line RoW, the installation of permanent transmission towers, the construction and operation of the Keewatinoow Converter Station and the construction of the north electrode site.

In general, the preservation of existing low-growth vegetation and the maintenance of buffers around ESSs along the HVdc transmission line RoW is expected to minimize and mitigate any effects incurred by habitat degradation in VEC habitats.

7.4.3 Reptiles

Residual effects, as they relate to reptile VECs within the Bipole III Transmission Project Study Area, are expected to be negative but of small to medium magnitude with the application of mitigation measures. The negative residual impacts to reptile populations are predominantly expected to be associated with alteration/disturbance and associated fragmentation of suitable habitat resulting from clearing and maintenance of the HVdc transmission line RoW and tower installation, and mortality and vehicle-related effects associated with increased use of seasonal access trails and the HVdc transmission line RoW

Additionally, small positive effects are possible for garter snakes where clearing of the HVdc transmission line RoW within forest habitat occurs.

For both the garter snake hibernacula and the northern prairie skink, residual environmental effects of the Project are limited to the HVdc transmission line RoW.

7.5 Potential Cumulative Effects

Several past, existing, and future projects occurring within the Bipole III Study Area and surrounding area may result in potential cumulative effects when considered in conjunction with the Bipole III Project. Such projects may include current transmission projects, converter stations, future hydroelectric projects, resource harvesting (i.e., forestry activity, agricultural development), and resource extraction projects (i.e., mining), infrastructure (i.e., highways, railroads and winter roads), climate change, and natural events. Summary of cumulative environmental effects are presented in Table 17.

7.6 Follow-up/Monitoring

7.6.1 Terrestrial Invertebrates

A monitoring program is not anticipated for terrestrial invertebrates. Field studies at sandy-soil prairie habitats are recommended prior to tower installation as part of the post-construction monitoring for the prairie skink. At this time, observations will be made to determine whether recommendations for mitigation measures were adhered to for terrestrial invertebrates.

7.6.2 Amphibians

No follow-up anuran habitat surveys are expected. Standard inspection and effects monitoring will be sufficient to ensure wetland mitigation recommendations are adhered to, such as the retention of adequate lake, stream, river and wetland buffers.

7.6.3 Reptiles

It is recommended that field surveys be conducted at tower sites where tower placement may overlap suitable habitat to aid in determining the possible presence of skinks along the HVdc transmission line RoW and both prairie skink habitat and garter snake hibernacula habitat at permanent tower installation sites.

Follow-up monitoring, such as environmental auditing and standard inspection and effects monitoring, will be used to determine whether recommended mitigation measures were followed for both potential garter snake hibernacula habitat and prairie skink habitat polygons. Monitoring is recommended following initial construction and subsequent vegetation management.

8.0 Tables

Table 1. Summary of number of coverboards examined during prairie skink coverboard surveys conducted in 2010. Surveys were conducted at selected sites within suitable habitat where private land access permission was granted, within the Bipole III Transmission Study Area RoW.

Site ID	Track ID	6-Jul	16-Jul	23-Jul	26-Jul	29-Jul	3-Aug	5-Aug	10-Aug	16-Aug	26-Aug	3-Sep	14-Sep	24-Sep	Total
SE-11-008-08W1	01	6	6	6		6	6		6	6	6	6	6	6	30
	02	14	14	14		14	14		14	14	14	14	14	14	
	03	5	5	5		5	5		5	5	5	5	5	5	
	04	5	5	5		6	5		5	5	5	5	5	5	
NE-09-009-08W1	08		20	25	35	35	35		35	35	35	35	35	35	35
NW-26-008-08W1	09							13	13	13	13	13	13	13	20
	10							7	7	7	7	7	7	7	
Grand Total		30	50	55	35	66	65	20	85	85	85	85	85	85	85

Table 2. Flight season for at-risk Lepidopteran species found in Manitoba. (Life history data from Klassen et al. 1989 and COSEWIC reports).

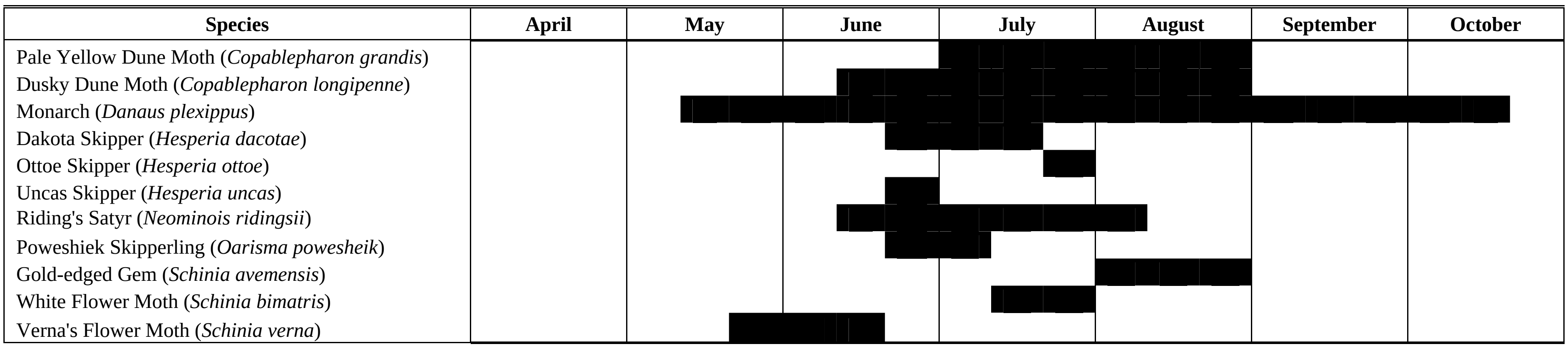


Table 3. At-risk terrestrial invertebrate species found in Manitoba and respective status under 1) The Committee on the Status of Endangered Wildlife in Canada (COSEWIC), 2) Species at Risk Act (SARA), and 3) Manitoba Endangered Species Act (MBESA). Taxonomic information retrieved March 2008, from the Integrated Taxonomic Information System (ITIS) (http://www.itis.gov).

Scientific Name	Common Name	Range within Bipole III Local Study Area	Status Listings		
			COSEWIC	SARA	MBESA
CLASS INSECTA					
Order Lepidoptera (Moths and Butterflies)					
Copablepharon grandis	Pale Yellow Dune Moth	NO[1]	Special concern	no status	not listed
Copablepharon longipenne	Dusky Dune Moth	NO[1]	Endangered	no status	not listed
Danaus plexippus	Monarch	YES	Special concern	Special concern	not listed
Hesperia dacotae	Dakota Skipper	NO[1]	Threatened	Threatened	Threatened
Hesperia ottoe	Ottoe Skipper	NO[1]	Endangered	Endangered	Threatened
Hesperia uncas	Uncas Skipper	NO[1]	not listed	not listed	Endangered
Neominois ridingsii	Riding's Satyr				Extirpated
Oarisma powesheik	Poweshiek Skipperling	NO	Threatened	Threatened	Threatened
Schinia avemensis	Gold-edged Gem	NO[1]	Endangered	Endangered	not listed
Schinia bimatris	White Flower Moth	NO[1]	Endangered	Endangered	not listed
Schinia verna	Verna's Flower Moth	NO[1]	Threatened	Threatened	not listed

[1] Although distribution range does not fall within the Bipole III Local Study Area, preferred habitat is present on the routes and the species proximity to the routes suggests these species need to be taken into consideration

Table 4. List of amphibian and reptile species found in Manitoba and respective status (From Preston 1982, with updated taxonomy retrieved March 2008, from the Integrated Taxonomic Information System (ITIS) (http://www.itis.gov).

Scientific Name	Common Name	Range within BiPole III Local Study Area	Status Listings[1] COSEWIC	SARA	MBESA	Other Status
CLASS REPTILIA						
Order Squamata (Lizards and Snakes)						
Plestiodon septentrionalis septentrionalis	Northern Prairie Skink	NO[2]	Endangered	Endangered	Not Listed	Protected Spps (MB Wildlife Act)
Heterodon nasicus nasicus	Plains Hognose Snake	NO[2]	Not Listed	Not Listed	Not Listed	Protected Spps (MB Wildlife Act)
Opheodrys vernalis	Smooth Green Snake	YES	Not Listed	Not Listed	Not Listed	n/a
Storeria occipitomaculata occipitomaculata	Northern Redbelly Snake	YES	Not Listed	Not Listed	Not Listed	n/a
Thamnophis radix	Plains Garter Snake	YES	Not Listed	Not Listed	Not Listed	n/a
Thamnophis sirtalis parietalis	Red-sided Garter Snake	YES	Not Listed	Not Listed	Not Listed	n/a
Order Testudines						
Chelydra serpentina serpentina	Common Snapping Turtle	YES	Special Concern	No Status	Not Listed	n/a
Chrysemys picta bellii	Western Painted Turtle	YES	Not at Risk		Not Listed	n/a
CLASS AMPHIBIA						
Order Anura (Frogs and Toads)						
Anaxyrus americanus americanus	Eastern American Toad	YES	Not Listed	Not Listed	Not Listed	n/a
Anaxyrus cognatus	Great Plains Toad	NO	Special Concern	Special Concern	Threatened	n/a
Anaxyrus hemiophrys	Canadian Toad	YES	Not at Risk		Not Listed	n/a
Hyla chrysoscelis	Cope's Gray Treefrog	YES	Not at Risk		Not Listed	n/a
Hyla versicolor	Gray Treefrog	YES	Not Listed	Not Listed	Not Listed	n/a
Lithobates clamitans	Green Frog	NO	Not Listed	Not Listed	Not Listed	n/a
Lithobates septentrionalis	Mink Frog	NO	Not Listed	Not Listed	Not Listed	n/a
Lithobates pipiens	Northern Leopard Frog (western boreal/prairie popn)	YES	Special Concern	Special Concern	Not Listed	n/a
Lithobates sylvaticus	Wood Frog	YES	Not Listed	Not Listed	Not Listed	n/a
Pseudacris crucifer	Spring Peeper	YES	Not Listed	Not Listed	Not Listed	n/a
Pseudacris maculata	Boreal Chorus Frog	YES	Not Listed	Not Listed	Not Listed	n/a
Spea bombifrons	Plains Spadefoot	YES	Not at Risk		Not Listed	Protected Spps (MB Wildlife Act)
Order Caudata (Salamanders)						
Ambystoma laterale	Blue-Spotted Salamander	YES	Not Listed	Not Listed	Not Listed	n/a
Ambystoma mavortium diaboli	Gray Tiger Salamander	YES	Not at Risk		Not Listed	n/a
Necturus maculosus maculosus	Common Mudpuppy	YES	Not at Risk		Not Listed	n/a

[1] COSEWIC - The Committee on the Status of Endangered Wildlife in Canada, SARA - Species at Risk Act, MBESA - Manitoba Endangered Species Act, Other Status - Division 6 of the MB Wildlife Act.
[2] Although distribution range does not fall within the Bipole III Local Study Area, preferred habitat is present on the routes and the spps proximity to the routes suggests these habitats need to be taken into consideration.

Table 5.1. Total area of wetland habitat classes present within the Bipole III Transmission Study Area.

Ecozone Number	Ecoregion Number	Ecodistrict Number	Habitat intercepted by the 66m ROW (km^2)	Habitat In Local Study Area (km^2)	Proportion Habitat in ROW vs Local Study Area (%)	Proportion Habitat within RoW (%)	Proportion Habitat within Local Study Area (%)	Habitat Intersected by L61K (Henday-Long Spruce) 6m ROW (km^2)	Habitat Intersected by KN36 (Keewatinoow-Construction Power Site) 6 m FR ROW (km^2)	Habitat Intersected by the Northern Electrode Line 5 m FR ROW (km^2)	Habitat within AC Collectors 31 m ROW (km^2)	Habitat within Construction Camp Footprint (km^2)	Habitat within Keewatinoow Converter Station Footprint (km^2)	Habitat within NES6 Footprint (km^2)	Habitat within NES7 Footprint (km^2)	Habitat within SES3 Footprint (km^2)
Hudson Plain	Hudson Bay Lowland	Winisk River Lowland	0.74	173.98	0.43	3.57	10.25	0.08	0.01	0.004	2.70	0.02	0.02	1.45	0.92	0.00
	Total		0.74	173.98	**0.43**	**3.57**	**10.25**	0.08	0.01	0.004	2.70	0.02	0.02	1.45	0.92	0.00
Hudson Plain Total			**0.74**	**173.98**	**0.43**	**3.57**	**10.25**	**0.08**	**0.01**	**0.004**	**2.70**	**0.02**	**0.02**	**1.45**	**0.92**	**0.00**
Taiga Shield	Selwyn Lake Upland	Embleton Lake	0.02	4.43	0.45	0.10	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total		**0.02**	**4.43**	**0.45**	**0.10**	**0.26**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Taiga Shield Total			**0.02**	**4.43**	**0.45**	**0.10**	**0.26**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Boreal Shield	Churchill River Upland	Waskaiowaka Lake	0.10	7.73	1.27	0.47	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Orr Lake	0.48	41.85	1.15	2.33	2.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Three Point Lake	0.51	53.97	0.94	2.44	3.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total		**1.09**	**103.56**	**1.05**	**5.25**	**6.10**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	Hayes River Upland	Knee Lake	0.43	39.82	1.09	2.10	2.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Pikwitonei Lake	0.55	46.44	1.18	2.64	2.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Sipiwesk Lake	2.36	157.65	1.50	11.41	9.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Norway House	0.54	36.59	1.48	2.62	2.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total		**3.88**	**280.50**	**1.38**	**18.77**	**16.52**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Boreal Shield Total			**4.97**	**384.06**	**1.29**	**24.02**	**22.62**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Boreal Plain	Mid-Boreal Lowland	Playgreen Lake	0.73	69.34	1.06	3.54	4.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Cormorant Lake	1.79	156.11	1.15	8.66	9.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Summerberry	1.97	158.86	1.24	9.53	9.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		The Pas Moraine	3.08	205.31	1.50	14.87	12.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Overflowing River	2.65	176.92	1.50	12.79	10.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total		**10.22**	**766.53**	**1.33**	**49.39**	**45.14**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	Interlake Plain	Swan Lake	2.95	219.05	1.34	14.24	12.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Waterhen	0.03	5.71	0.55	0.15	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Steinbach	0.00	5.75	0.00	0.00	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13
	Total		**2.98**	**230.52**	**1.29**	**14.39**	**13.57**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13
Boreal Plain Total			**13.20**	**997.05**	**1.32**	**63.77**	**58.71**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.13**

Table 5.1. Continued

Ecozone Number	Ecoregion Number	Ecodistrict Number	Habitat intercepted by the 66m ROW (km^2)	Habitat In Local Study Area (km^2)	Proportion Habitat in ROW vs Local Study Area (%)	Proportion Habitat within RoW (%)	Proportion Habitat within Local Study Area (%)	Habitat Intersected by L61K (Henday-Long Spruce) 6m ROW (km^2)	Habitat Intersected by KN36 (Keewatinoow-Construction Power Site) 6 m TLine ROW (km^2)	Habitat Intersected by the Northern Electrode Line 5 m TLine ROW (km^2)	Habitat within AC Collectors 31 m ROW (km^2)	Habitat within Construction Camp Footprint (km^2)	Habitat within Keewatinoow Converter Station Footprint (km^2)	Habitat within NES6 Footprint (km^2)	Habitat within NES7 Footprint (km^2)	Habitat within SES3 Footprint (km^2)
Prairie	Lake Manitoba Plain	Dauphin	0.08	5.21	1.48	0.37	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Alonsa	1.69	133.19	1.27	8.16	7.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Ste Rose	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Gladstone	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Langruth	0.00	0.17	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Winnipeg	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total		1.77	138.64	**1.27**	**8.54**	**8.16**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Prairie Total			**1.77**	**138.64**	**1.27**	**8.54**	**8.16**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Total (all zones)			**20.69**	**1698.16**	**1.22**	**100.00**	**100.00**	**0.08**	**0.01**	**0.004**	**2.70**	**0.02**	**0.02**	**1.45**	**0.92**	**0.13**

Table 5.2. Total area of herb wetland habitat present within the Bipole III Transmission Study Area.

Ecozone Number	Ecoregion Number	Ecodistrict Number	Habitat Intersected by the 66m ROW (km^2)	Habitat within the Local Study Area (km^2)	Habitat Intersected by L61K (Henday-Long Spruce) 6m ROW (km^2)	Habitat Intersected by KN36 (Keewatinoow-Construction Power Site) 6 m TLine ROW (km^2)	Habitat within AC Collectors 31 m ROW (km^2)	Habitat within NES6 Footprint (km^2)	Habitat within NES7 Footprint (km^2)
Hudson Plain	Hudson Bay Lowland	Winisk River Lowland	0.19	20.08	0.00	0.00	0.18	0.03	0.02
	Total		**0.19**	**20.08**	**0.00**	**0.00**	**0.18**	**0.03**	**0.02**
Hudson Plain Total			**0.19**	**20.08**	**0.00**	**0.00**	**0.18**	**0.03**	**0.02**
Taiga Shield	Selwyn Lake Upland	Embleton Lake	0.01	3.43	0.00	0.00	0.00	0.00	0.00
	Total		**0.01**	**3.43**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Taiga Shield Total			**0.01**	**3.43**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Boreal Shield	Churchill River Upland	Waskaiowaka Lake	0.04	1.77	0.00	0.00	0.00	0.00	0.00
		Orr Lake	0.06	5.32	0.00	0.00	0.00	0.00	0.00
		Three Point Lake	0.02	9.73	0.00	0.00	0.00	0.00	0.00
	Total		**0.12**	**16.81**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	Hayes River Upland	Knee Lake	0.02	8.18	0.00	0.00	0.00	0.00	0.00
		Pikwitonei Lake	0.03	5.46	0.00	0.00	0.00	0.00	0.00
		Sipiwesk Lake	0.50	35.43	0.00	0.00	0.00	0.00	0.00
		Norway House	0.27	23.51	0.00	0.00	0.00	0.00	0.00
	Total		**0.82**	**72.58**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Boreal Shield Total			**0.95**	**89.39**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Boreal Plain	Mid-Boreal Lowland	Playgreen Lake	0.10	16.35	0.00	0.00	0.00	0.00	0.00
		Cormorant Lake	0.36	23.18	0.00	0.00	0.00	0.00	0.00
		Summerberry	1.60	124.71	0.00	0.00	0.00	0.00	0.00
		The Pas Moraine	0.79	63.28	0.00	0.00	0.00	0.00	0.00
		Overflowing River	0.63	40.80	0.00	0.00	0.00	0.00	0.00
	Total		**3.48**	**268.32**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	Interlake Plain	Swan Lake	0.55	35.10	0.00	0.00	0.00	0.00	0.00
		Waterhen	0.02	2.76	0.00	0.00	0.00	0.00	0.00
		Steinbach	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total		**0.57**	**37.86**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Boreal Plain Total			**4.05**	**306.18**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Prairie	Lake Manitoba Plain	Dauphin	0.00	1.13	0.00	0.00	0.00	0.00	0.00
		Alonsa	0.83	74.27	0.00	0.00	0.00	0.00	0.00
		Ste Rose	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Gladstone	0.00	0.02	0.00	0.00	0.00	0.00	0.00
		Langruth	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Winnipeg	0.00	0.03	0.00	0.00	0.00	0.00	0.00
	Total		**0.83**	**75.44**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Prairie Total			**0.83**	**75.44**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Total (all zones)			**6.03**	**494.52**	**0.00**	**0.00**	**0.18**	**0.03**	**0.02**

Table 5.3. Total area of shrub wetland habitat present within the Bipole III Transmission Study Area.

Ecozone Number	Ecoregion Number	Ecodistrict Number	Habitat Intersected by the 66m ROW (km^2)	Habitat within the Local Study Area (km^2)	Habitat Intersected by L61K (Henday-Long Spruce) 6m ROW (km^2)	Habitat Intersected by KN36 (Keewatinoow-Construction Power Site) 6 m TLine ROW (km^2)	Habitat Intersected by the Northern Electrode Line 5 m TLine ROW (km^2)	Habitat within AC Collectors 31 m ROW (km^2)	Habitat within Construction Camp Footprint (km^2)	Habitat within Keewatinoow Converter Station Footprint (km^2)	Habitat within NES6 Footprint (km^2)	Habitat within NES7 Footprint (km^2)
Hudson Plain	Hudson Bay Lowland	Winisk River Lowland	0.54	145.83	0.08	0.01	0.00	2.18	0.02	0.02	1.42	0.90
	Total		**0.54**	**145.83**	**0.08**	**0.01**	**0.00**	**2.18**	**0.02**	**0.02**	**1.42**	**0.90**
Hudson Plain Total			**0.54**	**145.83**	**0.08**	**0.01**	**0.00**	**2.18**	**0.02**	**0.02**	**1.42**	**0.90**
Taiga Shield	Selwyn Lake Upland	Embleton Lake	0.01	0.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total		**0.01**	**0.96**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Taiga Shield Total			**0.01**	**0.96**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Boreal Shield	Churchill River Upland	Waskaiowaka Lake	0.01	4.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Orr Lake	0.35	30.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Three Point Lake	0.07	7.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total		**0.44**	**41.59**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	Hayes River Upland	Knee Lake	0.13	11.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Pikwitonei Lake	0.50	40.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Sipiwesk Lake	0.70	59.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Norway House	0.14	5.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total		**1.47**	**116.15**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Boreal Shield Total			**1.91**	**157.74**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Boreal Plain	Mid-Boreal Lowland	Playgreen Lake	0.14	23.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Cormorant Lake	1.07	87.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Summerberry	0.37	34.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		The Pas Moraine	1.45	92.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Overflowing River	0.40	24.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total		**3.44**	**262.30**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	Interlake Plain	Swan Lake	1.10	96.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Waterhen	0.01	2.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Steinbach	0.00	1.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total		**1.11**	**100.06**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Boreal Plain Total			**4.55**	**362.36**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Prairie	Lake Manitoba Plain	Dauphin	0.08	3.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Alonsa	0.84	58.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Ste Rose	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Gladstone	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Langruth	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Winnipeg	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total		**0.92**	**62.89**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Prairie Total			**0.92**	**62.89**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Total (all zones)			**7.93**	**729.78**	**0.08**	**0.01**	**0.00**	**2.18**	**0.02**	**0.02**	**1.42**	**0.90**

Table 5.4. Total area of treed wetland habitat present within the Bipole III Transmission Study Area.

Ecozone Number	Ecoregion Number	Ecodistrict Number	Habitat Intersected by the 66m ROW (km^2)	Habitat within the Local Study Area (km^2)	Habitat Intersected by L61K (Henday-Long Spruce) 6m ROW (km^2)	Habitat Intersected by KN36 (Keewatinoow-Construction Power Site) 6 m TLine ROW (km^2)	Habitat within AC Collectors 31 m ROW (km^2)	Habitat within NES6 Footprint (km^2)	Habitat within NES7 Footprint (km^2)	Habitat within SES3 Footprint (km^2)
Hudson Plain	Hudson Bay Lowland	Winisk River Lowland	0.00	8.07	0.00	0.00	0.34	0.00	0.01	0.00
	Total		**0.00**	**8.07**	**0.00**	**0.00**	**0.34**	**0.00**	**0.01**	**0.00**
Hudson Plain Total			**0.00**	**8.07**	**0.00**	**0.00**	**0.34**	**0.00**	**0.01**	**0.00**
Taiga Shield	Selwyn Lake Upland	Embleton Lake	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00
	Total		**0.00**	**0.04**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Taiga Shield Total			**0.00**	**0.04**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Boreal Shield	Churchill River Upland	Waskaiowaka Lake	0.05	1.87	0.00	0.00	0.00	0.00	0.00	0.00
		Orr Lake	0.07	6.51	0.00	0.00	0.00	0.00	0.00	0.00
		Three Point Lake	0.41	36.78	0.00	0.00	0.00	0.00	0.00	0.00
	Total		**0.53**	**45.16**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	Hayes River Upland	Knee Lake	0.28	20.20	0.00	0.00	0.00	0.00	0.00	0.00
		Pikwitonei Lake	0.01	0.89	0.00	0.00	0.00	0.00	0.00	0.00
		Sipiwesk Lake	1.16	63.13	0.00	0.00	0.00	0.00	0.00	0.00
		Norway House	0.14	7.56	0.00	0.00	0.00	0.00	0.00	0.00
	Total		**1.59**	**91.78**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Boreal Shield Total			**2.11**	**136.94**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Boreal Plain	Mid-Boreal Lowland	Playgreen Lake	0.50	29.00	0.00	0.00	0.00	0.00	0.00	0.00
		Cormorant Lake	0.37	45.24	0.00	0.00	0.00	0.00	0.00	0.00
		Summerberry	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		The Pas Moraine	0.83	49.67	0.00	0.00	0.00	0.00	0.00	0.00
		Overflowing River	1.62	112.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total		**3.31**	**235.92**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	Interlake Plain	Swan Lake	1.29	87.90	0.00	0.00	0.00	0.00	0.00	0.00
		Waterhen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Steinbach	0.00	4.69	0.00	0.00	0.00	0.00	0.00	0.13
	Total		**1.29**	**92.59**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.13**
Boreal Plain Total			**4.60**	**328.51**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.13**
Prairie	Lake Manitoba Plain	Dauphin	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00
		Alonsa	0.02	0.16	0.00	0.00	0.00	0.00	0.00	0.00
		Ste Rose	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Gladstone	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Langruth	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Winnipeg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total		**0.02**	**0.31**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Prairie Total			**0.02**	**0.31**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Total (all zones)			**6.73**	**473.87**	**0.00**	**0.00**	**0.34**	**0.00**	**0.01**	**0.13**

Table 6. Criteria used in identifying Valuable Environmental Components (VECs) for amphibians, reptiles and terrestrial invertebrates associated with the Bipole III Transmission Project.

Selection Critieria	Species Common Name								
	Northern Prairie Skink	**Red-sided Garter Snake**	**Northern Leopard Frog[1]**	**Wood Frog**	**Boreal Chorus Frog[2]**	**Plains Spadefoot**	**Dakota Skipper**	**Ottoe Skipper**	**Uncas Skipper**
Range w/in BP3 Project Study Area	YES	YES	YES	YES	YES	YES	YES	NO[3]	YES
Status Listing- Federal	YES		YES				YES	YES	
Status Listing- Provincial	YES					YES	YES	YES	YES
Prairie- Study Area	YES	YES	YES	YES	YES	YES	YES	YES	YES
Boreal Plain- Study Area		YES	YES	YES	YES				
Boreal Shield- Study Area		YES	YES	YES	YES				
Taiga Shield- Study Area			YES	YES	YES				
Hudson Plain- Study Area			YES	YES	YES				
Sandy Soil Assn	YES					YES		YES	YES
Native Prairie Association							YES		
Wetland		YES	YES	YES	YES	YES			
Treed Muskeg			YES	YES	YES				
Treed Rock		YES							
Willow-Alder					YES				
Grassland	YES		YES		YES	YES			
Shrubland									
Forest				YES					
Distribution range adequate for replicate sampling over Study Area		YES	YES	YES	YES				
Increased risk of negative population effects because of isolated populations/concentrations	YES	YES				YES	YES	YES	YES
Increased risk of negative population effects because of fragmentation effects- sensitivity to fragmentation				YES			YES	YES	YES
Increased risk of negative habitat effects because preferred habitat is uncommon	YES	YES				YES	YES	YES	YES
Cumulative Total	**8**	**10**	**12**	**11**	**11**	**8**	**8**	**8**	**7**

[1] Western Boreal/Prairie population
[2] Although this species met VEC status requirements, presence was ubiquitous, precluding inclusion of this species in VEC investigations
[3] Although this species does not overlap the BPIII Project Study Area, records show a historical population near the current proposed Bipole III ROW, warranting inclusion of this species in VEC investigations

Table 7. Total modeled suitable habitat for Dakota skipper in the Bipole III Study Area by ecozone, ecoregion and ecodistrict.

Ecozone	Ecoregion	Ecodistrict	Suitable Habitat in 66m ROW (km^2)	Suitable Habitat In Local Study Area (km^2)	Proportion Habitat in ROW vs Local Study Area (%)	Proportion Habitat within RoW (%)	Proportion Habitat within Local Study Area (%)	Total Area (km^2) Habitat within SES3 Footprint
Boreal Shield	Churchill River Upland	Orr Lake	0.00	0.07	0.00	0.00	0.03	0.00
		Three Point Lake	0.00	0.06	0.00	0.00	0.02	0.00
	Total		**0.00**	**0.13**	**0.00**	**0.00**	**0.06**	**0.00**
	Hayes River Upland	Sipiwesk Lake	0.00	0.43	0.00	0.00	0.19	0.00
	Total		**0.00**	**0.43**	**0.00**	**0.00**	**0.19**	**0.00**
Boreal Shield Total			**0.00**	**0.56**	**0.00**	**0.00**	**0.25**	**0.00**
Boreal Plain	Mid-Boreal Lowland	Playgreen Lake	0.00	0.08	0.00	0.00	0.03	0.00
		Cormorant Lake	0.00	0.12	0.00	0.00	0.05	0.00
		Summerberry	0.21	5.49	3.90	7.31	2.41	0.00
		The Pas Moraine	0.01	2.44	0.48	0.40	1.07	0.00
		Overflowing River	0.00	0.05	0.00	0.00	0.02	0.00
	Total		**0.23**	**8.18**	**2.76**	**7.72**	**3.60**	**0.00**
	Interlake Plain	Swan Lake	0.17	21.42	0.77	5.66	9.43	0.00
		Waterhen	0.16	13.48	1.22	5.60	5.93	0.00
		Gimli	0.00	0.13	0.00	0.00	0.06	0.00
		Steinbach	0.00	0.59	0.00	0.00	0.26	0.004
	Total		**0.33**	**35.62**	**0.93**	**11.26**	**15.68**	**0.004**
Boreal Plain Total			**0.56**	**43.80**	**1.27**	**18.97**	**19.27**	**0.004**

Table 7. Continued.

Ecozone	Ecoregion	Ecodistrict	Suitable Habitat in 66m ROW (km^2)	Suitable Habitat In Local Study Area (km^2)	Proportion Habitat in ROW vs Local Study Area (%)	Proportion Habitat within RoW (%)	Proportion Habitat within Local Study Area (%)	Total Area (km^2) Habitat within SES3 Footprint
Prairie	Aspen Parkland	Stockton	0.00	0.51	0.00	0.00	0.22	0.00
	Total		**0.00**	**0.51**	**0.00**	**0.00**	**0.22**	**0.00**
	Lake Manitoba Plain	Dauphin	0.05	3.74	1.23	1.58	1.64	0.00
		Alonsa	2.11	165.38	1.27	71.98	72.78	0.00
		St. Rose	0.00	0.34	0.00	0.00	0.15	0.00
		Gladstone	0.01	1.13	0.54	0.21	0.50	0.00
		Langruth	0.00	0.70	0.00	0.00	0.31	0.00
		Winnipeg	0.06	2.74	2.27	2.13	1.21	0.00
		MacGregor	0.15	7.94	1.89	5.13	3.50	0.00
		Portage	0.00	0.06	0.00	0.00	0.03	0.00
		Winkler	0.00	0.34	0.00	0.00	0.15	0.00
	Total		**2.37**	**182.37**	**1.30**	**81.03**	**80.26**	**0.00**
Prairie Total			**2.37**	**182.88**	**1.30**	**81.03**	**80.48**	**0.00**
Total (all zones)			**2.93**	**227.24**	**1.29**	**100.00**	**100.00**	**0.004**

Table 8. Total modeled suitable habitat for Ottoe and Uncas skipper, and northern prairie skinks in the Bipole III Study Area by ecozone, ecoregion and ecodistrict.

Ecozone	Ecoregion	Ecodistrict	Suitable Habitat in 66m ROW (km^2)	Suitable Habitat in Local Study Area (km^2)	Proportion Habitat in ROW vs Local Study Area (%)	Proportion Habitat within RoW (%)	Proportion Habitat within Local Study Area (%)
Boreal Plain	Interlake Plain	Swan Lake	0.00	0.21	0.00	0.00	4.66
		Waterhen	0.00	0.49	0.00	0.00	11.07
	Total		**0.00**	**0.69**	**0.00**	**0.00**	**15.74**
Boreal Plain Total			**0.00**	**0.69**	**0.00**	**0.00**	**15.74**
Prairie	Aspen Parkland	Stockton	0.00	0.16	0.00	0.00	3.65
	Total		**0.00**	**0.16**	**0.00**	**0.00**	**3.65**
	Lake Manitoba Plain	Alonsa	0.02	0.86	2.22	20.54	19.51
		MacGregor	0.07	2.69	2.75	79.46	61.10
	Total		**0.09**	**3.55**	**2.62**	**100.00**	**80.61**
Prairie Total			**0.09**	**3.71**	**2.51**	**100.00**	**84.26**
Total (all zones)			**0.09**	**4.40**	**2.11**	**100.00**	**100.00**

Table 9. Total modeled suitable breeding habitat for plains spadefoot in the Bipole III Study Area by ecozone, ecoregion and ecodistrict.

Ecozone	Ecoregion	Ecodistrict	Suitable Habitat in 66m ROW (km^2)	Suitable Habitat In Local Study Area (km^2)	Proportion Habitat in ROW vs Local Study Area (%)	Proportion Habitat within RoW (%)	Proportion Habitat within Local Study Area (%)
Boreal Plain	Interlake Plain	Waterhen	0.03	3.54	0.80	9.96	17.26
	Total		**0.03**	**3.54**	**0.80**	**9.96**	**17.26**
Boreal Plain Total			**0.03**	**3.54**	**0.80**	**9.96**	**17.26**
Prairie	Lake Manitoba Plain	Dauphin	0.00	0.03	0.00	0.00	0.12
		Alonsa	0.26	16.94	1.51	90.04	82.62
	Total		**0.26**	**16.97**	**1.50**	**90.04**	**82.74**
Prairie Total			**0.26**	**16.97**	**1.50**	**90.04**	**82.74**
Total (all zones)			**0.28**	**20.51**	**1.38**	**100.00**	**100.00**

Table 10. Area of cover types present within borrow areas and borrow excavated material placement locations for the Bipole III Project.

Site Type	Site name	Water (m2)	Exposed Land (m2)	Shrub Tall (m2)	Wetland Treed (m2)	Wetland Shrub (m2)	Wetland Herb (m2)	Total Wetland (m2)	Coniferous (m2)	MixedWood Dense (m2)	Total Borrow Site Area (m2)
Borrow Area	B-5-1	0	2	0	0	0	0	0	12015	22656	34673
	B-5-3	0	3581	0	0	0	0	0	20075	0	23656
	N - 10 - 1	0	5601	5783	1051	37130	4433	42613	49314	0	103311
	N - 10 - 2	0	4519	0	20215	26894	1450	48558	6470	0	59547
	N - 3 Area - II	0	104569	119500	0	0	0	0	0	0	224070
	N - 4	17596	3947	0	9133	6491	0	15624	403582	14415	455163
	N - 5	0	0	0	0	16351	0	16351	337926	0	354277
	N - 6	1937	69190	270	69626	135602	4880	210108	296566	0	578072
	N - 7 Area - I	8979	0	0	0	0	11004	11004	1317	0	21301
	N - 7 Area - II	0	0	0	0	36283	0	36283	25997	0	62280
	N - 7 Area - III	0	0	0	0	30290	0	30290	28073	0	58363
	N - 8	0	48	397122	0	602	0	602	0	0	397772
	N - 9	0	0	106164	0	0	0	0	2819	0	108983
	Limestone Quarry Stockpile	0	17404	0	0	0	0	0	2275	0	19679
	"Mount Kumagai" Stockpile	5920	88531	0	0	0	0	0	0	0	94452
Total Covertype Area		**34432**	**297393**	**628840**	**100025**	**289642**	**21767**	**411434**	**1186428**	**37071**	**2595598**
Borrow Excavated Material Placement Location	1A	0	30300	0	139820	2878	0	142698	150708	0	323706
	1B	0	7800	107805	59635	19732	0	79367	6454	0	201426
	1C	0	10760	34578	21764	2408	0	24172	112078	0	181589
	1D	0	13734	89122	21416	23035	0	44451	0	0	147307
	1E	0	19358	376987	0	0	0	0	7431	0	403777
	1F	0	6368	163502	0	0	0	0	6870	0	176740
Total Covertype Area		**0**	**88320**	**771995**	**242635**	**48054**	**0**	**290689**	**283542**	**0**	**1434546**

Table 11. Total modeled suitable breeding habitat for northern leopard frog in the Bipole III Study Area by ecozone, ecoregion and ecodistrict.

Ecozone	Ecoregion	Ecodistrict	Suitable Habitat in 66m ROW (km2)	Suitable Habitat In Local Study Area (km2)	Proportion Habitat in ROW vs Local Study Area (%)	Proportion Habitat within ROW (%)	Proportion Habitat in within Local Study Area (%)	Suitable Habitat within SES1c Footprint (km2)	Suitable Habitat within SES3 Footprint (km2)
Hudson Plain	Hudson Bay Lowland	Winisk River Lowland	0.54	145.83	0.37	2.78	9.27	0.00	0.00
	Total		0.54	145.83	0.37	2.78	9.27	0.00	0.00
Hudson Plain Total			**0.54**	**145.83**	**0.37**	**2.78**	**9.27**	**0.00**	**0.00**
Taiga Shield	Selwyn Lake Upland	Embleton Lake	0.01	0.96	0.54	0.03	0.06	0.00	0.00
	Total		0.01	0.96	0.54	0.03	0.06	0.00	0.00
Taiga Shield Total			**0.01**	**0.96**	**0.54**	**0.03**	**0.06**	**0.00**	**0.00**
Boreal Shield	Churchill River Upland	Waskaiowaka Lake	0.01	4.09	0.23	0.05	0.26	0.00	0.00
		Orr Lake	0.35	30.03	1.18	1.81	1.91	0.00	0.00
		Three Point Lake	0.07	7.46	0.98	0.37	0.47	0.00	0.00
	Total		0.44	41.59	1.05	2.23	2.64	0.00	0.00
	Hayes River Upland	Knee Lake	0.13	11.44	1.12	0.65	0.73	0.00	0.00
		Pikwitonei Lake	0.50	40.09	1.26	2.57	2.55	0.00	0.00
		Sipiwesk Lake	0.70	59.09	1.19	3.59	3.76	0.00	0.00
		Norway House	0.14	5.52	2.49	0.70	0.35	0.00	0.00
	Total		1.47	116.15	1.27	7.51	7.39	0.00	0.00
Boreal Shield Total			**1.91**	**157.74**	**1.21**	**9.74**	**10.03**	**0.00**	**0.00**

Table 11. Continued

Ecozone	Ecoregion	Ecodistrict	Suitable Habitat in 66m ROW (km2)	Suitable Habitat In Local Study Area (km2)	Proportion Habitat in ROW vs Local Study Area (%)	Proportion Habitat within ROW (%)	Proportion Habitat in within Local Study Area (%)	Suitable Habitat within SES1c Footprint (km2)	Suitable Habitat within SES3 Footprint (km2)
Boreal Plain	Mid-Boreal Lowland	Summerberry	0.05	3.94	1.39	0.28	0.25	0.00	0.00
		The Pas Morainbe	0.01	0.14	4.99	0.03	0.01	0.00	0.00
		Overflowing River	0.00	0.07	0.00	0.00	0.00	0.00	0.00
	Total		0.06	4.16	1.48	0.31	0.26	0.00	0.00
	Interlake Plain	Swan Lake	0.27	29.09	0.93	1.38	1.85	0.00	0.00
		Waterhen	0.53	36.00	1.47	2.69	2.29	0.00	0.00
		Gimli	0.00	1.73	0.00	0.00	0.11	0.01	0.00
		Steinbach	0.00	8.12	0.00	0.00	0.52	0.00	0.24
	Total		0.80	74.94	1.07	4.07	4.77	0.01	0.24
Boreal Plain Total			**0.86**	**79.10**	**1.09**	**4.39**	**5.03**	**0.01**	**0.24**
Prairie	Aspen Parkland	Shilo	0.00	2.15	0.00	0.00	0.14	0.00	0.00
		Stockton	0.00	7.98	0.00	0.00	0.51	0.00	0.00
	Total		0.00	10.12	0.00	0.00	0.64	0.00	0.00
	Lake Manitoba Plain	Dauphin	0.11	7.36	1.44	0.54	0.47	0.00	0.00
		Alonsa	1.77	126.47	1.40	9.04	8.04	0.00	0.00
		St. Rose	0.00	0.01	0.00	0.00	0.00	0.00	0.00
		Gladstone	2.02	131.32	1.54	10.31	8.35	0.00	0.00
		Langruth	0.00	14.77	0.00	0.00	0.94	0.00	0.00
		Winnipeg	9.04	658.63	1.37	46.09	41.88	2.19	0.00
		MacGregor	2.94	206.63	1.42	15.01	13.14	0.00	0.00
		Portage	0.00	6.00	0.00	0.00	0.38	0.00	0.00
		Winkler	0.41	27.57	1.47	2.07	1.75	0.00	0.00
	Total		16.29	1178.78	1.38	83.07	74.96	2.19	0.00
Prairie Total			**16.29**	**1188.90**	**1.37**	**83.07**	**75.60**	**2.19**	**0.00**
Total (all zones)			**19.61**	**1572.53**	**1.25**	**100.00**	**100.00**	**2.20**	**0.24**

Table 12. Total modeled suitable habitat for garter snake hibernacula in the Bipole III Study Area by ecozone, ecoregion and ecodistrict.

Ecozone	Ecoregion	Ecodistrict	Suitable Habitat in 66m ROW (km^2)	Suitable Habitat in Local Study Area (km^2)	Proportion Habitat in ROW vs Local Study Area (%)	Proportion Habitat within RoW (%)	Proportion Habitat within Local Study Area (%)
Boreal Shield	Churchill River Upland	Three Point Lake	0.00	0.37	0.00	0.00	0.65
	Total		**0.00**	**0.37**	**0.00**	**0.00**	**0.65**
Boreal Shield Total			**0.00**	**0.37**	**0.00**	**0.00**	**0.65**
Boreal Plain	Mid-Boreal Lowlands	Cormorant Lake	0.92	42.68	2.14	73.81	75.06
		Summerberry	0.05	0.58	8.72	4.04	1.01
		Overflowing River	0.05	0.56	9.23	4.20	0.99
	Total		**1.02**	**43.82**	**2.32**	**82.05**	**77.07**
	Interlake Plain	Swan Lake	0.00	1.50	0.00	0.00	2.65
		Waterhen	0.15	4.86	2.99	11.73	8.55
	Total		**0.15**	**6.36**	**2.29**	**11.73**	**11.19**
Boreal Plain Total			**1.16**	**50.19**	**2.32**	**93.78**	**88.26**
Prairie	Lake Manitoba Plain	Dauphin	0.00	1.17	1.22	0.00	2.06
		Alonsa	0.08	5.14	1.50	6.22	9.03
	Total		**0.08**	**6.31**	**1.50**	**6.22**	**11.09**
Prairie Total			**0.08**	**6.31**	**1.22**	**6.22**	**11.09**
Total (all zones)			**1.24**	**56.86**	**2.18**	**100.00**	**100.00**

Table 13. Summary of Lepidoptera families captured during sweep-net surveys conducted at selected sites within the Bipole III Transmission Local Study Area, July and August, 2010. No VEC lepidoptera were captured during surveys.

Survey Site Legal Description	Habitat Model	Family								Totals
		Danaidae	Danaidae or Nymphalidae	Lycaenidae	Nymphalidae	Pieridae	Satyridae	Tortricidae	Hesperiidae	
NE-09-009-08-W1	Sandy-Soil	1	1	3	6	32	4	0	0	47
NW-26-008-08W1	Sandy-Soil	1	0	0	5	77	1	0	0	84
SE-01-008-07W1	Prairie	4	0	0	3	33	12	0	0	52
SE-11-008-08W1	Sandy-Soil	9	3	1	45	86	60	1	0	205
SW-01-008-07W1	Prairie	1	0	0	0	7	0	0	0	8
Totals		**16**	**4**	**4**	**59**	**235**	**77**	**0**	**0**	**396**

Table 14. Summary of garter snake hibernacula visual encounter surveys conducted at selected sites within the Bipole III Transmission Local Study Area, October 2010.

Transect	Date	Potential Hibernacula (#)	Locations Surveyed (#)
T01	10/7/2010	3	12
T02	10/7/2010	4	9
T03	10/7/2010	2	9
T04	10/6/2010	2	11
Total		11	41

Table 15. Summary of environmental assessment effects of the Bipole III Transmission Project, as based on habitat models for TIAR species VECs.

Sub-Category	Valued Environmental Component	Rationale for VEC Selection	Environmental Indicator	Parameter/ Variable	Environmental Effect	Assessment	Mitigation Measures	Residual Environmental Effect	Follow-up
Terrestrial Invertebrates	Dakota Skipper	SARA and MBESA listed Threatened species; Reliant on native prairie habitats, limiting within the BPIII Study Area	Availability of suitable habitat	Presence (km^2) and quality of preferred habitat within the Local Study Area; Species presence/absence.	Disturbance of suitable habitat; Habitat loss at permanent tower footprints; Microhabitat alterations, including changes in understory plant composition and abundance of key larval host plants and adult nectar sources, surface litter, and soil composition; Sensory disturbance effects and direct mortality from machinery-related activity, including traffic, exhaust emissions, noise, dust, headlight illumination, spills, and leaks	2.37 km^2 of suitable habitat is located within the BPIII RoWs' Prairie Ecozone but unlikely to be true suitable habitat; Assessment of modelled habitat sites found sub-optimal habitat; little to no high-grade prairie habitat was identified by other sources	No mitigation measures recommended as habitat is likely sub-optimal where it exists	N/A	Follow-up monitoring is not anticipated
	Uncas Skipper	MBESA listed Endangered species; Reliant on sandy-soil prairie habitat which is limiting within the BPIII Study Area				0.09 km^2 of suitable habitat is located within the BPIII RoW within the Prairie Ecozone	Where feasible, minimize disturbance and clearing along RoW where suitable habitat polygons occur; Maintain 30 m vegetation buffers around habitat polygons, within which ground disturbance, vegetation removal, & vehicular traffic is limited; Minimize ground disturbance where removal of tall-growth vegetation is required; Where feasible, avoidance of suitable habitat polygons during tower placement; Tower placement outside of buffered suitable habitat polygons to be reviewed by MB Hydro at final design stage	Habitat alteration/ disturbance from transmission line RoW construction (i.e., tower installation, RoW clearing) and maintenance in sensitive areas	Follow-up monitoring is not anticipated
	Ottoe Skipper	SARA Endangered species, MBESA Threatened species; Reliant on sandy-soil prairie habitat which is limiting within the BPIII Study Area							
Amphibians	Plains Spadefoot	Protected Species under the Manitoba Wildlife Act; Manitoba habitat limited in area and distribution, with isolated population present within the BPIII Study Area	Availability and quality of suitable habitat, distribution of species, population dynamics	Presence (km^2) and quality of preferred habitat along BPIII RoW and Local Study Area; Species presence/absence; Concentrations during peak breeding activity	Alteration or disturbance of suitable habitat within Project footprint, including overwintering, cover, and breeding habitat; Fragmentation within home ranges (i.e., movement corridors between overwintering and summering/breeding habitats); Microhabitat alterations, including changes in air and soil temperature, relative humidity, light intensity, leaf litter, and coarse woody debris; Sensory disturbance effects and direct mortality from machinery-related activity, including traffic, instream sediment, exhaust emissions, noise, dust, headlight illumination, spills, leaks, and ground potential rise	0.28 km^2 of suitable habitat is located within the BPIII RoW	Winter construction only (Aug 16-March 31)in northern regions of Study Area suitable habitat polygons; In southern regions, limit construction to outside of peak VEC anuran breeding periods (i.e., construction to be conducted Aug 16-March 31) , with 30 m riparian buffers to be retained around breeding habitat where possible, where ground disturbance, vegetation removal, & vehicle traffic is limited; In southern regions, avoidance of buffered suitable habitat during tower installation is recommended where feasible, & where removal of tall-growth vegetation is needed, methods that best minimize soil & ground disturbance are recommended	Fragmentation of sensitive areas; habitat alteration/ disturbance throughout the Project footprint, resulting in disruption to connectivity between metapopulations; Mortality and vehicle-related effects associated with increased use of seasonal access trails and RoWs	Follow-up monitoring is not anticipated; Standard inspection and effects monitoring will suffice to ensure recommended mitigation measures are met
	Northern Leopard Frog	SARA listed Special Concern species				20.69 km^2 of suitable habitat is located within the BPIII RoW			
	Wood Frog	Only herptile with distribution throughout entire BPIII Study Area; Good representation of forest-dwelling herptile							
Reptiles	Northern Prairie Skink	SARA listed Endangered species, Protected Species under the Manitoba Wildlife Act; Sand prairie habitat in Manitoba is limited in area and distribution and present within the BPIII Study Area	Availability and quality of suitable habitat, distribution of species, population dynamics	Presence (km^2) and quality of preferred habitat along BPIII RoW and Local Study Area; Species presence/absence.	Disturbance and destruction of suitable habitat/habitat loss (including nests if present) along the RoW; Microhabitat alterations, including changes in air and soil temperature, relative humidity, ground cover, and coarse woody debris; Sensory disturbance effects and direct mortality from machinery-related activity, including traffic, exhaust emissions, noise, vibrations, dust, spills, and leaks	Bipole III TLine RoW runs along the edge of the species distribution; 0.09 km^2 of suitable habitat is located within the BPIII RoW within the Prairie Ecozone	Maintain 100 m buffers around habitat polygons, in which ground disturbance, vegetation removal, & vehicle traffic be limited, & where not feasible, minimize soil & ground cover disturbance during construction & maintenance activities; 200 m buffer from observed or located skink nests during tower placement; Where feasible, avoid suitable habitat during tower placement; Where avoidance of habitat is not feasible, spring/summer field investigations prior to tower placement where polygons overlap tower footprints	Habitat alteration/ disturbance from transmission line RoW construction and maintenance in sensitive areas, and potential for installation of towers in sensitive areas	It is recommended that spring-time pre-construction surveys be conducted at tower sites within suitable habitat once tower locations are determined; Standard inspection and effects monitoring to ensure recommended mitigation measures are met
	Garter Snake Hibernacula	The dependency on overwintering den sites leaves snake populations concentrated, and therefore vulnerable to disturbance, degradation and local extirpation		Presence (km^2) and quality of preferred habitat along BPIII RoW and Local Study Area; Abundance of high concentration areas	Disturbance or destruction of overwintering habitat (i.e., hibernacula); Creation of movement corridors along the RoW; Microhabitat alterations, including changes in air and soil temperature, relative humidity, ground cover, and coarse woody debris; Sensory disturbance effects and direct mortality from machinery-related activity, including traffic, herbicide use along the RoW, exhaust emissions, noise, vibrations, dust, spills, and leaks	Known and potential hibernacula sites occur within or close to the Local Study Area; 1.24 km^2 of suitable habitat is located within the BPIII RoW	Maintain 200 m buffers around hibernacula habitat polygons intercepting or paralleling the Project RoW during peak hibernacula activity where feasible, within which ground disturbance, vegetation removal, & vehicle traffic be limited; Minimize ground & soil disturbance where removal of tall-growth vegetation is required; Avoidance of suitable habitat during tower placement, where feasible; Tower installation in summer (June 1-August 31), or summer field investigations prior to tower placement where polygons overlap tower footprints	Habitat alteration/ disturbance from clearing of RoW and tower installation in sensitive areas; Fragmentation of sensitive areas; Mortality and vehicle-related effects associated with increased use of seasonal access trails and the RoW; Creation of movement corridors along RoW	It is recommended that spring-time pre-construction surveys be conducted at tower sites within suitable habitat once tower locations are determined; follow-up monitoring to ensure recommended mitigation measures are met

Table 16. Residual environmental effect assessment summary table for TIAR species with respect to the Bipole III Project.

VEC	Project Component	Potential Residual Effects	Phase	Direction	Ecological Importance	Societal Importance	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Residual Effect Significance
Dakota Skipper	HVdc Transmission Line and AC Collector Lines	n/a: present prairie habitat is thought to be suboptimal Dakota skipper habitat	Construction					No Residual Effect				
			Operation					No Residual Effect				
	Keewatinoow Converter Station		Construction					No Residual Effect				
			Operation					No Residual Effect				
	Riel Converter Station		Construction					No Residual Effect				
			Operation					No Residual Effect				
	Ground Electrodes and Lines		Construction					No Residual Effect				
			Operation					No Residual Effect				
Ottoe Skipper	HVdc Transmission Line and AC Collector Lines	Habitat alteration/ disturbance from transmission line RoW construction (i.e., tower installation, RoW clearing) and maintenance in sensitive areas	Construction	Negative	High	Low	Medium	Local Assessment Area	Short-term	Infrequent	Reversible	Not Significant
			Operation	Negative	High	Low	Small	Local Assessment Area	Short-term	Infrequent	Reversible	Not Significant
	Keewatinoow Converter Station		Construction					No Residual Effect				
			Operation					No Residual Effect				
	Riel Converter Station		Construction					No Residual Effect				
			Operation					No Residual Effect				
	Ground Electrodes and Lines		Construction					No Residual Effect				
			Operation					No Residual Effect				
Uncas Skipper	HVdc Transmission Line and AC Collector Lines	Habitat alteration/ disturbance from transmission line RoW construction (i.e., tower installation, RoW clearing) and maintenance in sensitive areas	Construction	Negative	High	Low	Medium	Local Assessment Area	Short-term	Infrequent	Reversible	Not Significant
			Operation	Negative	High	Low	Small	Local Assessment Area	Short-term	Infrequent	Reversible	Not Significant
	Keewatinoow Converter Station		Construction					No Residual Effect				
			Operation					No Residual Effect				
	Riel Converter Station		Construction					No Residual Effect				
			Operation					No Residual Effect				
	Ground Electrodes and Lines		Construction					No Residual Effect				
			Operation					No Residual Effect				
Plains Spadefoot	HVdc Transmission Line and AC Collector Lines	Fragmentation of sensitive area; habitat alteration/disturbance, resulting in disruption to connectivity between metapopulations; mortality and vehicle-related effects associated with increased use of seasonal access trails and RoWs	Construction	Negative	Moderate	Low	Medium	Local Assessment Area	Short-term	Infrequent	Reversible	Not Significant
			Operation	Negative	Moderate	Low	Small	Local Assessment Area	Short-term	Sporadic/ Intermittent	Reversible	Not Significant
	Keewatinoow Converter Station		Construction					No Residual Effect				
			Operation					No Residual Effect				
	Riel Converter Station		Construction					No Residual Effect				
			Operation					No Residual Effect				
	Ground Electrodes and Lines		Construction					No Residual Effect				
			Operation					No Residual Effect				
	Borrow Areas and Placement Sites		Construction					No Residual Effect				
			Operation					No Residual Effect				

Table 16. Cont'd

VEC	Project Component	Potential Residual Effects	Phase	Direction	Ecological Importance	Societal Importance	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Residual Effect Significance
Wood Frog	HVdc Transmission Line and AC Collector Lines	Fragmentation of sensitive area; habitat alteration/disturbance, resulting in disruption to connectivity between metapopulations; mortality and vehicle-related effects associated with increased use of seasonal access trails and RoWs	Construction	Negative	Low	Low	Small	Project Site/ Footprint	Short-term	Infrequent	Reversible	Not Significant
			Operation	Negative	Low	Low	Small	Project Site/ Footprint	Short-term	Sporadic/ Intermittent	Reversible	Not Significant
	Keewatinoow Converter Station		Construction	Negative	Low	Low	Small	Project Site/ Footprint	Medium-term	Regular/ Continuous	Reversible	Not Significant
			Operation	Negative	Low	Low	Small	Project Site/ Footprint	Medium - term	Regular/ Continuous	Reversible	Not Significant
	Riel Converter Station		Construction					No Residual Effect				
			Operation					No Residual Effect				
	Ground Electrodes and Lines	Fragmentation of sensitive area; habitat alteration/disturbance, resulting in disruption to connectivity between metapopulations	Construction	Negative	Low	Low	Small	Project Site/ Footprint	Short-term	Infrequent	Reversible	Not Significant
			Operation					No Residual Effect				
-	Borrow Areas and Placement Sites	Fragmentation of sensitive area; habitat alteration/disturbance, resulting in disruption to connectivity between metapopulations	Construction	Negative	Low	Low	Small	Project Site/ Footprint	Short-term	Infrequent	Reversible	Not Significant
-			Operation					No Residual Effect				
Northern Leopard Frog	HVdc Transmission Line and AC Collector Lines	Fragmentation of sensitive area; habitat alteration/disturbance, resulting in disruption to connectivity between metapopulations; mortality and vehicle-related effects associated with increased use of seasonal access trails and RoWs	Construction	Negative	High	Low	Medium	Local Assessment Area	Short-term	Infrequent	Reversible	Not Significant
			Operation	Negative	High	Low	Small	Local Assessment Area	Short-term	Sporadic/ Intermittent	Reversible	Not Significant
	Keewatinoow Converter Station		Construction	Negative	High	Low	Small	Project Site/ Footprint	Medium - term	Regular/ Continuous	Reversible	Not Significant
			Operation	Negative	High	Low	Small	Project Site/ Footprint	Medium - term	Regular/ Continuous	Reversible	Not Significant
	Riel Converter Station		Construction					No Residual Effect				
			Operation					No Residual Effect				
	Ground Electrodes and Lines	Fragmentation of sensitive area; habitat alteration/disturbance, resulting in disruption to connectivity between metapopulations	Construction	Negative	High	Low	Small	Project Site/ Footprint	Short-term	Infrequent	Reversible	Not Significant
			Operation					No Residual Effect				
-	Borrow Areas and Placement Sites	Fragmentation of sensitive area; habitat alteration/disturbance, resulting in disruption to connectivity between metapopulations	Construction	Negative	High	Low	Small	Project Site/ Footprint	Short-term	Infrequent	Reversible	Not Significant
-			Operation					No Residual Effect				

Table 16. Cont'd

VEC	Project Component	Potential Residual Effects	Phase	Direction	Ecological Importance	Societal Importance	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Residual Effect Significance
Red-sided garter snake	HVdc Transmission Line and AC Collector Lines	Habitat alteration/ disturbance from clearing of RoW and tower installation in sensitive areas; fragmentation of sensitive areas; mortality and vehicle-related effects associated with increased use of seasonal access trails and the RoW; creation of movement corridors along the RoW	Construction	Negative	Moderate	Moderate	Medium	Local Assessment Area	Short-term	Infrequent	Reversible	Not Significant
			Operation	Positive	Moderate	Moderate	Small	Local Assessment Area	Short-term	Regular/ Continuous	Reversible	Not Significant
	Keewatinoow Converter Station		Construction	No Residual Effect								
			Operation	No Residual Effect								
	Riel Converter Station		Construction	No Residual Effect								
			Operation	No Residual Effect								
	Ground Electrodes and Lines		Construction	No Residual Effect								
			Operation	No Residual Effect								
-	Borrow Areas and Placement Sites		Construction	No Residual Effect								
-		-	Operation	No Residual Effect								
Northern Prairie Skink	HVdc Transmission Line and AC Collector Lines	Habitat alteration/ disturbance in sensitive areas	Construction	Negative	High	Low	Medium	Local Assessment Area	Short-term	Infrequent	Reversible	Not Significant
			Operation	Negative	High	Low	Small	Local Assessment Area	Short-term	Infrequent	Reversible	Not Significant
	Keewatinoow Converter Station		Construction	No Residual Effect								
			Operation	No Residual Effect								
	Riel Converter Station		Construction	No Residual Effect								
			Operation	No Residual Effect								
	Ground Electrodes and Lines		Construction	No Residual Effect								
			Operation	No Residual Effect								
-	Borrow Areas and Placement Sites		Construction	No Residual Effect								
-		-	Operation	No Residual Effect								

Table 17. Actions summary table for cumulative effects assessment for the Bipole III Project, as related to TIAR species.

Other Actions by Category	Other Action Description	VEC	Measurable Parameter/Variable	Environmental Effects
Power Generation: Hydro-electric Projects- Past/Existing	Wuskwatim Transmission Project	WOFR, NLFR, GASN	abundance; presence/absence	Induced effect; Increased seasonal recreational use of RoW as a result of Project developments; Increased direct mortality of VEC species that may use associated RoWs as movement corridors; Residual effects include: physical presence of the new facilities, access, productive forest land, as well as standing timber volumes and annual allowable cuts, and loss of wildlife habitat; connectivity of metapopulation between ponds
Power Generation: Hydro-electric Projects- Past/Existing	Other northern transmission projects- Henday and Radisson converter stations	WOFR, NLFR, GASN	abundance; presence/absence	Habitat alteration at project footprints
Power Generation: Hydro-electric Projects- Past/Existing	Riel converter station	WOFR, NLFR, GASN	abundance; presence/absence	Increased Risk of Contingency Events: residual increase in the potential risk of contingency events relating to site construction and operation, but the associated risks are considered to be mitigable, manageable and insignificant; Not expected to cause significant adverse environmental effects given mitigation measures. The risk of related adverse effects (i.e., oil spills and fires) will be mitigated to the maximum extent feasible through design, use of monitoring and alarm systems, compliance with relevant government regulations, and institution of appropriate environmental protection measures, operating procedures and emergency response plans. This will also involve the preparation of a Project-specific EnvPP, which will be adhered to by both Manitoba Hydro staff and contractors.
Power Generation: Hydro-electric Projects- Future	Conawapa Hydroelectric Project	NLFR & WOFR	availability of breeding habitat; breeding habitat quality	Flooding of uplands (higher water level) & change in flow regime; Change in quality and quantity of breeding (i.e., wetland) habitat; decrease of water quality with increased waste-water from construction camp; With flooding of uplands, an increase in the amount of open water may reduce availability of wetland habitat
Power Generation: Hydro-electric Projects- Future	Keeyask Hydroelectric Project	NLFR & WOFR	availability of breeding habitat; breeding habitat quality	Flooding of uplands (higher water level) & change in flow regime; Change in quality and quantity of breeding (i.e., wetland) habitat; decrease of water quality with increased waste-water from construction camp; With flooding of uplands, an increase in the amount of open water may reduce availability of wetland habitat
Resource Harvest - Forestry - Past/Existing	Tolko operation and associated activities - road development	NLFR, WOFR, GASN	availability of breeding habitat; anuran breeding habitat quality	Habitat fragmentation, alterations of microhabitat; Air: Timber harvesting activities within FML Area No. 2 will not result in any significant air quality impacts. Moreover, the operation of heavy equipment will have very localized effects. One activity that may have a limited (and significantly minimal) transboundary effect, depending on intensity and location, is the burning of debris within a cut block; potential impacts on wildlife will be mitigated by adherence to the practices and strategies for these species.

Table 17. Continued.

Other Actions by Category	Other Action Description	VEC	Measurable Parameter/Variable	Environmental Effects
Resource Harvest - Forestry - Past/Existing	Louisiana-pacific operations and associated activities - road development	PSFO, NLFR, WOFR, GASN	water quality	Habitat fragmentation; water quality; loss of old growth or late-seral stage forest and associated availability of microhabitat such as downed woody debris; LPC's commitments to comply with federal and provincial statutes, regulations, guidelines and policies, in addition to environmental protection commitments in the FMP SOPs and its intent to create ecosystem data using PHSs, should effectively mitigate most of the adverse potential impacts associated with FMP implementation.
Resource Harvest - Forestry - Future	Unknown	PSFO, NLFR, WOFR, GASN		
Resource Harvest - Agriculture	Agricultural development	Skippers; NLFR, WOFR, GASN, NPSK		Conversion of prairie lands; infilling of wetlands; for wetlands, best management practises should mitigate loss of wetlands in the prairies during agricultural development; herbicide (or fungicide in the potato belt) use & run-off
Resource Extraction - Mining - Past/Existing	Companies in and around the nickelbelt e.g. (Vale-Inco, Pure Nickel, Crowflight minerals, Hudson Bay Exploration and Development Company)	GASN, WOFR, NLFR		potential hibernacula disturbance, potential changes in water quality in anuran breeding habitat
Resource Extraction - Mining - Past/Existing	Mining exploration	GASN		potential hibernacula disturbance
Resource Extraction - Mining - Future	Unknown	GASN, WOFR, NLFR		potential hibernacula disturbance, potential changes in water quality in anuran breeding habitat
Resource Extraction - Oil Pipelines - Past/Existing		OTSK, UNSK, DASK, NLFR, WOFR, GASN, NPSK		negligible effects with proper compliance of mitigation recommendations
Resource Extraction - Fibre Optics - Past/Existing		OTSK, UNSK, DASK, NLFR, WOFR, GASN, NPSK		negligible effects with proper compliance of mitigation recommendations
Infrastructure - Past/Existing	Winter roads	NLFR & WOFR	quality of breeding habitat	

Table 17. Continued.

Other Actions by Category	Other Action Description	VEC	Measurable Parameter/Variable	Environmental Effects
Infrastructure - Past/Existing	Highways and major roadways	GASN, NLFR & WOFR	quality and quantity of suitable habitat; adundance; presence/absence	Habitat fragmentation; direct mortality
Infrastructure - Future	New highway construction and upgrading, winter road development	All VECs: OTSK, UNSK, DASK, NLFR, WOFR, PSFO, GASN, NPSK	quality and quantity of suitable habitat; adundance; presence/absence	Habitat fragmentation; direct mortality
Infrastructure	Floodway Project	WOFR, NLFR	breeding habitat quality and quantity	
Activities	Resource Use	NLFR	abundance; presence/absence	NLFR Harvesting for Biological supply houses
Natural Events	Floods	NLFR & WOFR	breeding habitat quality and quantity	
Natural Events	Fire	Skippers & NPSK	quality and quantity of suitable habitat	increase in suitable habitat where vegetational encroachment is occurring in sand prairie habitat and forest habitat
Natural Events	Wind/tornadoes	GASN; NLFR & WOFR & PSFO	changes in habitat quality and quantity	increase in woody debris and microhabitat availability
Natural Events	Climate Change	All VECs: OTSK, UNSK, DASK, NLFR, WOFR, PSFO, GASN, NPSK	quality and quantity of suitable habitat	long-term changes to availability, quality, and geographical extent of suitable habitat

9.0 Figures

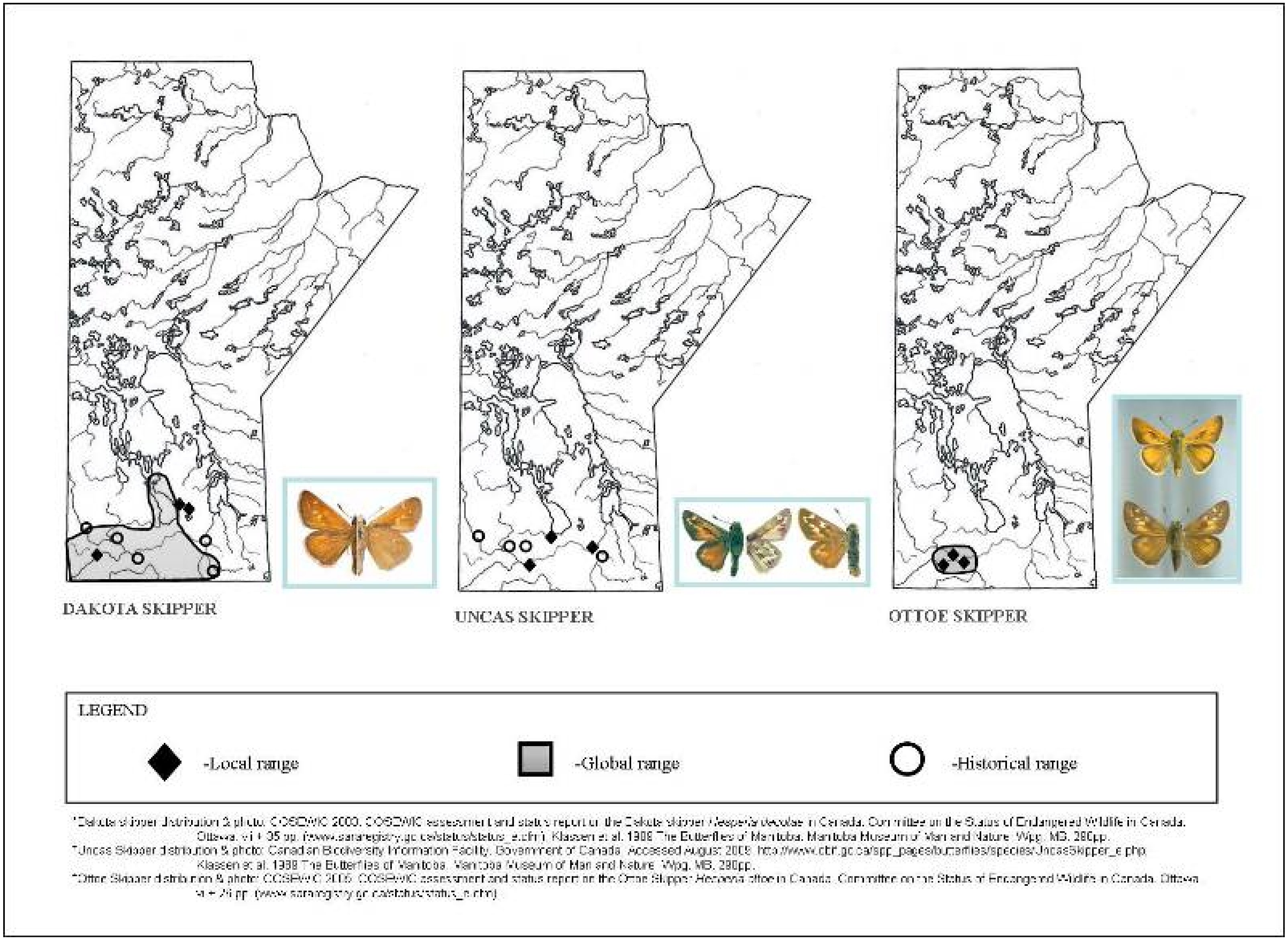


Figure 1. Distribution of Dakota skipper (*Hesperia dacotae*), Uncas skipper (*Hesperia uncas*) and Ottoe skipper (*Hesperia ottoe*) within Manitoba.

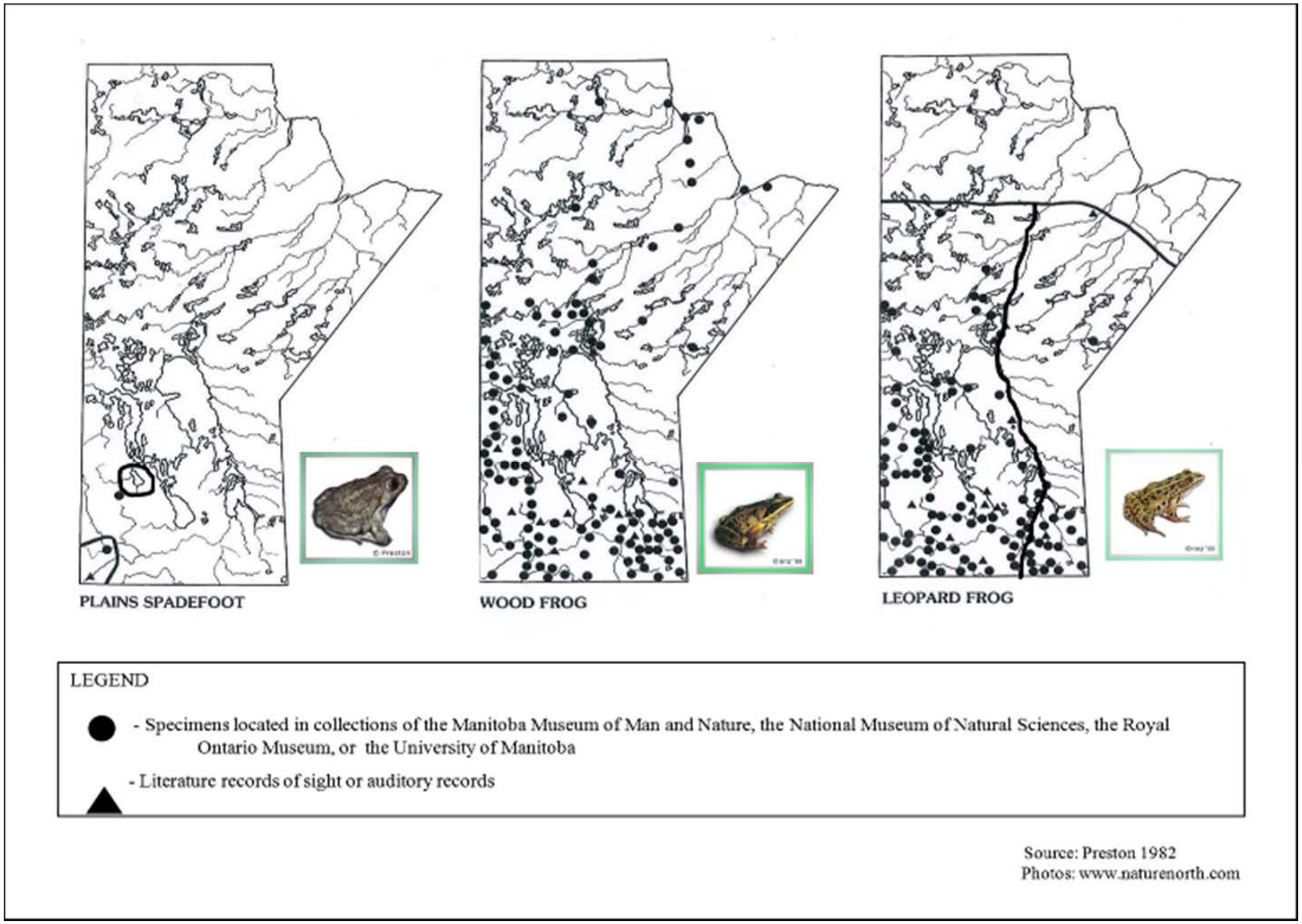


Figure 2. Distribution of plains spadefoot (*Spea bombifrons*), wood frog (*Lithobates sylvaticus*) and northern leopard frog (*Lithobates pipiens*) within Manitoba. For the northern leopard frog, Western Boreal/Prairie (west of vertical line) and Eastern populations (east of vertical line) are identified.

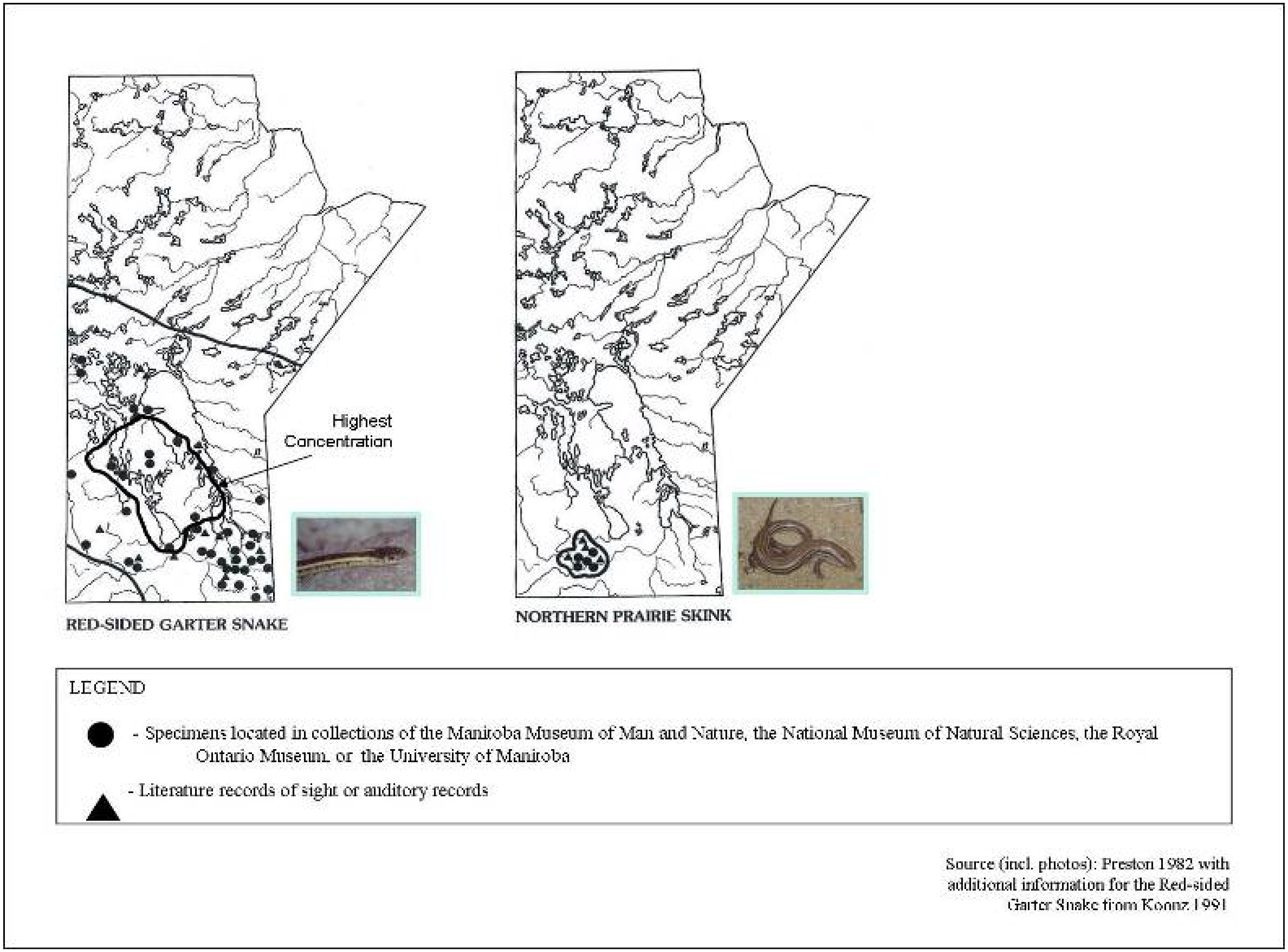


Figure 3. Distribution of red-sided garter snake (*Thamnophis sirtalis parietalis*) and northern prairie skink (*Plestiodon septentrionalis septentrionalis*) within Manitoba.

10.0 Photos

Photo 1. Habitat found in Dakota skipper suitable habitat model polygon Track 6.

Photo 2. Habitat found in Dakota skipper suitable habitat model polygon Track 6.

Photo 3. Habitat found in Dakota skipper suitable habitat model polygon Track 5.

Photo 4. Habitat found in Dakota skipper suitable habitat model polygon Track 7.

Photo 5. Habitat found in Dakota skipper suitable habitat model polygon Track 13.

Photo 6. Habitat found in Dakota skipper suitable habitat model polygon Track 13.

Photo 7. Habitat found in Dakota skipper suitable habitat model polygon Tracks 11 & 12.

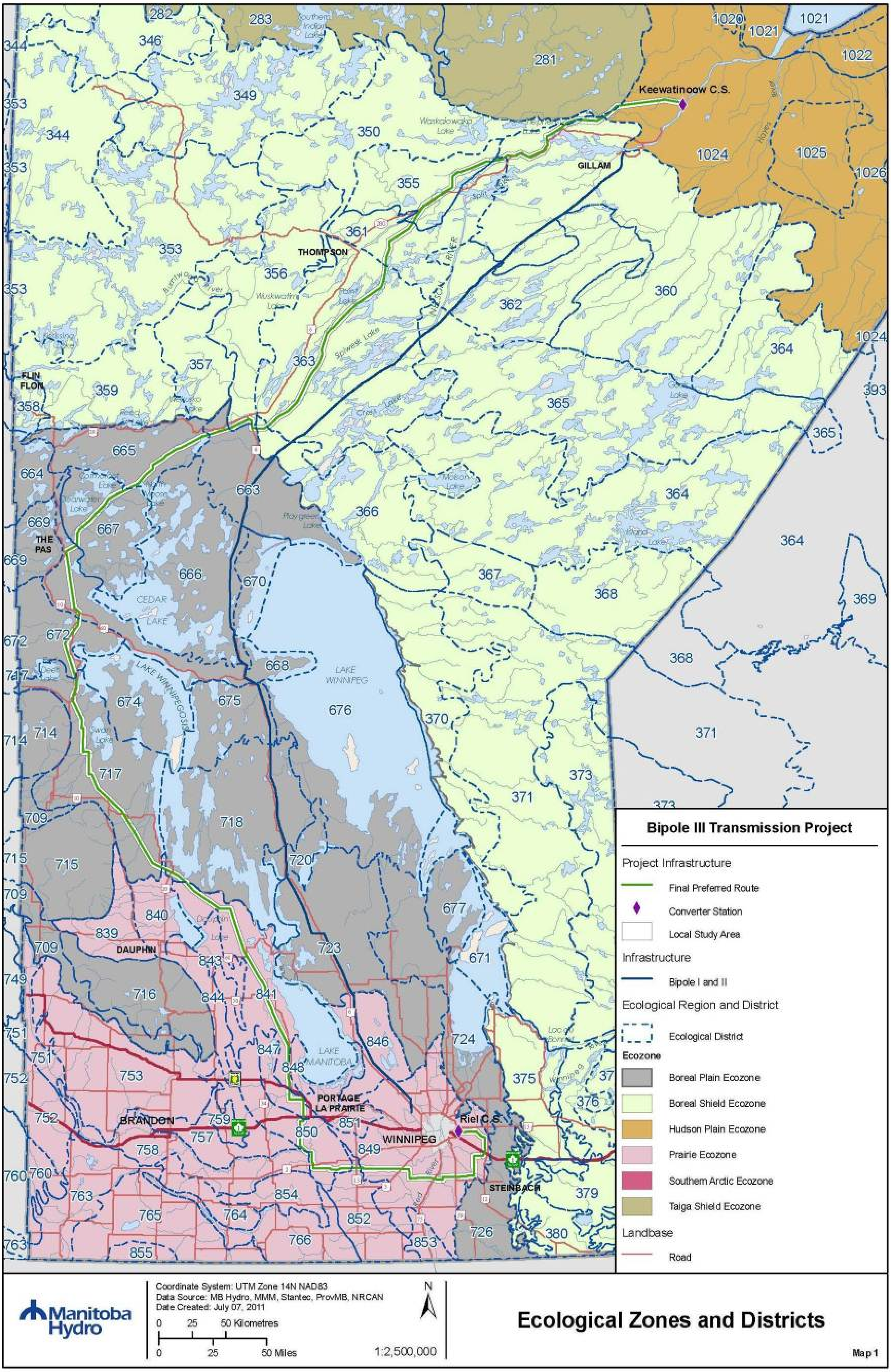
Photo 8. Habitat found in Dakota skipper suitable habitat model polygon Tracks 11 & 12.

Photo 9. Habitat found in Dakota skipper suitable habitat model polygon Tracks 11 & 12.

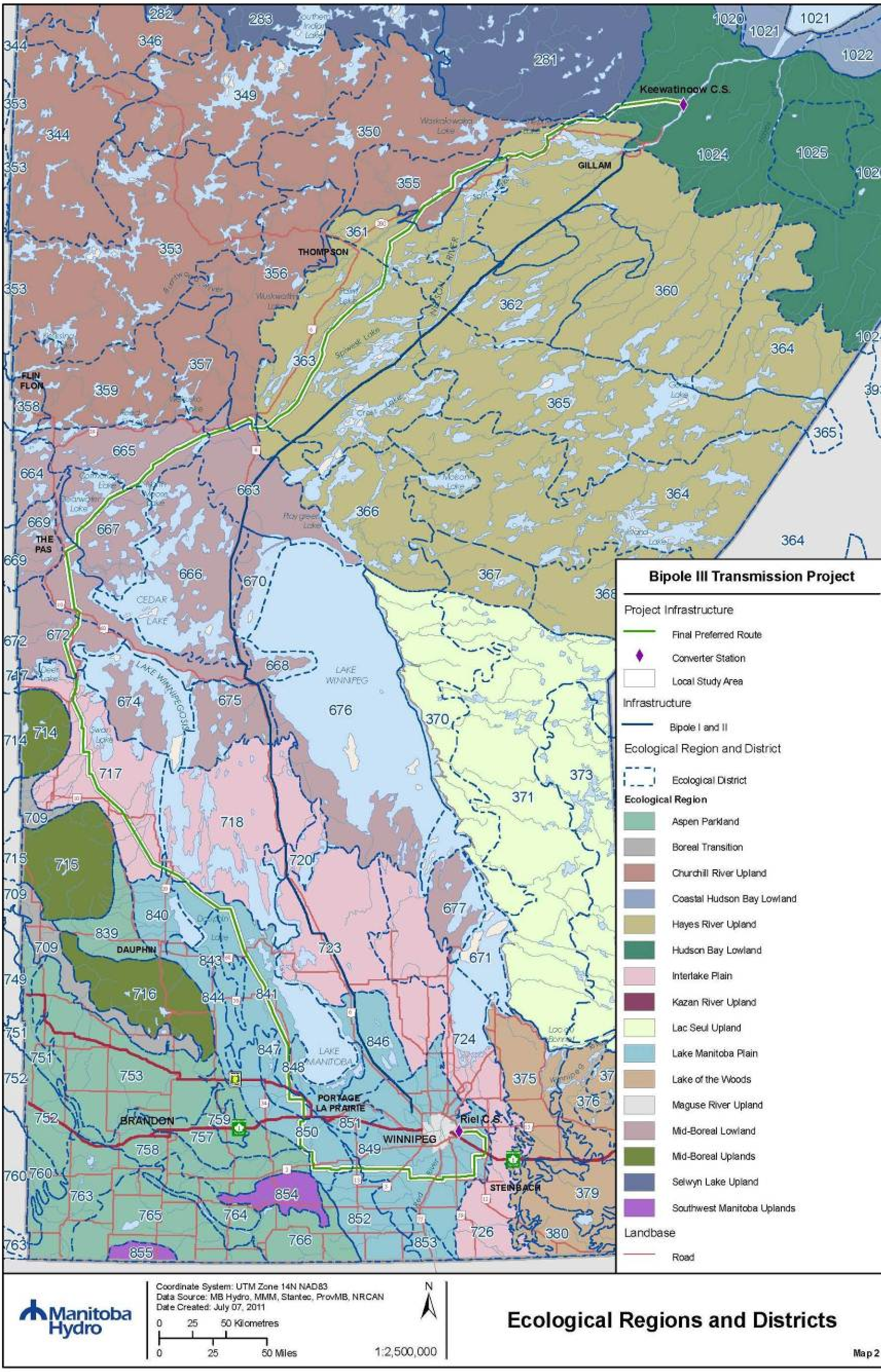
Photo 10. Potential prairie skink tracks observed at habitat model polygon Track 8.

Photo 11. Potential prairie skink tracks observed approximately 500m south-west of habitat model polygon Track 4.

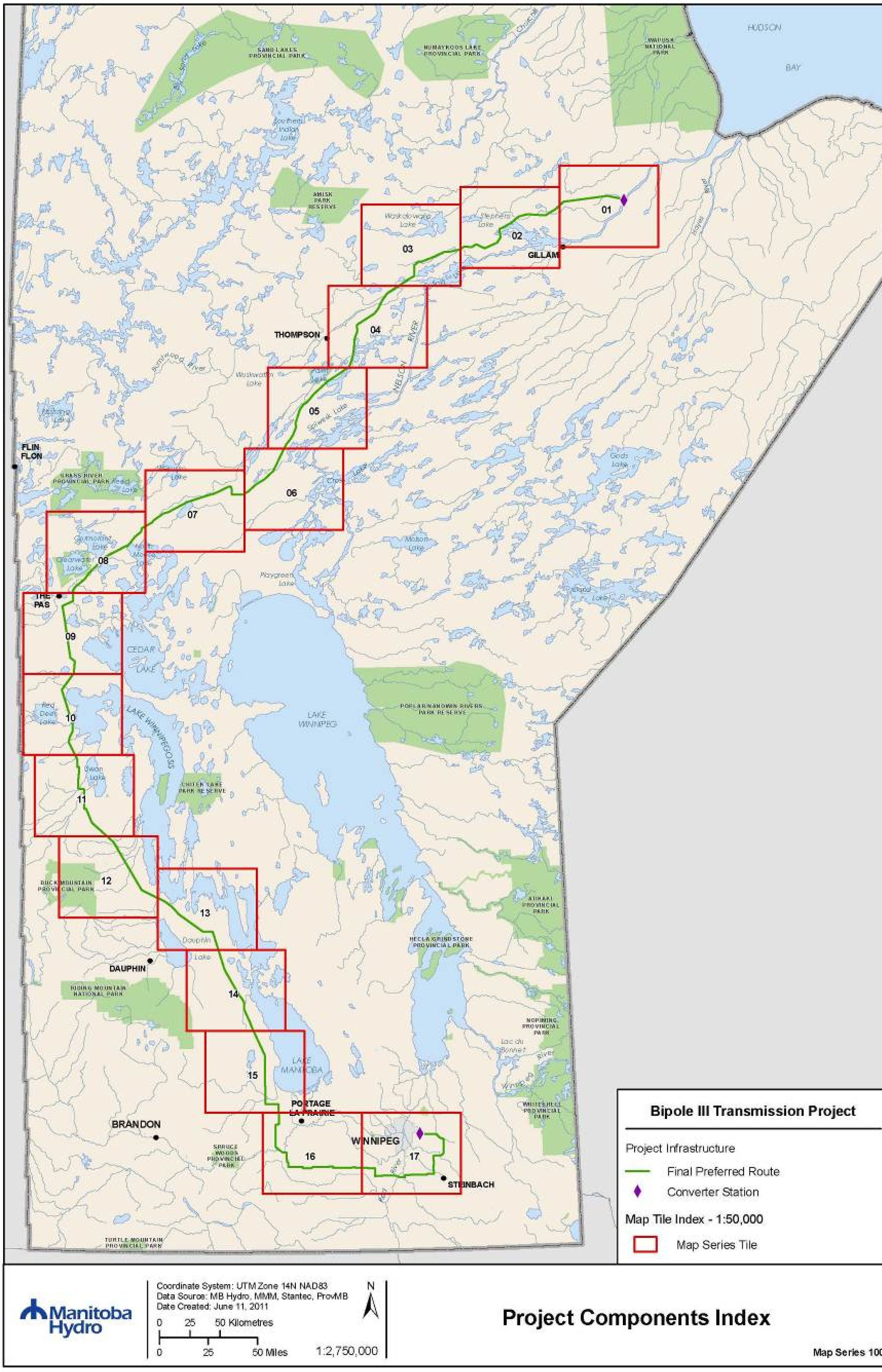
11.0 Maps



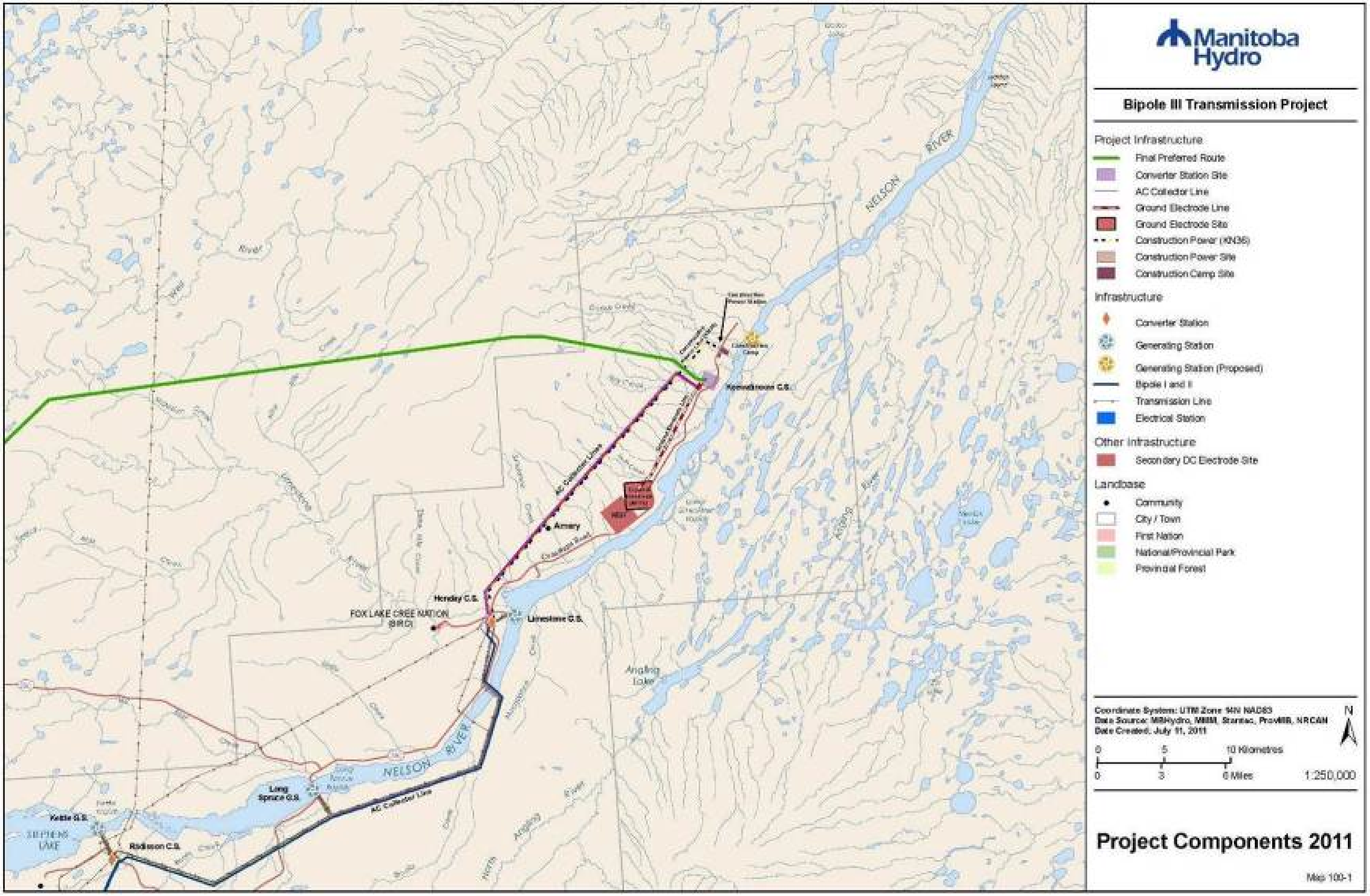
Map 1. HVdc transmission line routing for the Bipole III Transmission Project, overlapping Manitoba’s ecozones.



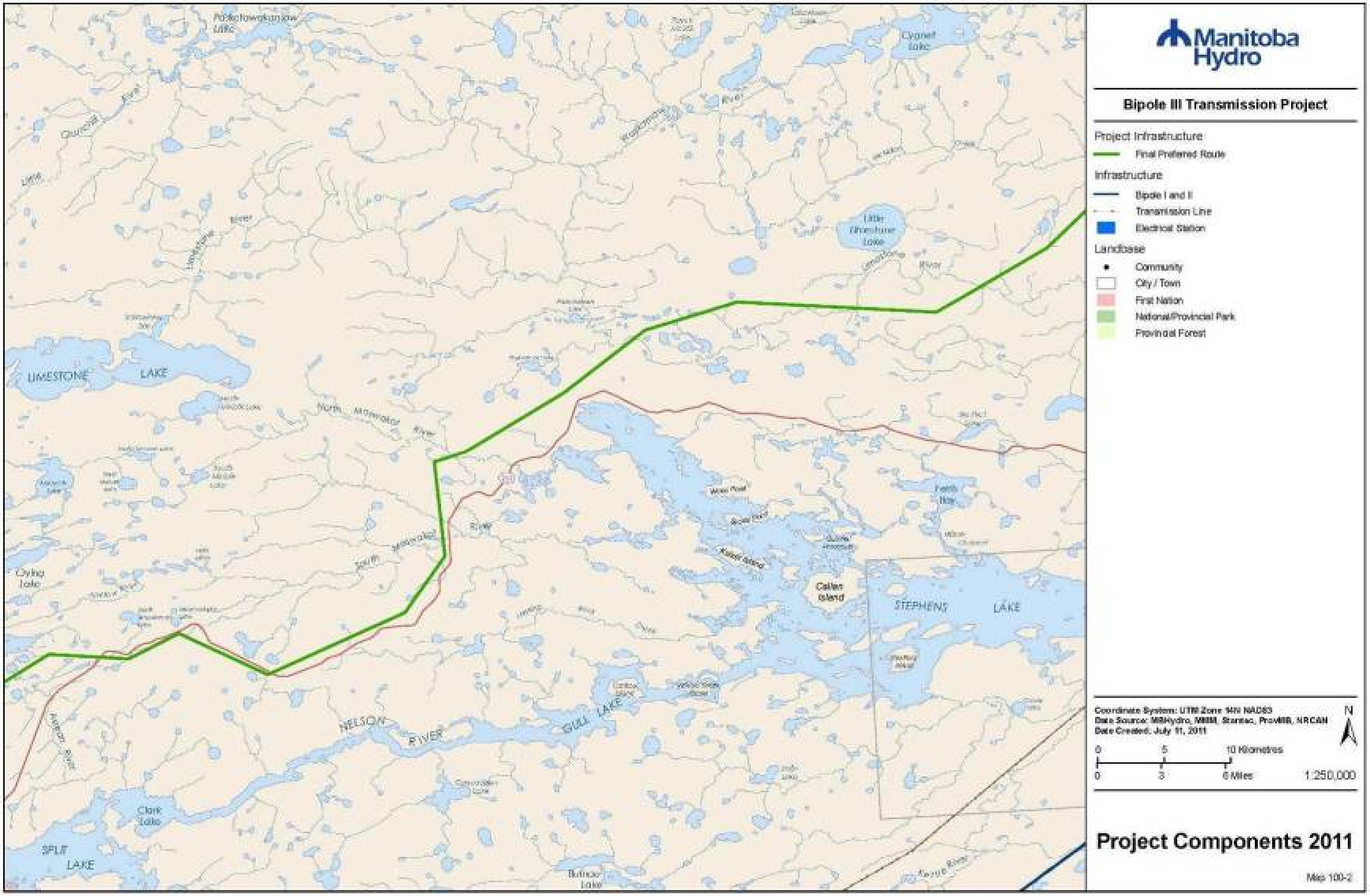
Map 2. HVdc transmission line routing for the Bipole III Transmission Project, overlapping Manitoba's ecoregions.



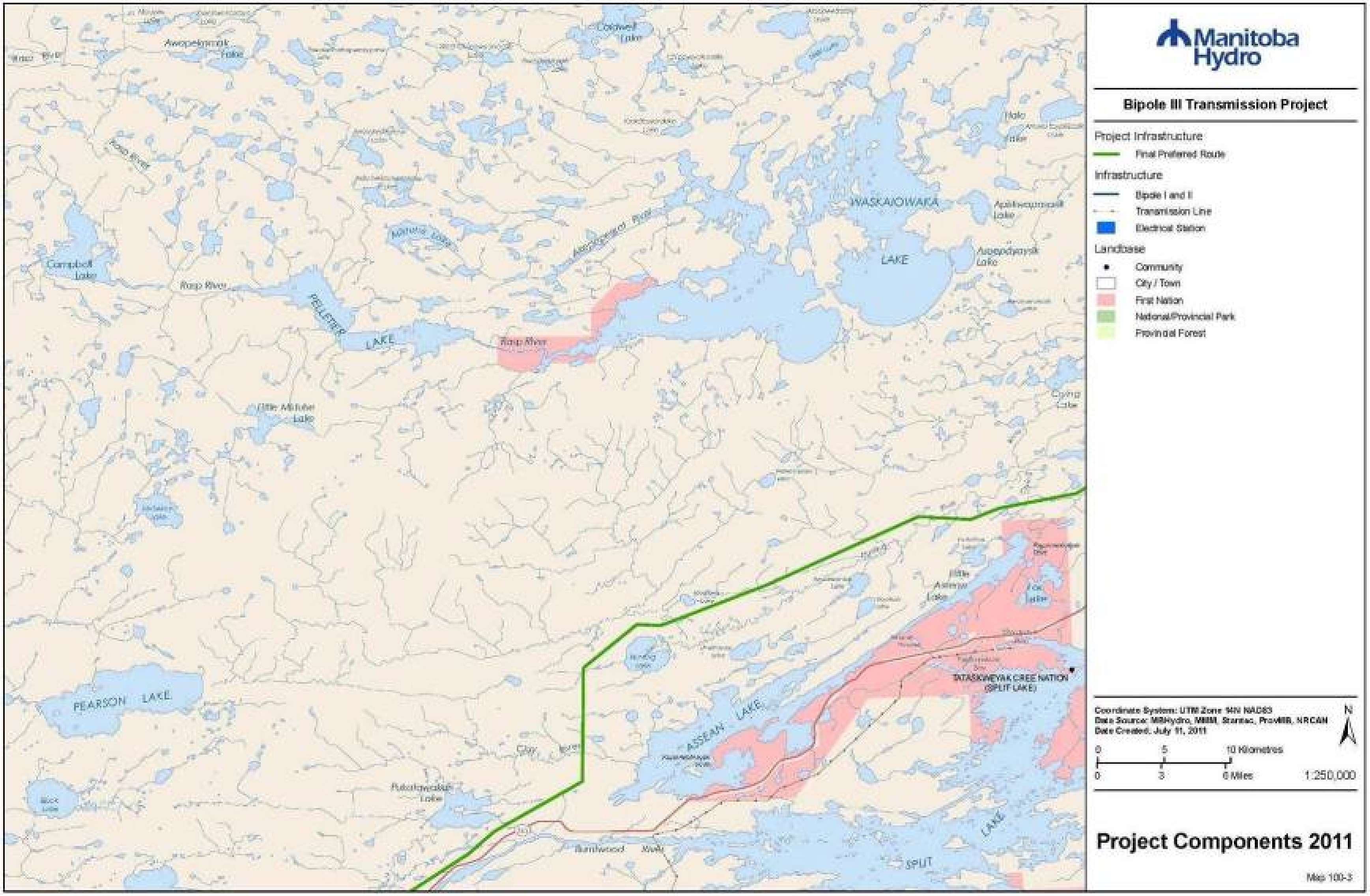
Map Series 100. Index map of the Bipole III Transmission Project HVdc transmission line route and associated project components.



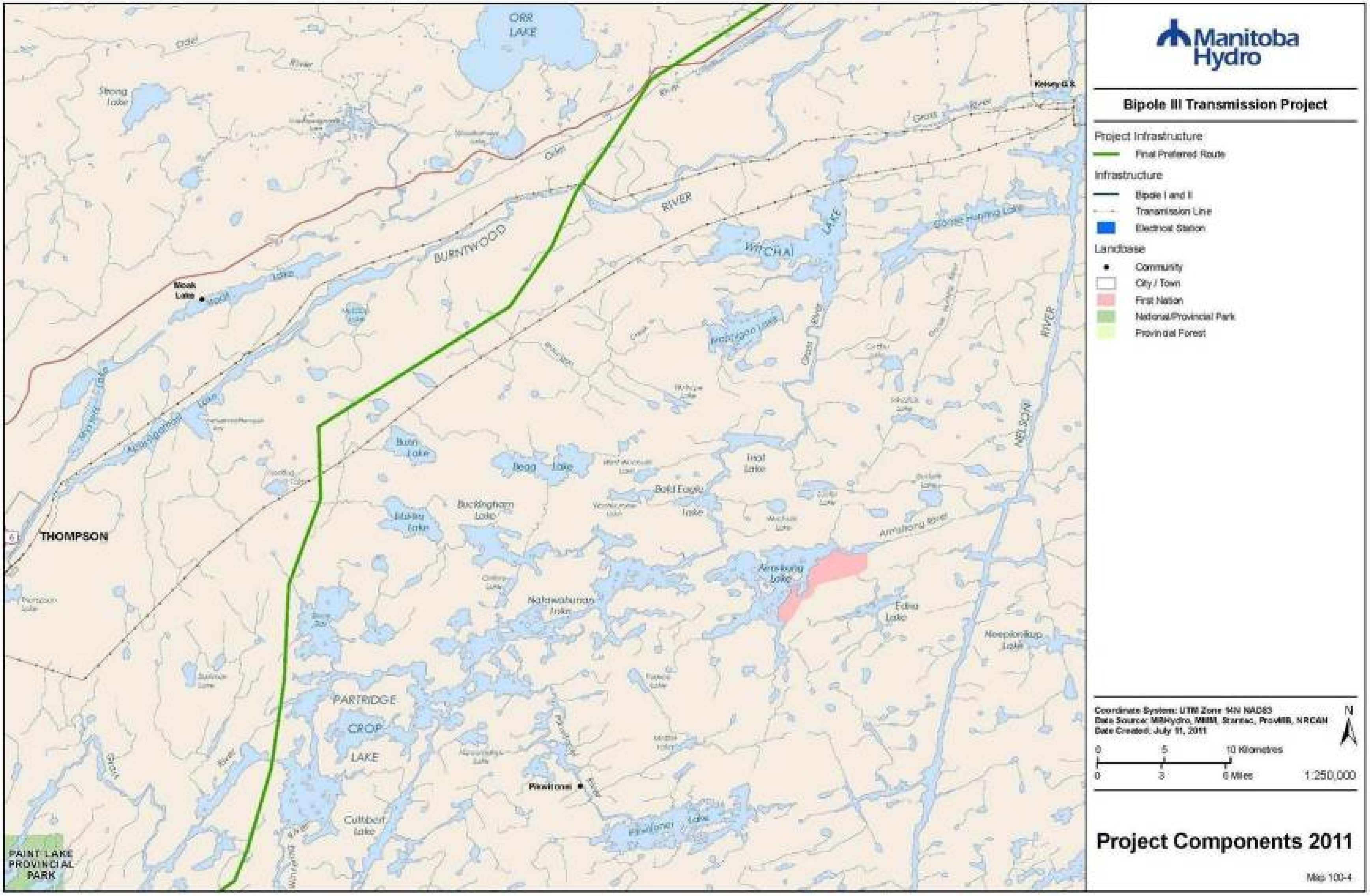
Map Series 100-1. Bipole III Transmission Project HVdc transmission line route and associated project components.



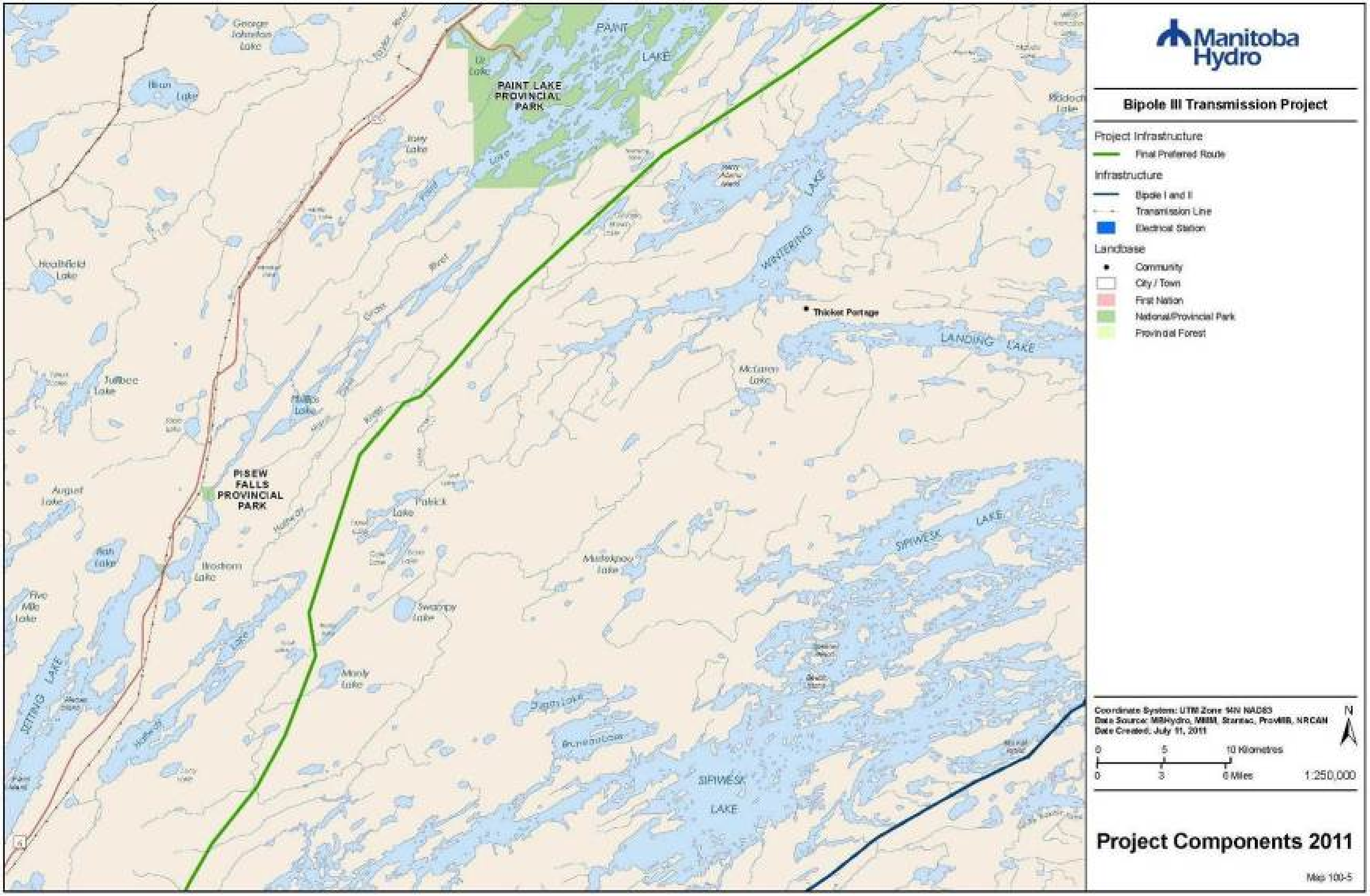
Map Series 100-2. Bipole III Transmission Project HVdc transmission line route and associated project components.



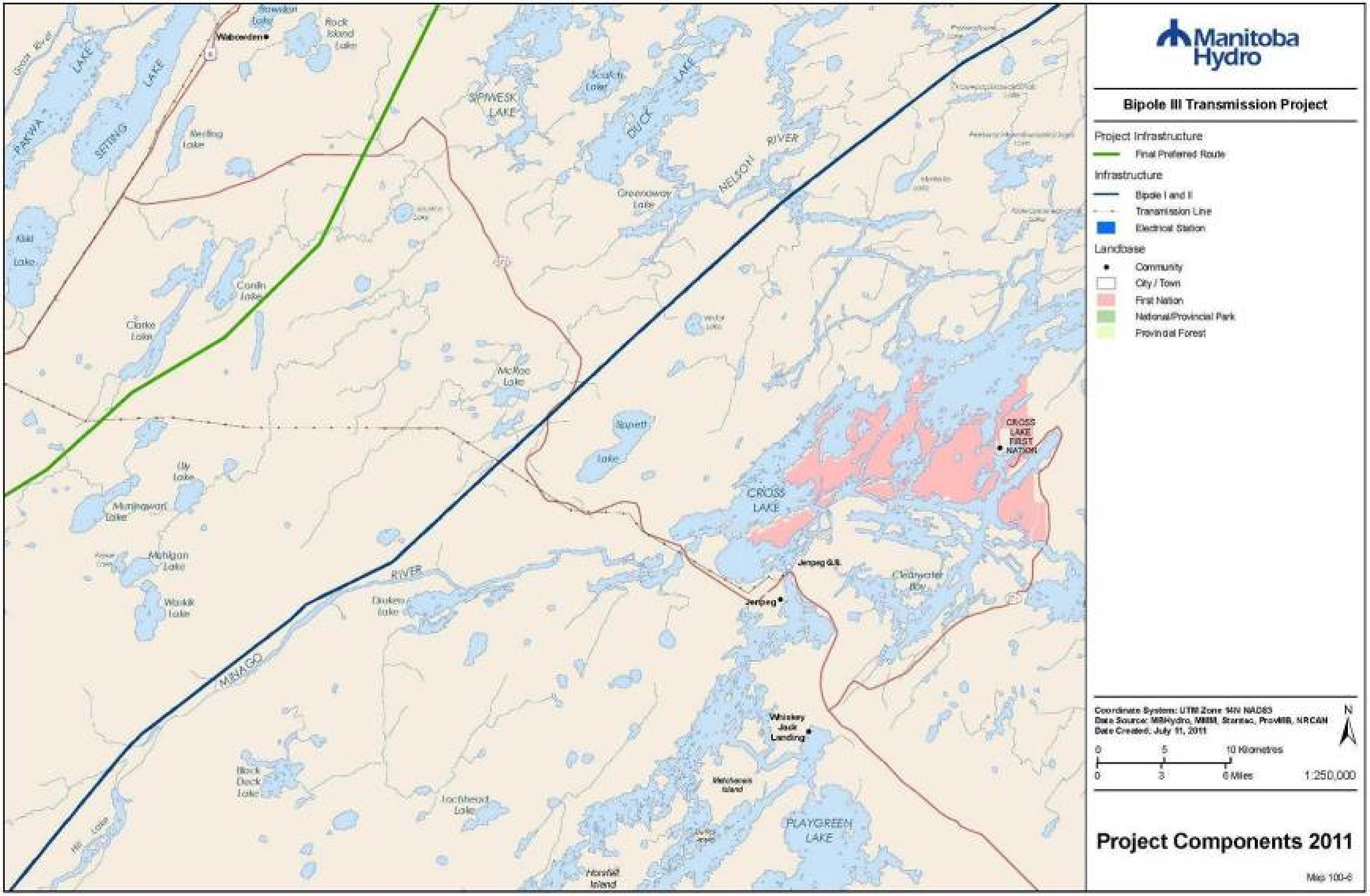
Map Series 100-3. Bipole III Transmission Project HVdc transmission line route and associated project components.



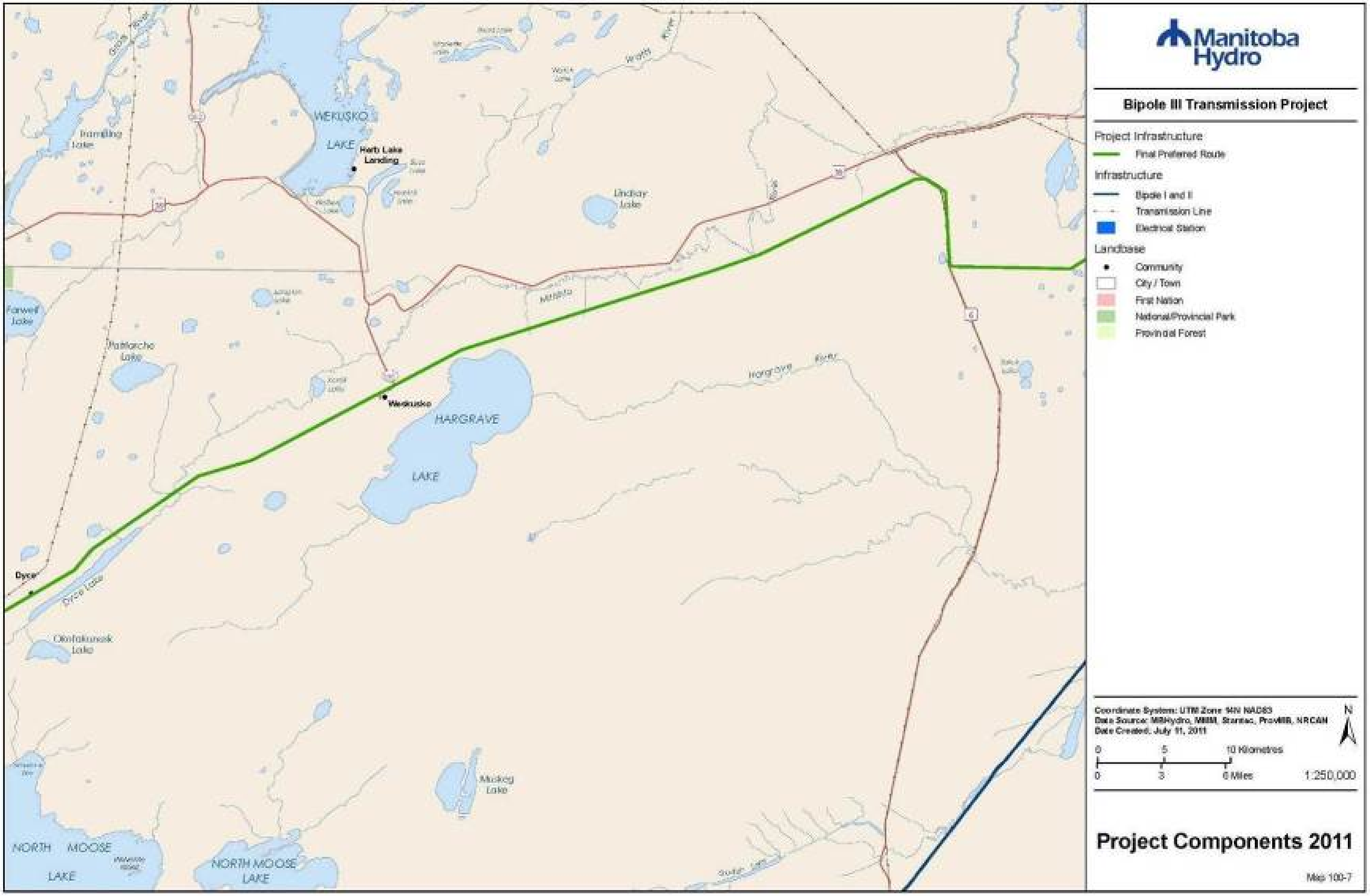
Map Series 100-4. Bipole III Transmission Project HVdc transmission line route and associated project components.



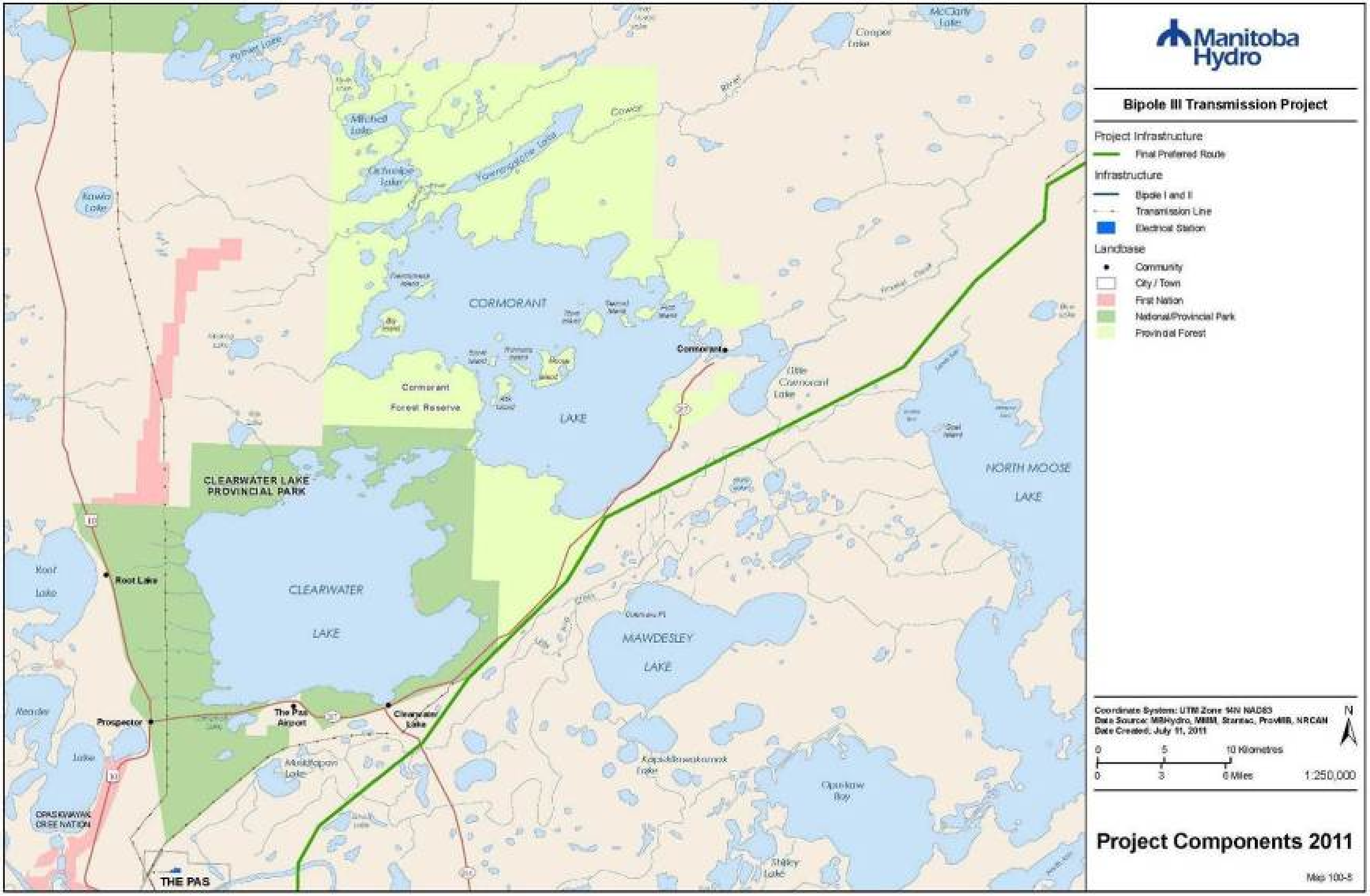
Map Series 100-5. Bipole III Transmission Project HVdc transmission line route and associated project components.



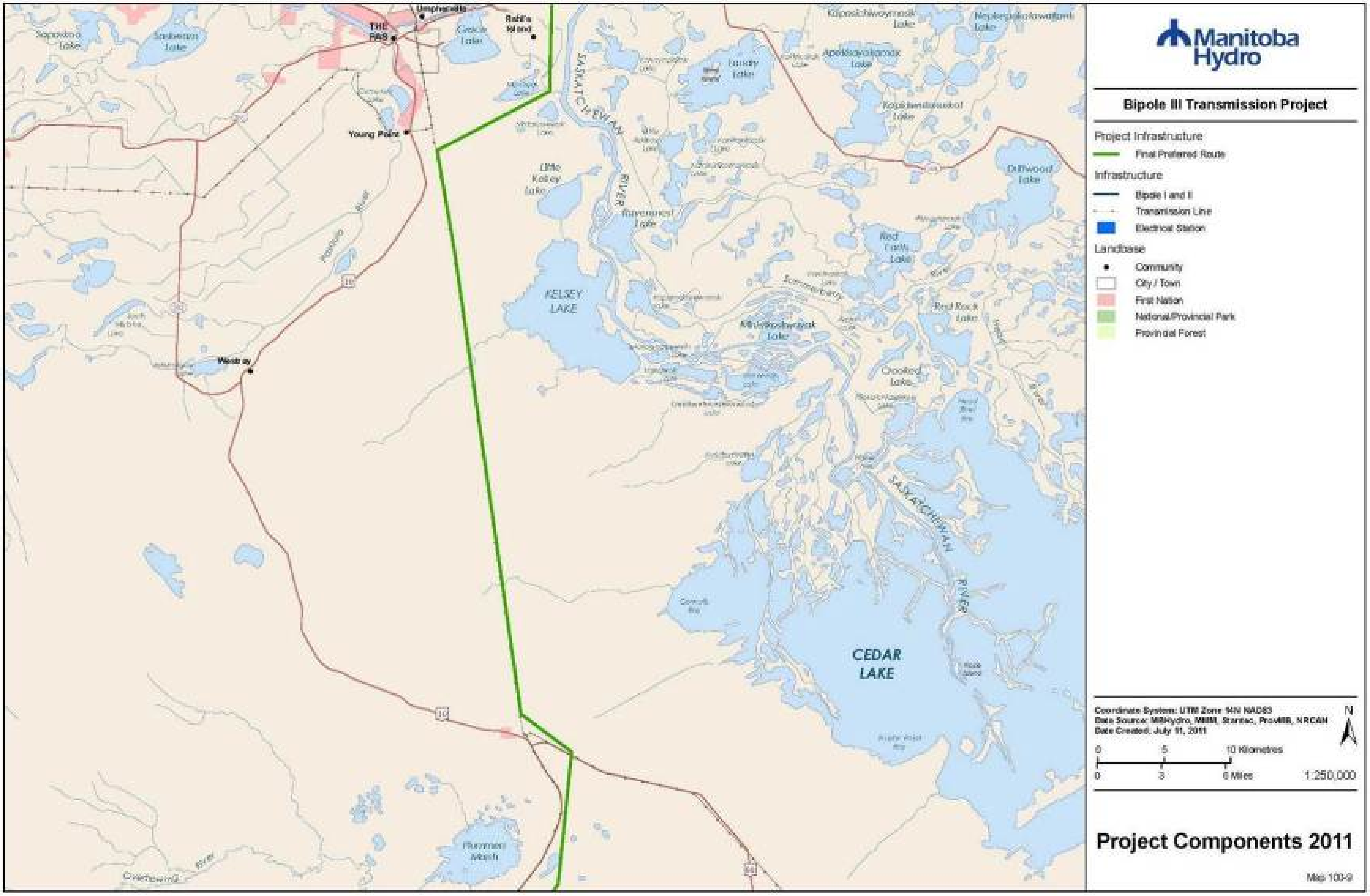
Map Series 100-6. Bipole III Transmission Project HVdc transmission line route and associated project components.



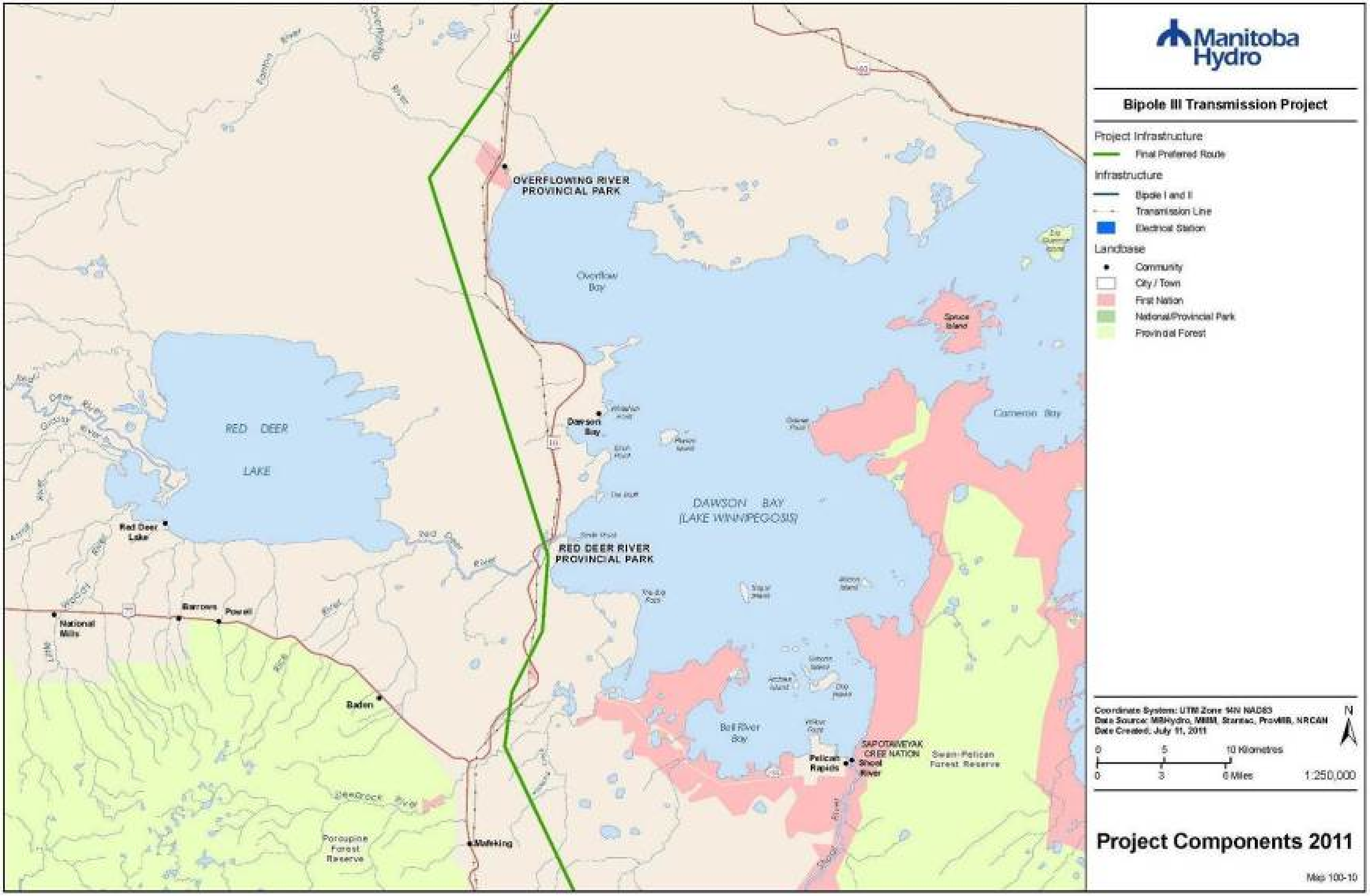
Map Series 100-7. Bipole III Transmission Project HVdc transmission line route and associated project components.



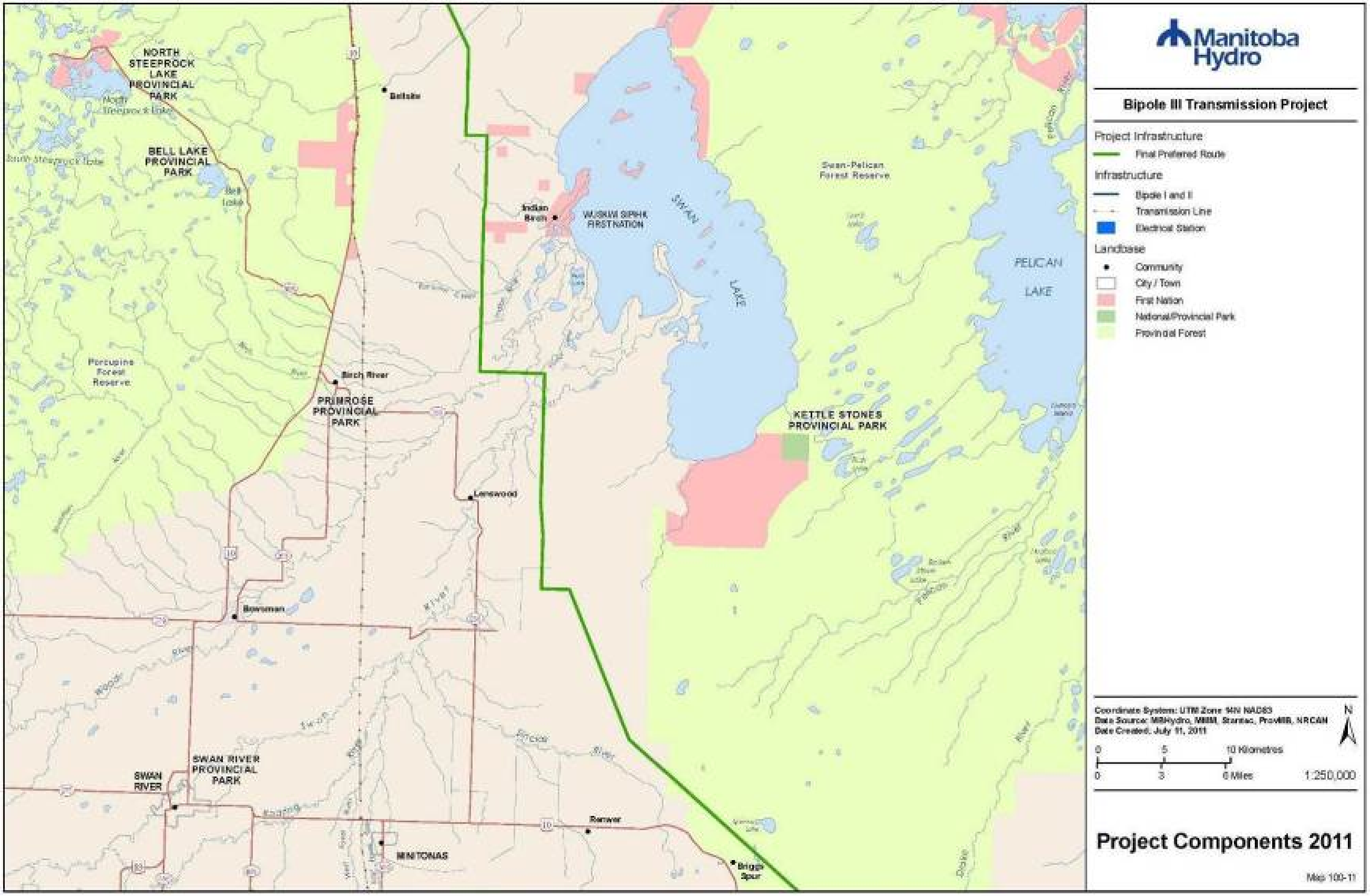
Map Series 100-8. Bipole III Transmission Project HVdc transmission line route and associated project components.



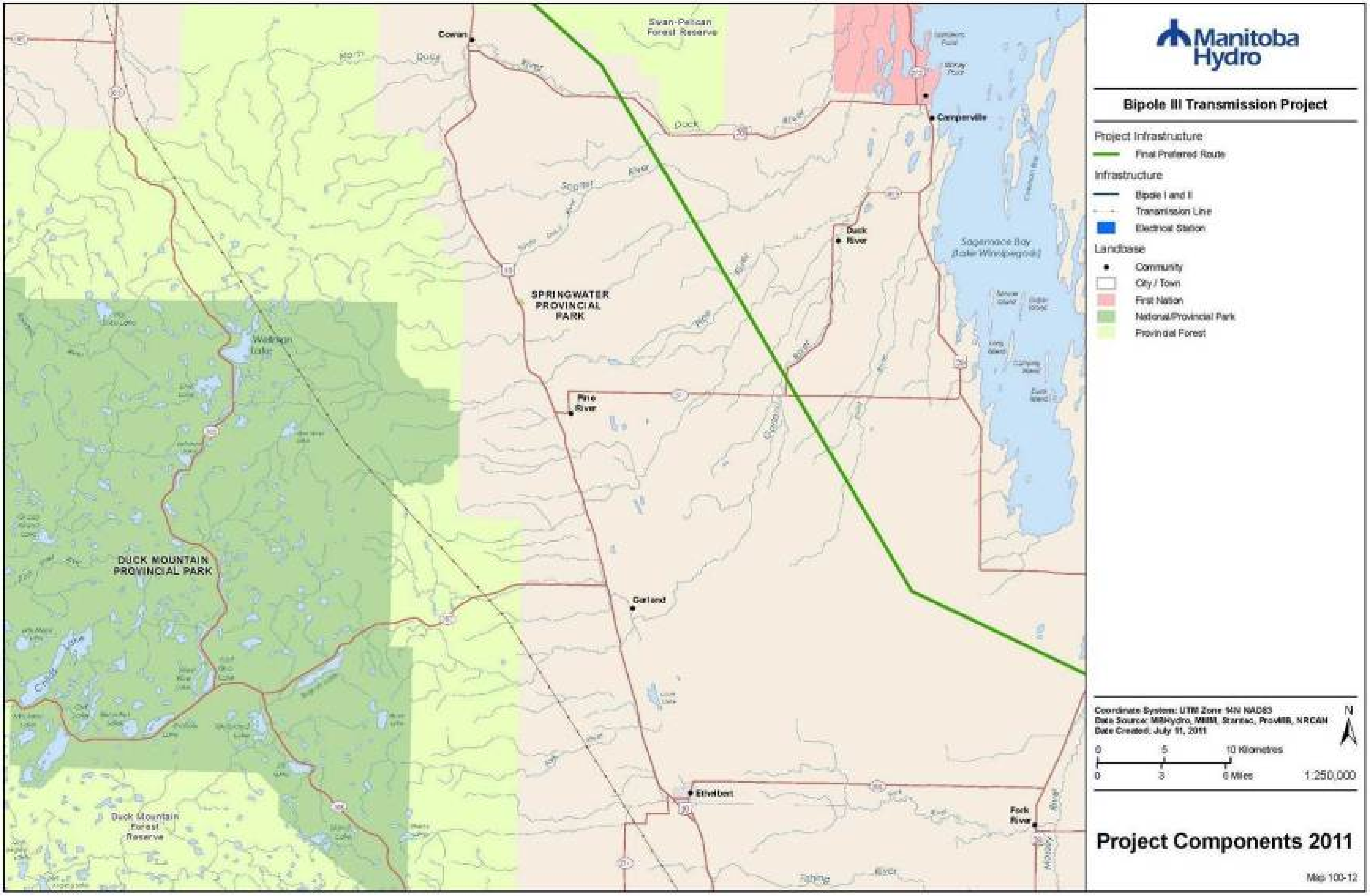
Map Series 100-9. Bipole III Transmission Project HVdc transmission line route and associated project components.



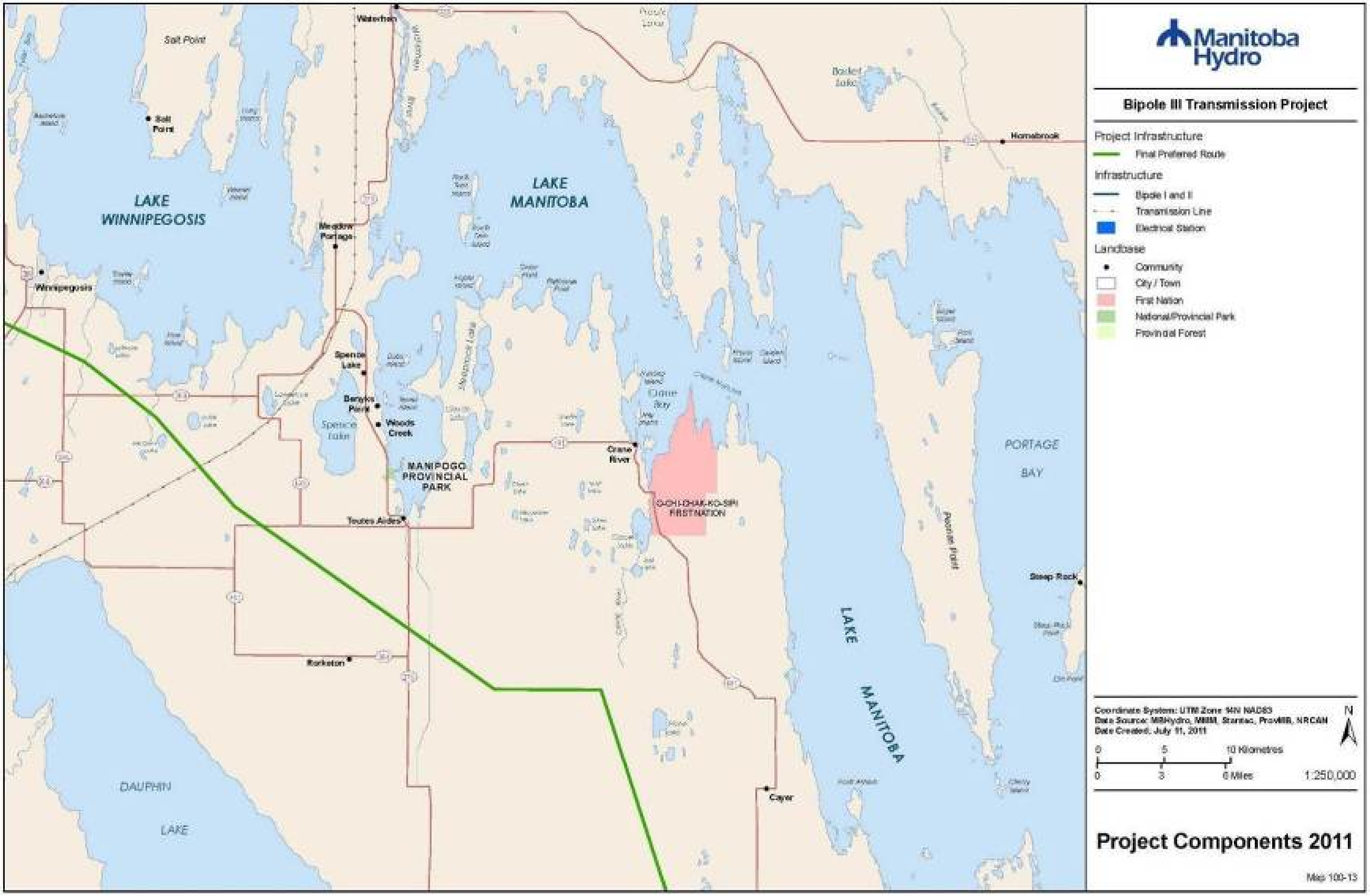
Map Series 100-10. Bipole III Transmission Project HVdc transmission line route and associated project components.



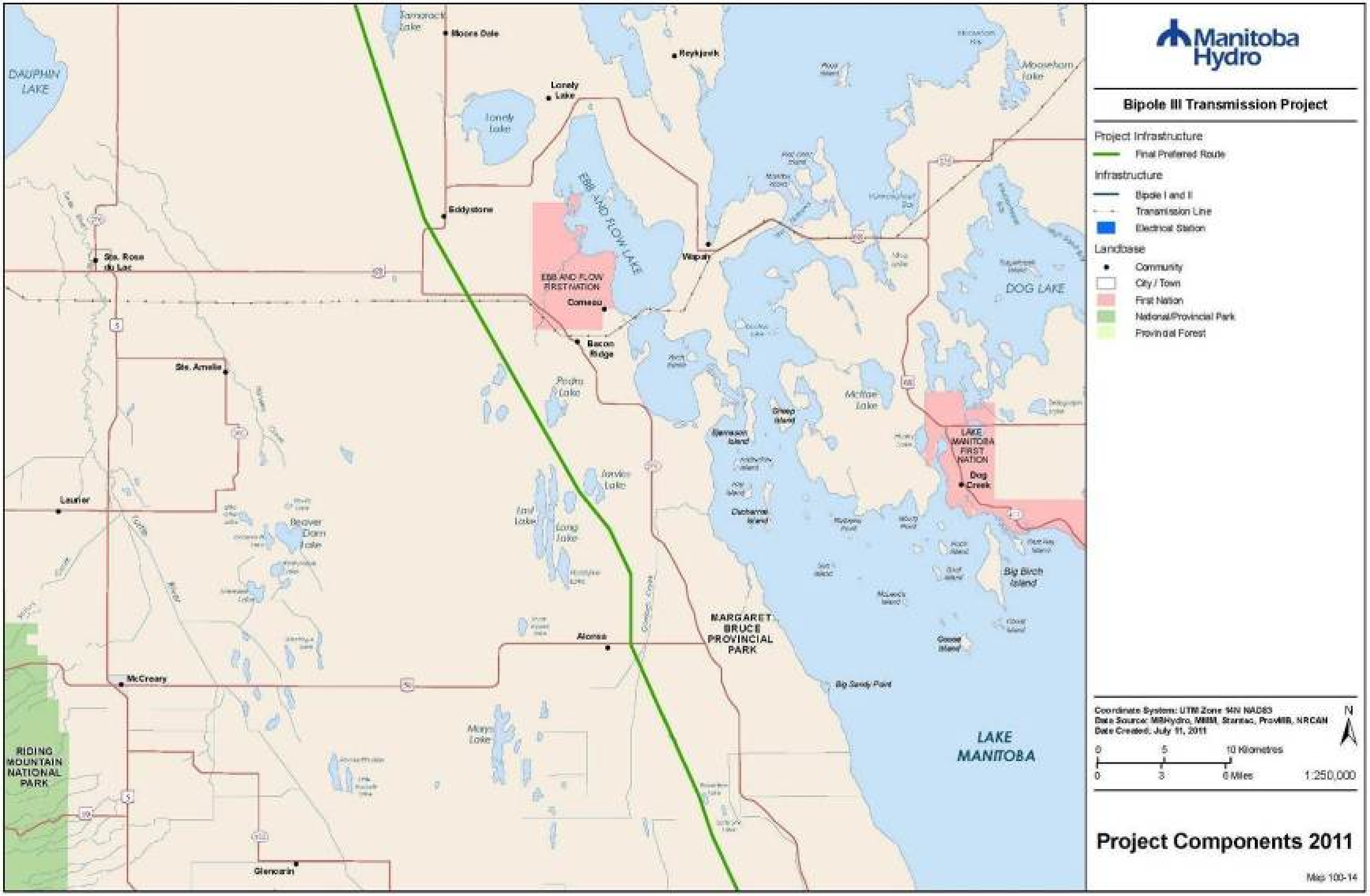
Map Series 100-11. Bipole III Transmission Project HVdc transmission line route and associated project components.



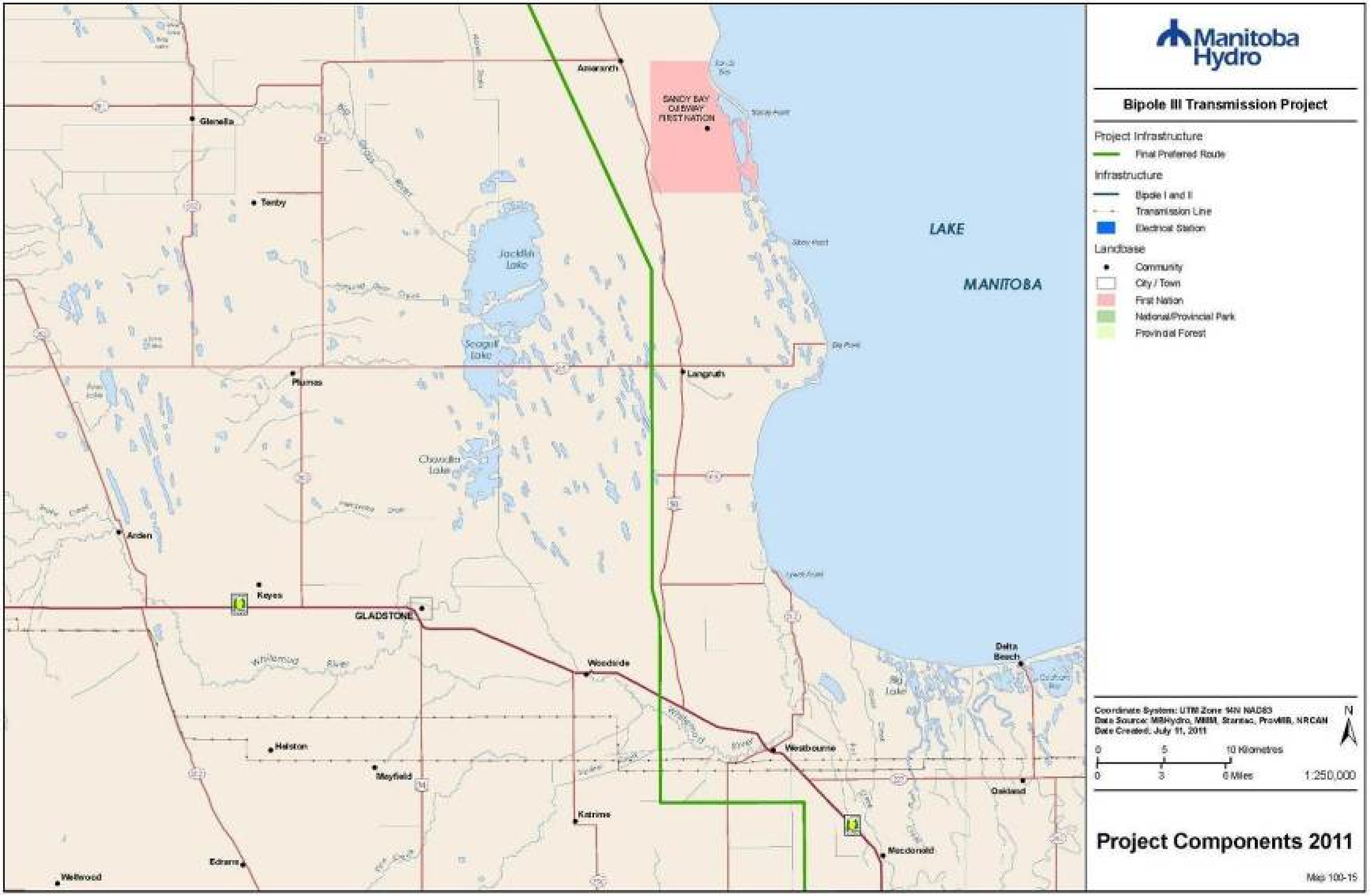
Map Series 100-12. Bipole III Transmission Project HVdc transmission line route and associated project components.



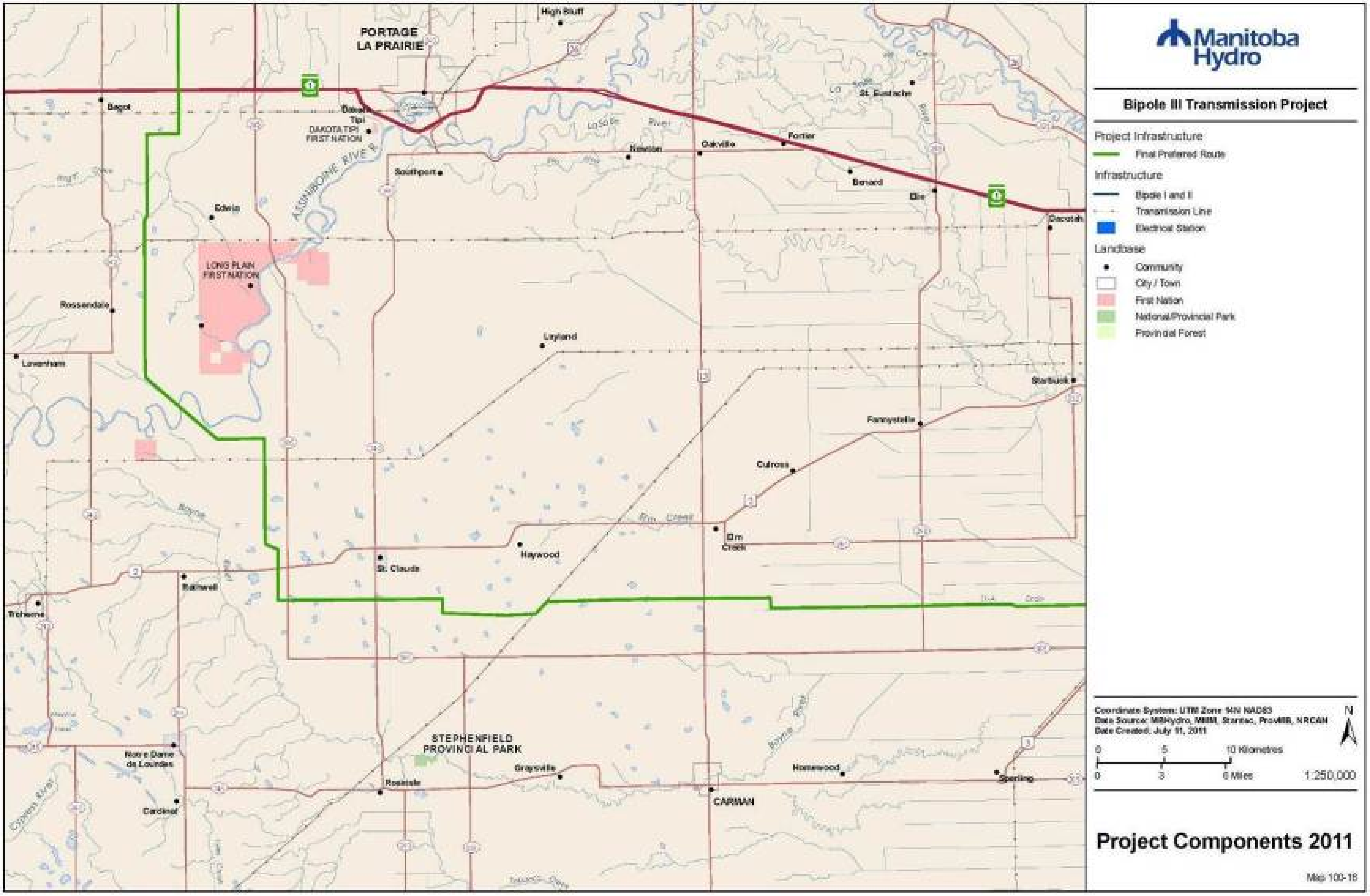
Map Series 100-13. Bipole III Transmission Project HVdc transmission line route and associated project components.



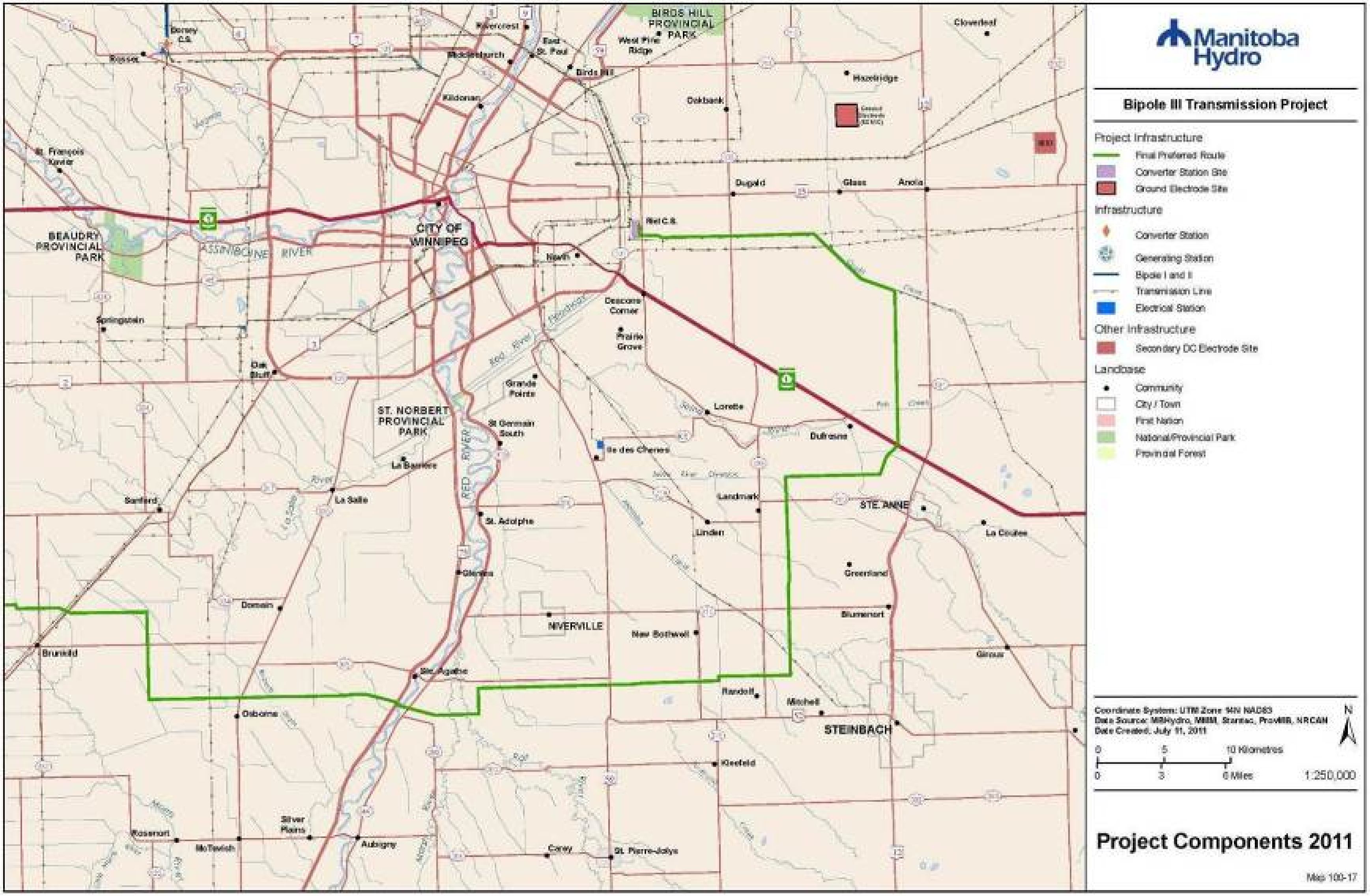
Map Series 100-14. Bipole III Transmission Project HVdc transmission line route and associated project components.



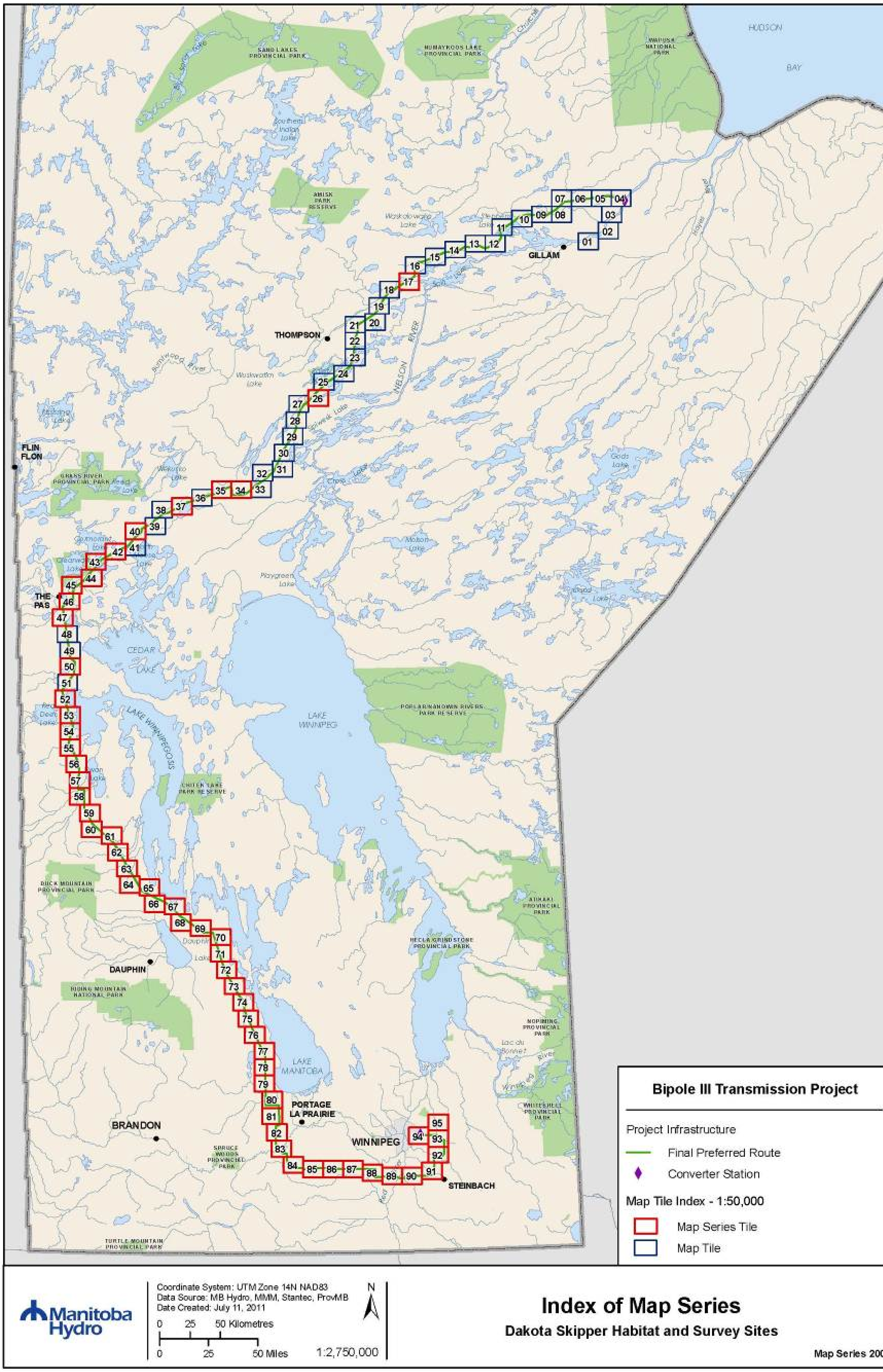
Map Series 100-15. Bipole III Transmission Project HVdc transmission line route and associated project components.



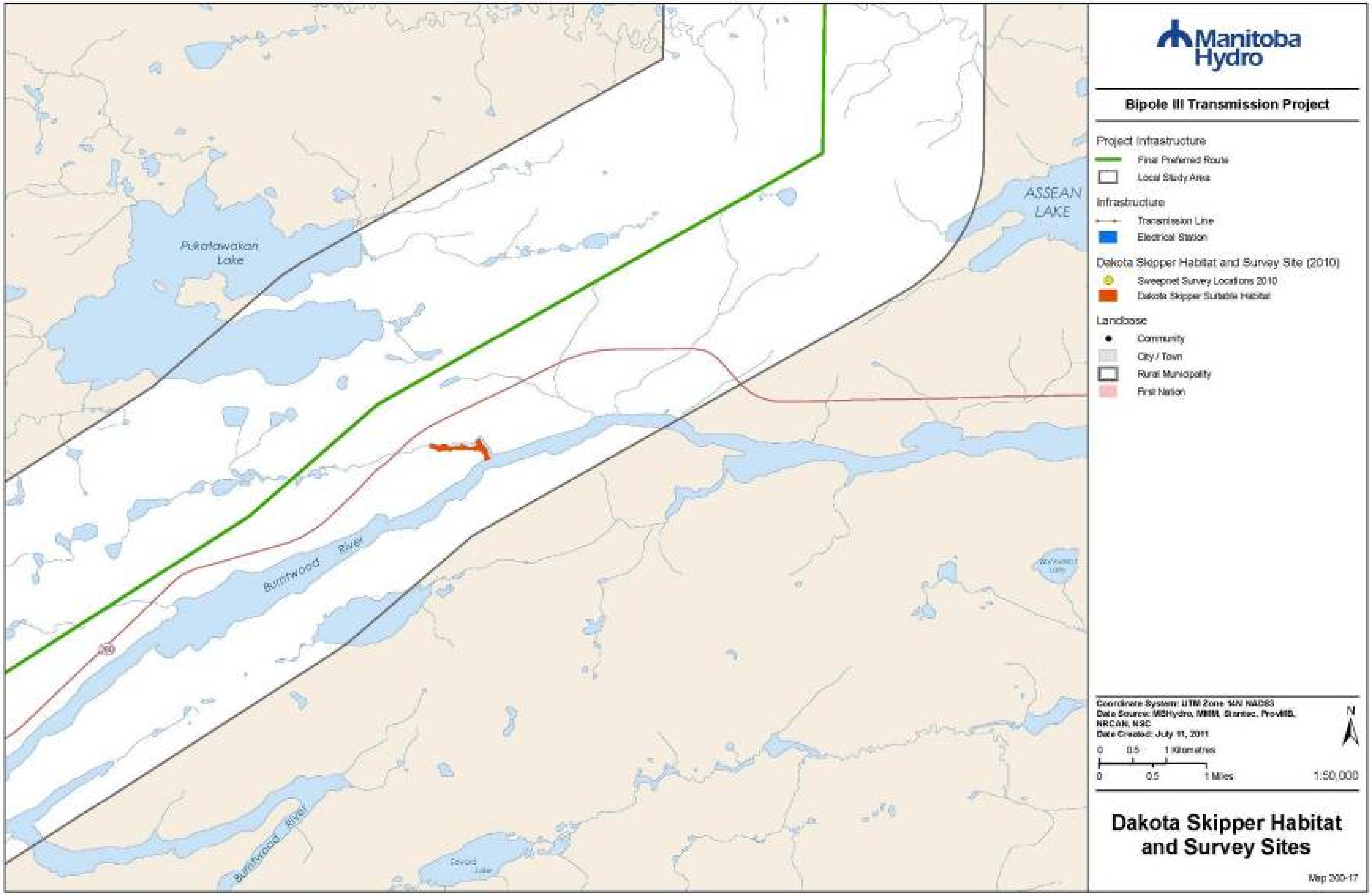
Map Series 100-16. Bipole III Transmission Project HVdc transmission line route and associated project components.



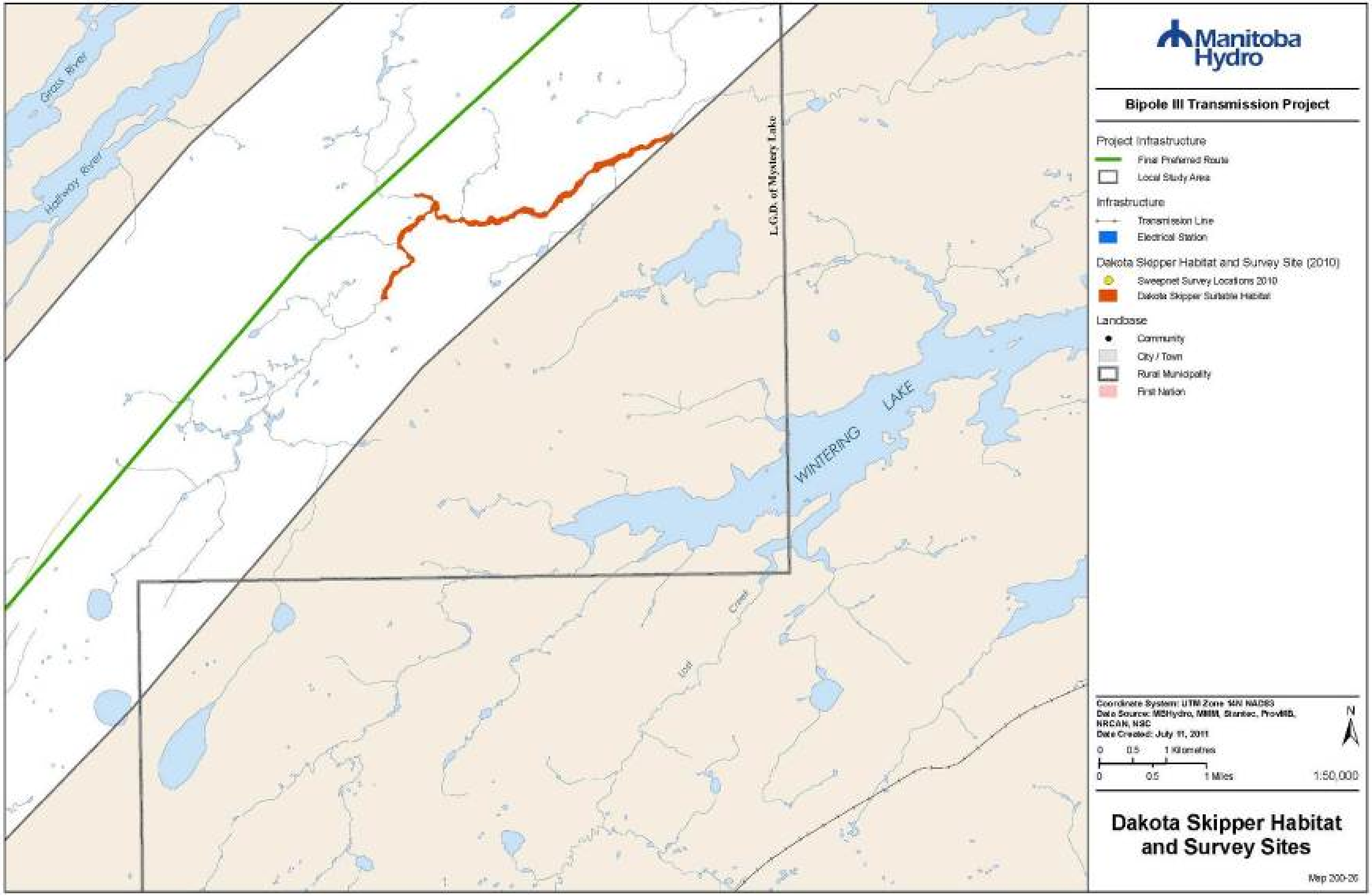
Map Series 100-17. Bipole III Transmission Project HVdc transmission line route and associated project components.



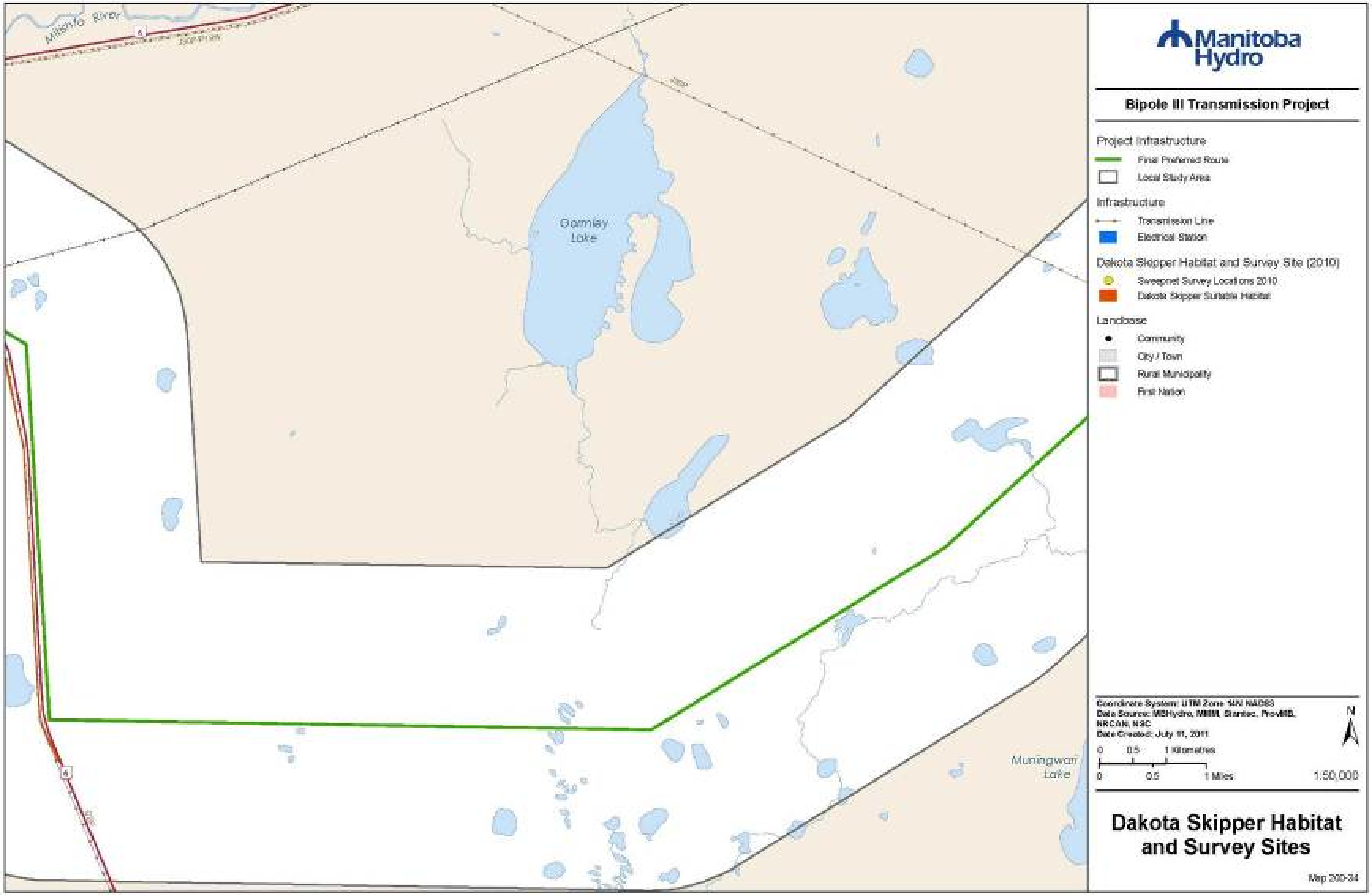
Map Series 200. Index map for Dakota Skipper modeled habitat overlapping its distribution range within the Bipole III Project Study Area Prairie Ecozone.



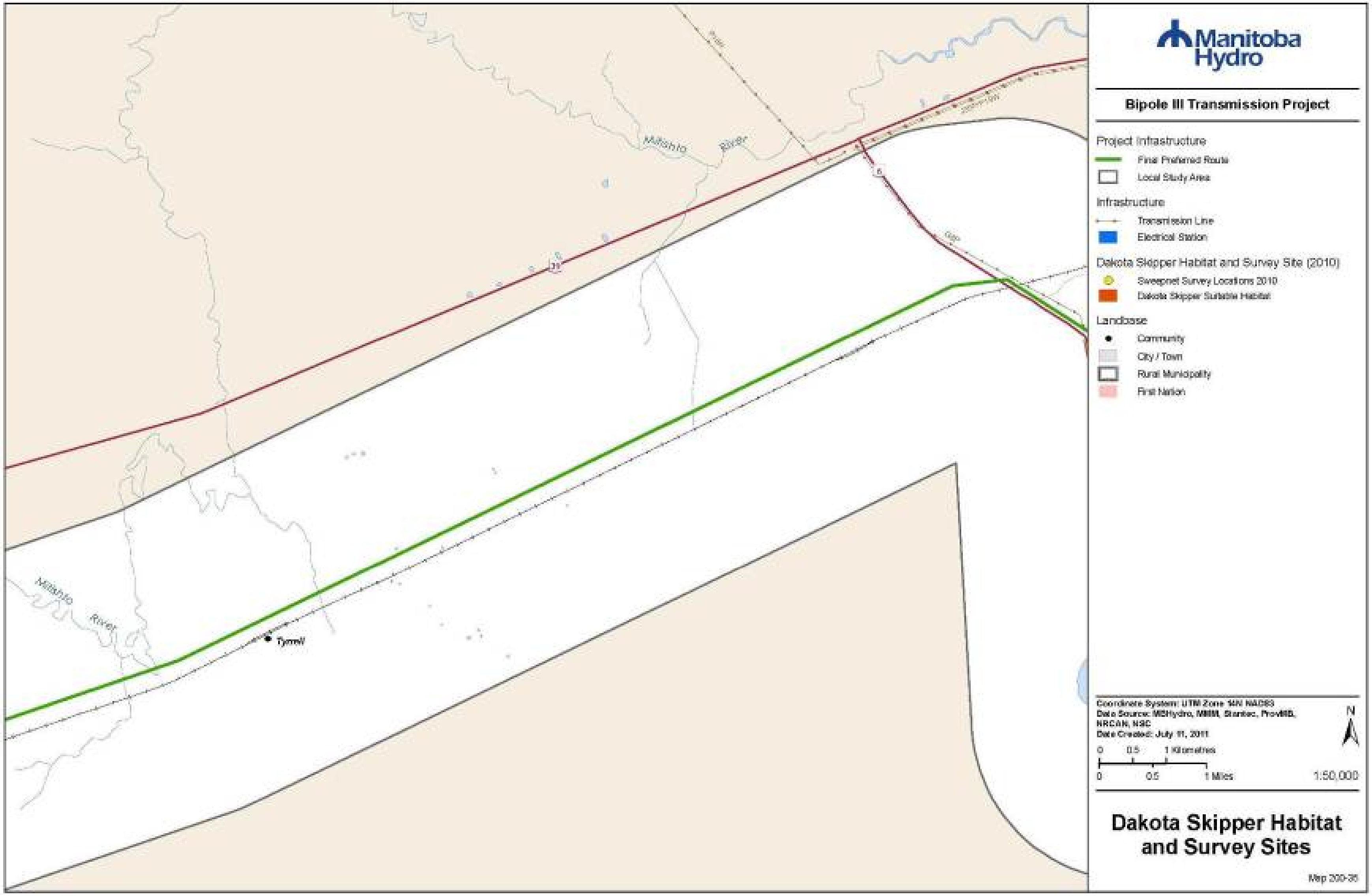
Map Series 200-1. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



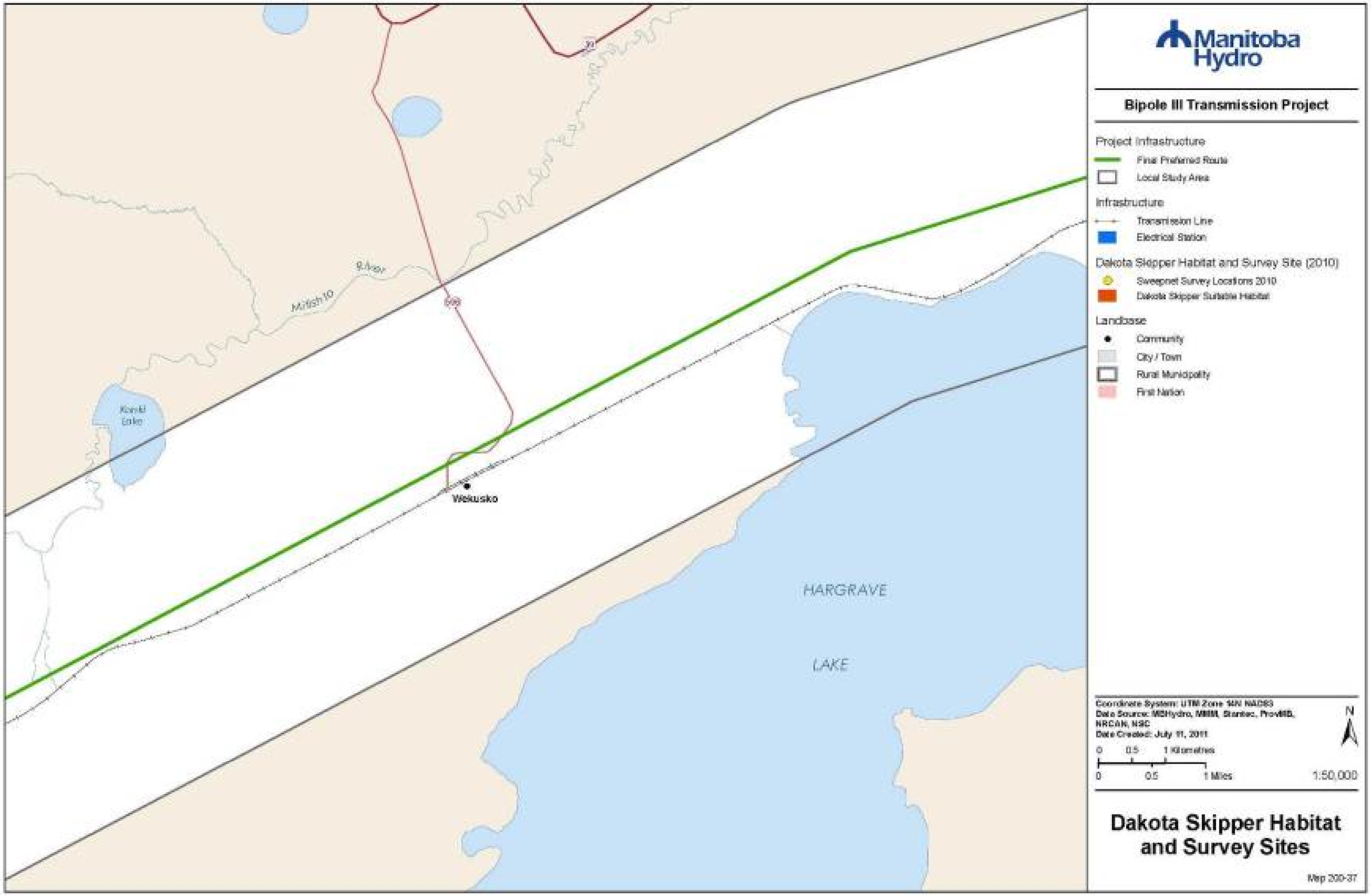
Map Series 200-2. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



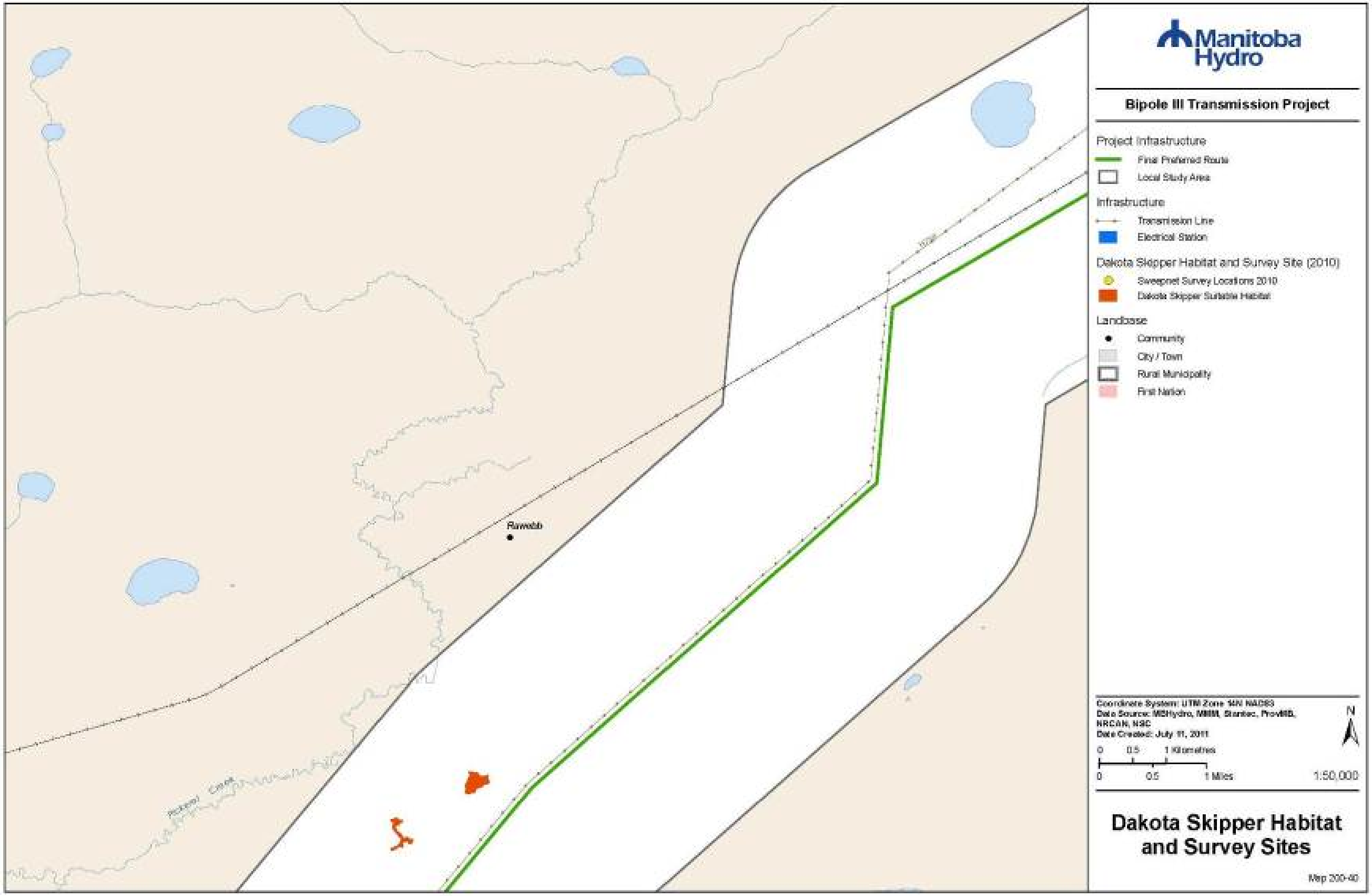
Map Series 200-3. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



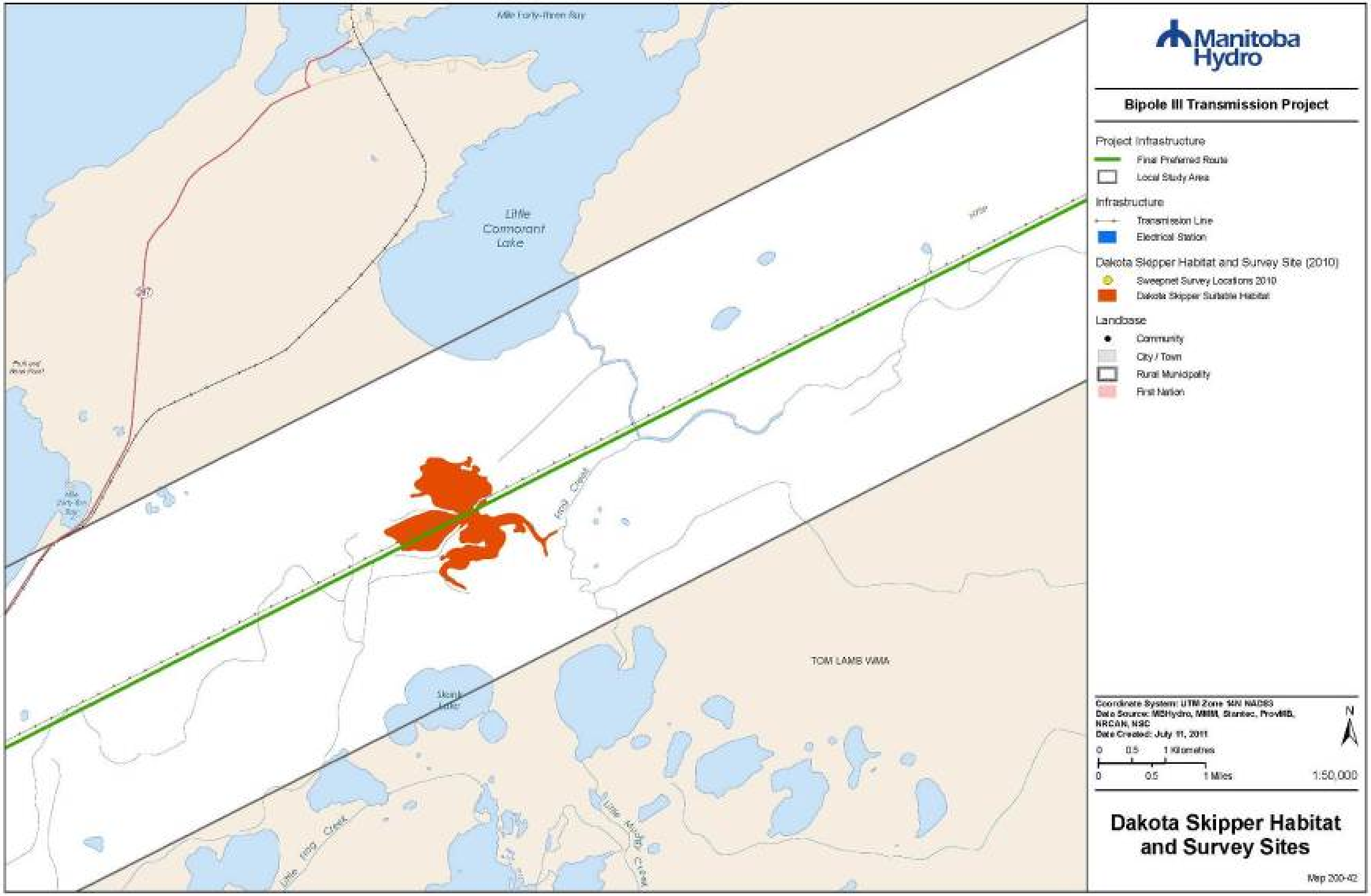
Map Series 200-4. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



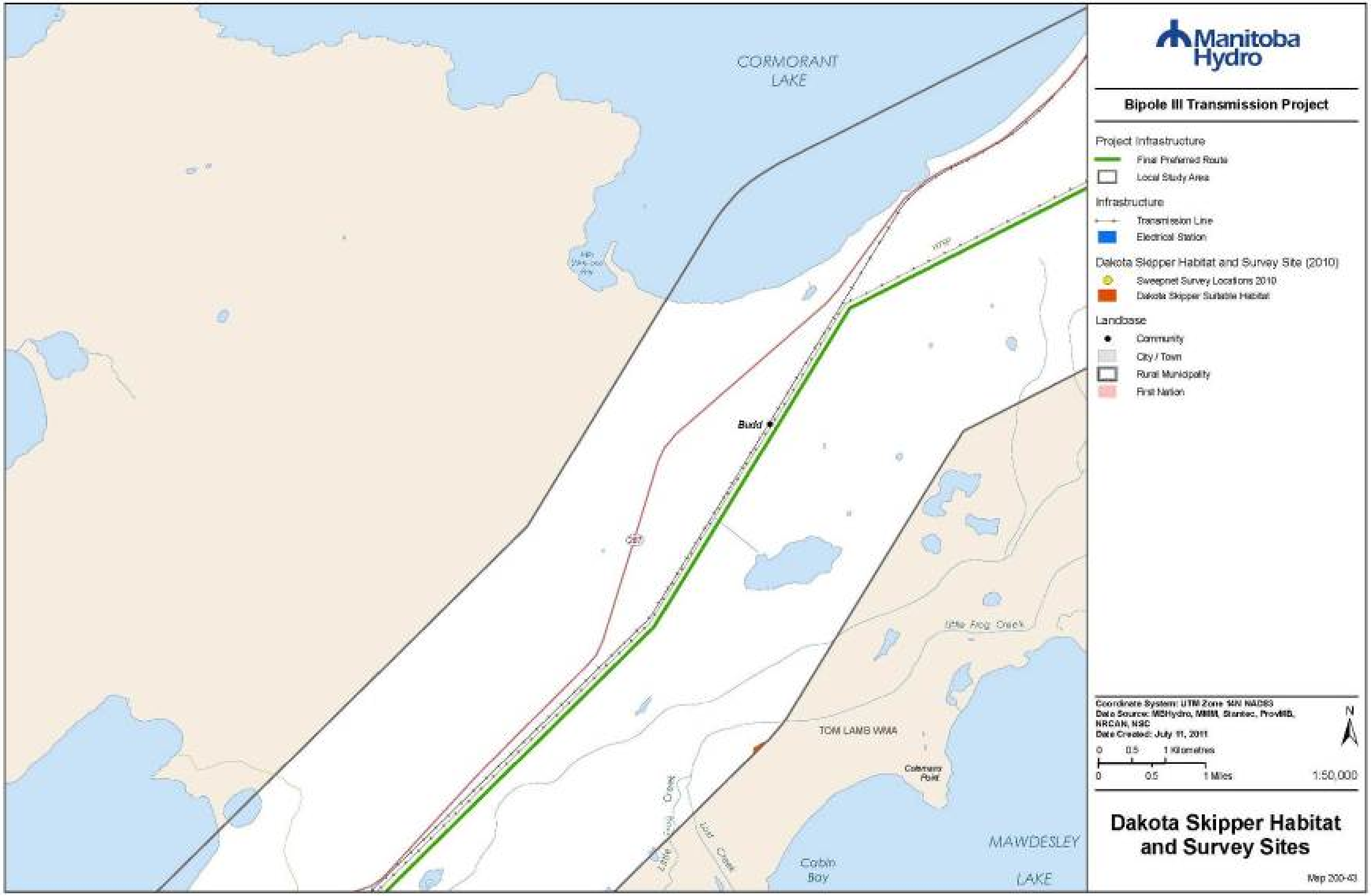
Map Series 200-5. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



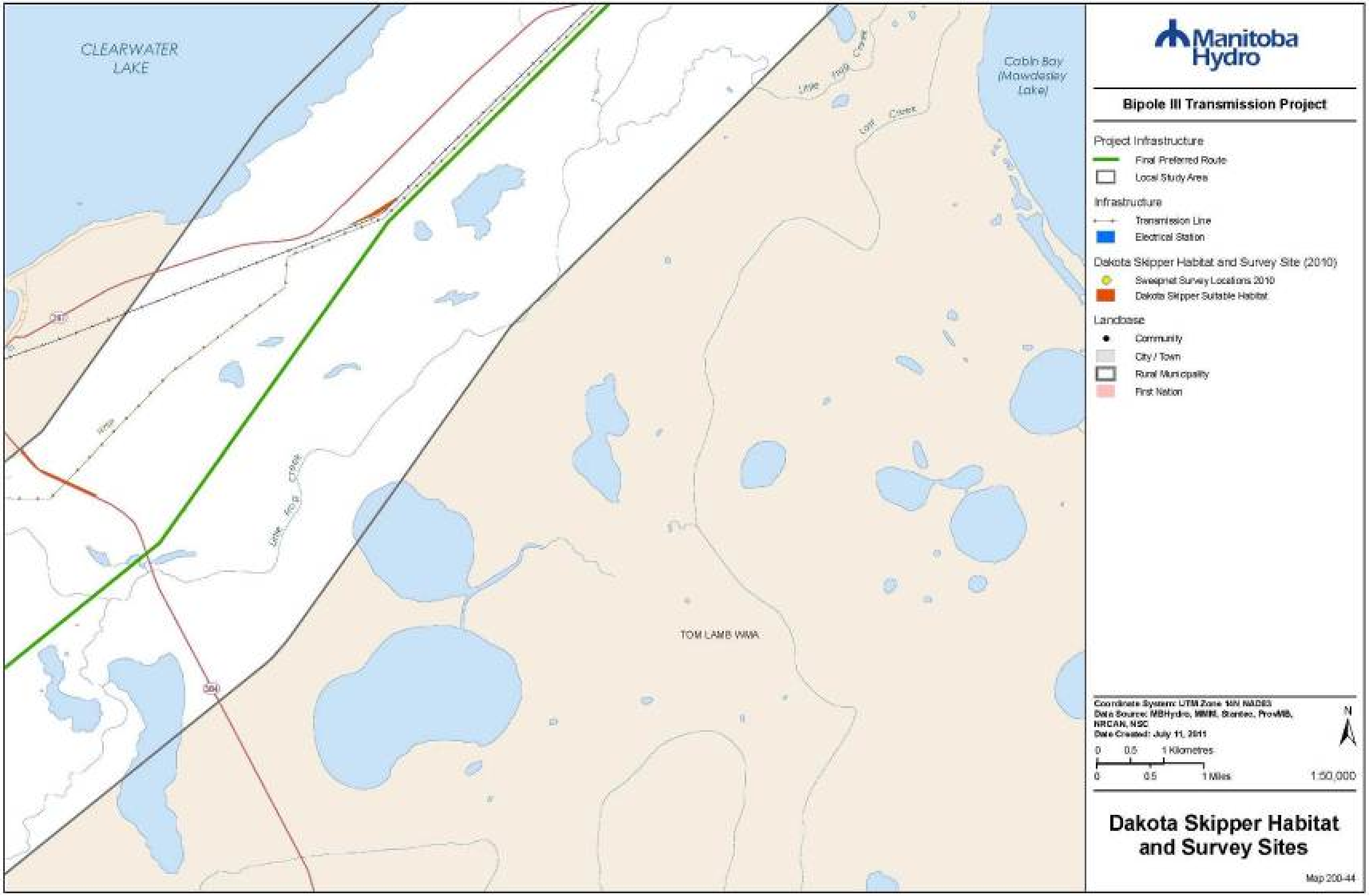
Map Series 200-6. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



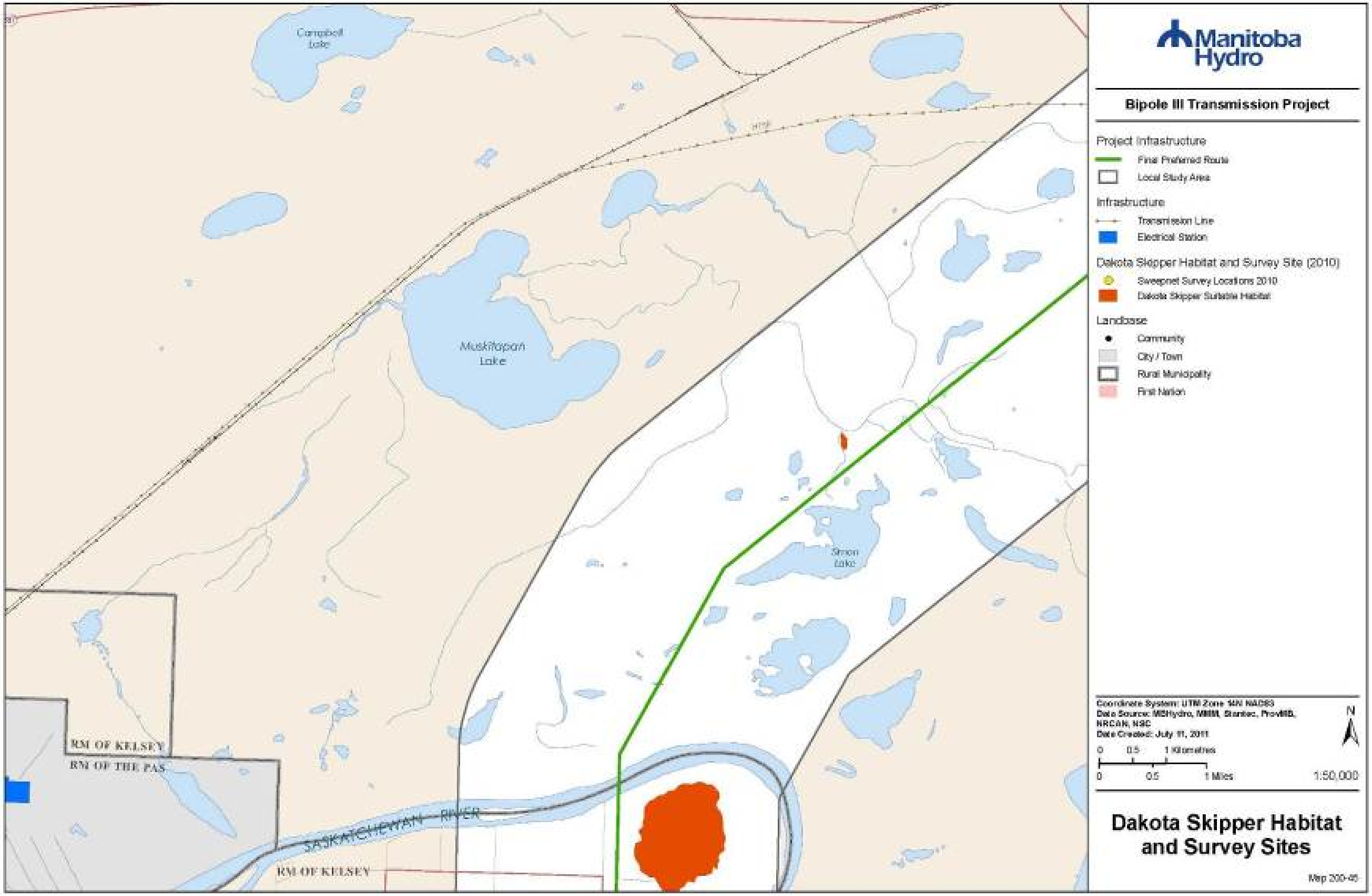
Map Series 200-7. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



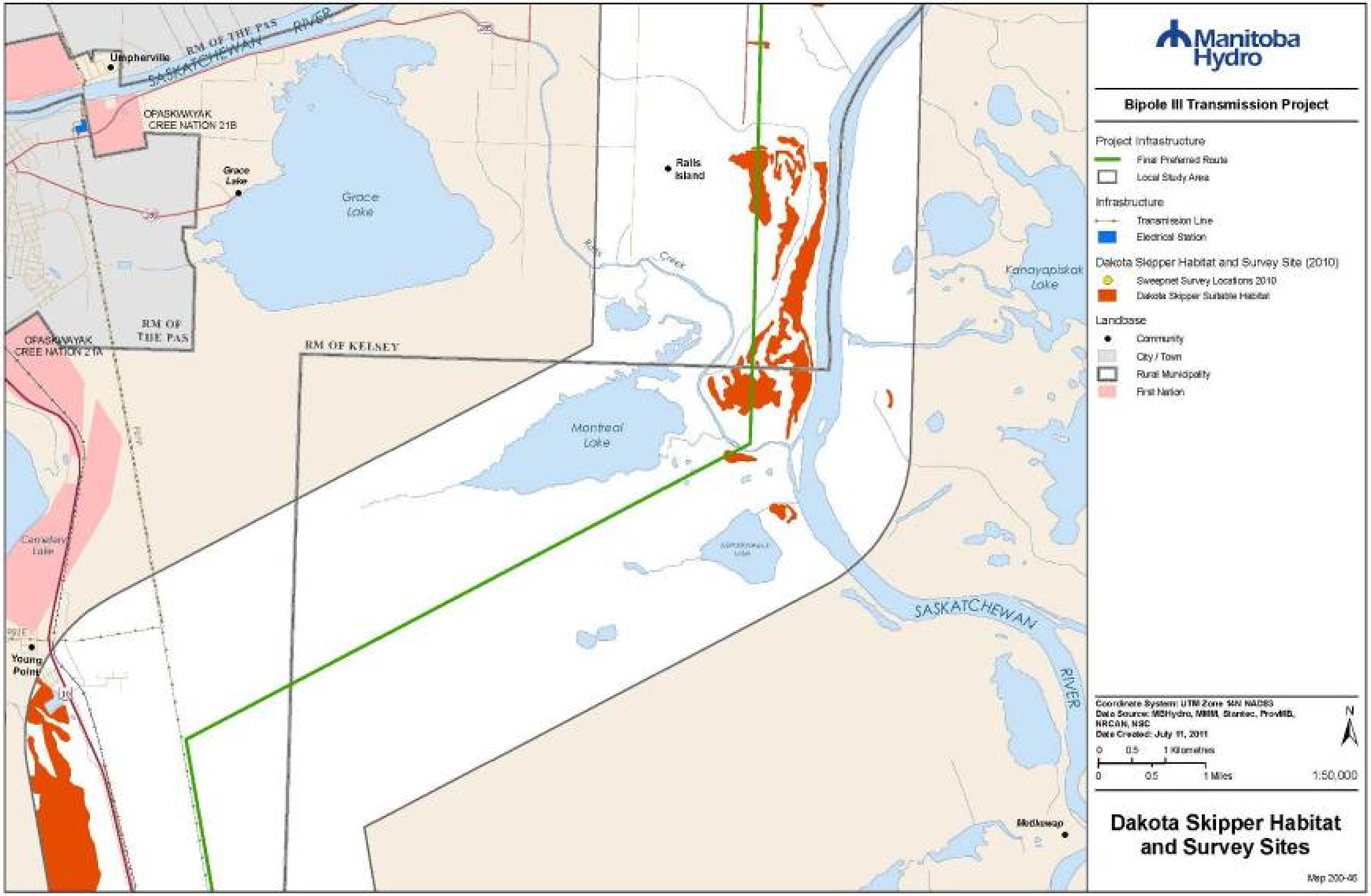
Map Series 200-8. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



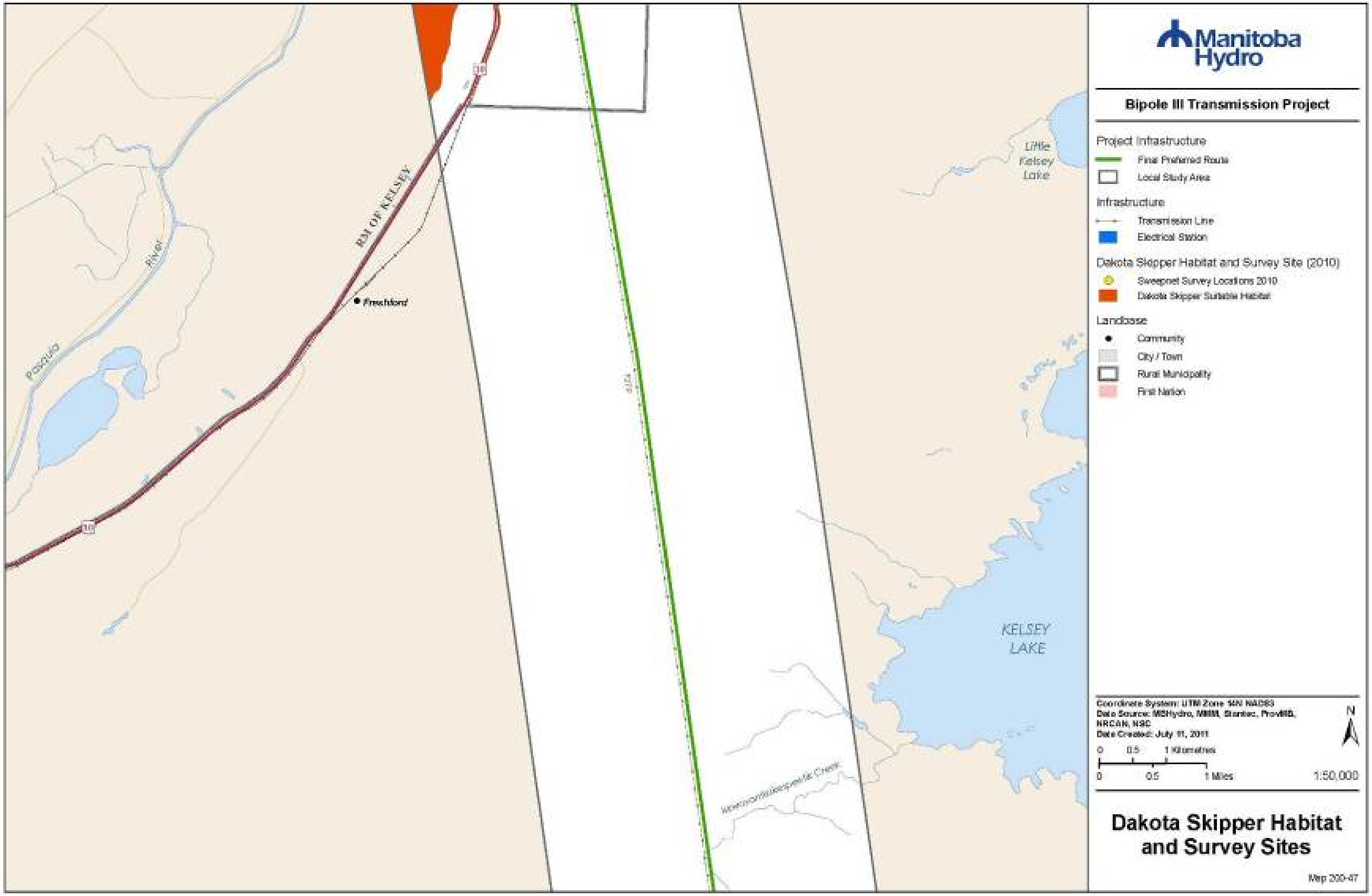
Map Series 200-9. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



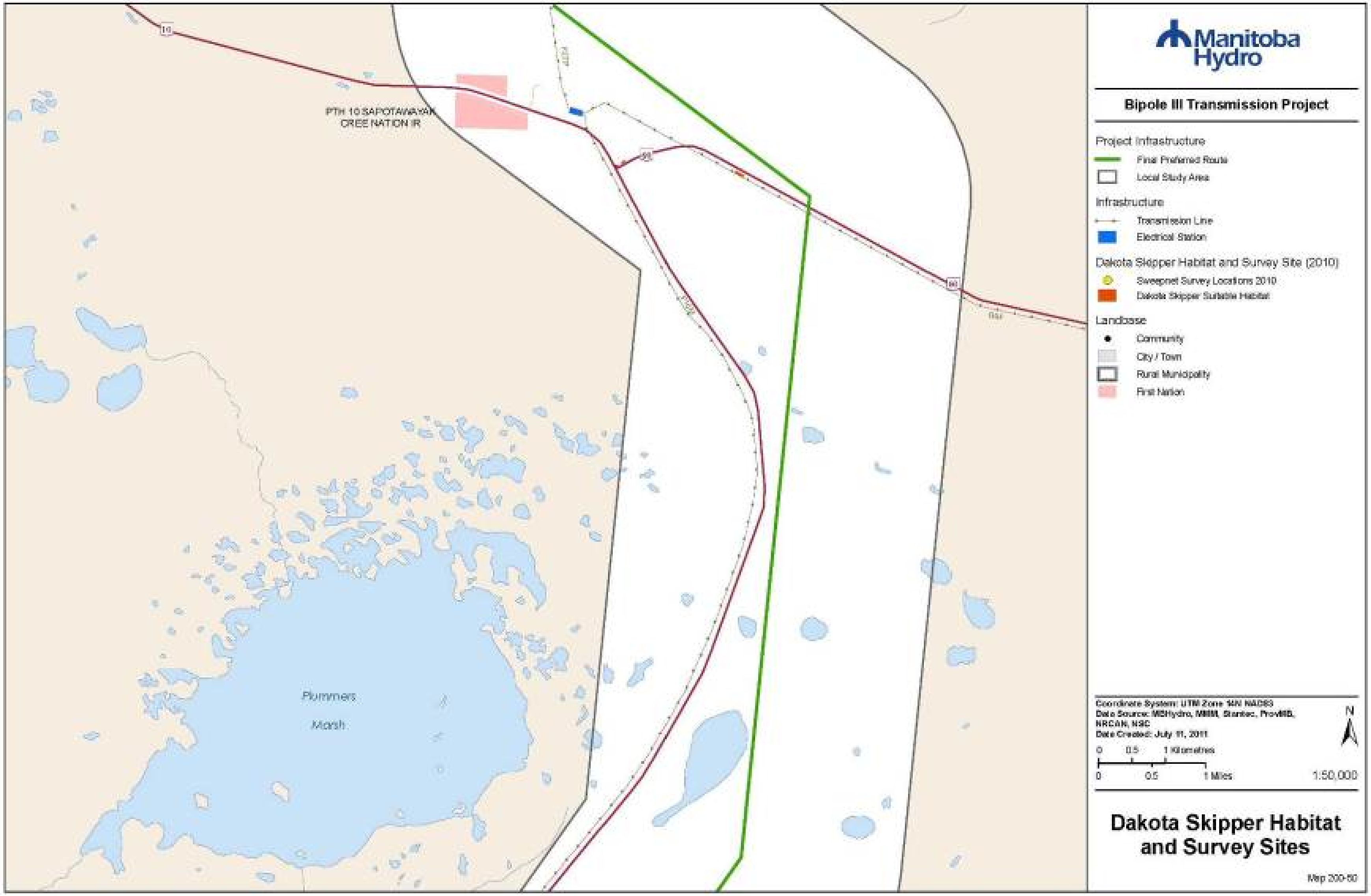
Map Series 200-10. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



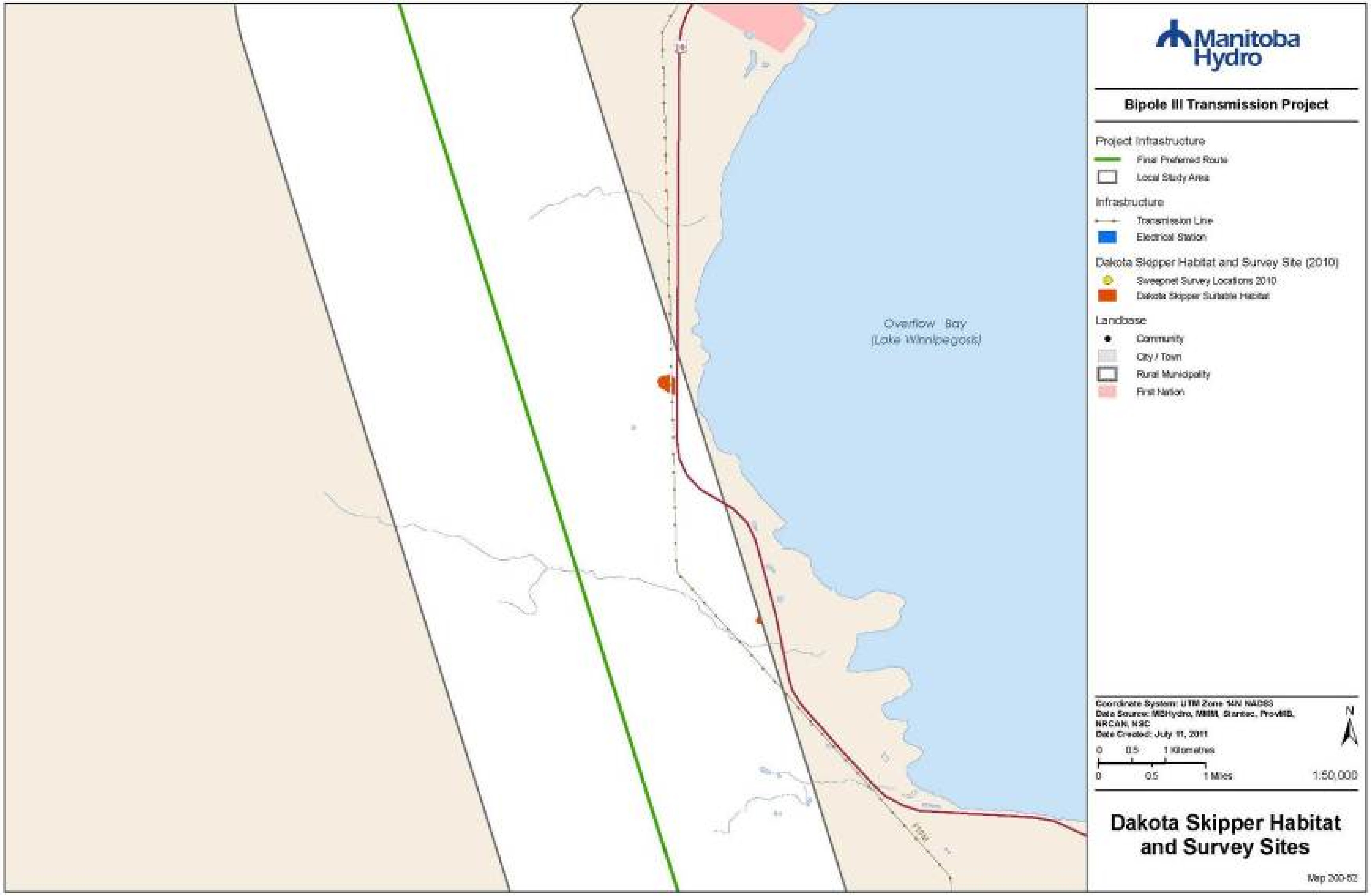
Map Series 200-11. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



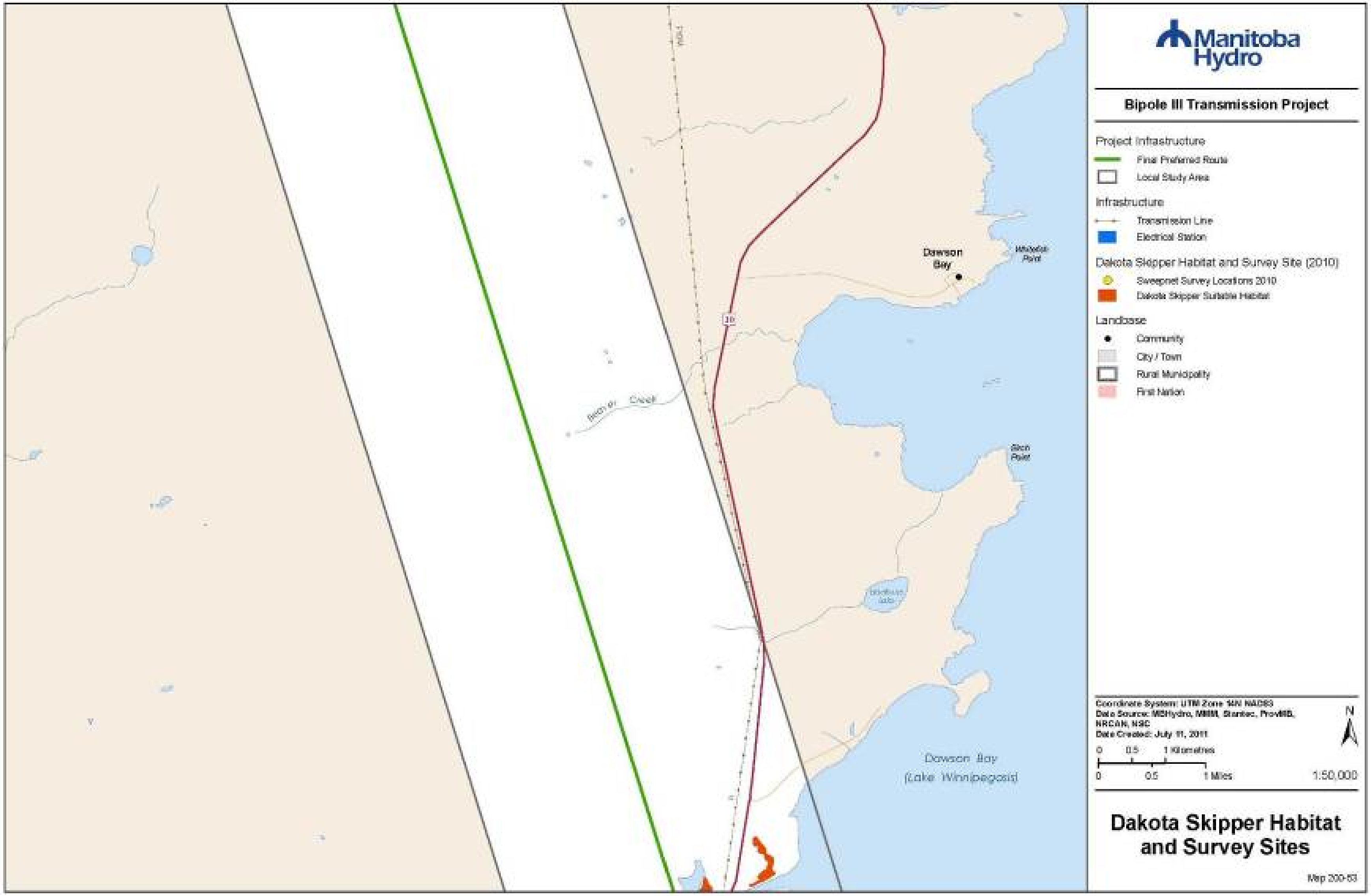
Map Series 200-12. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



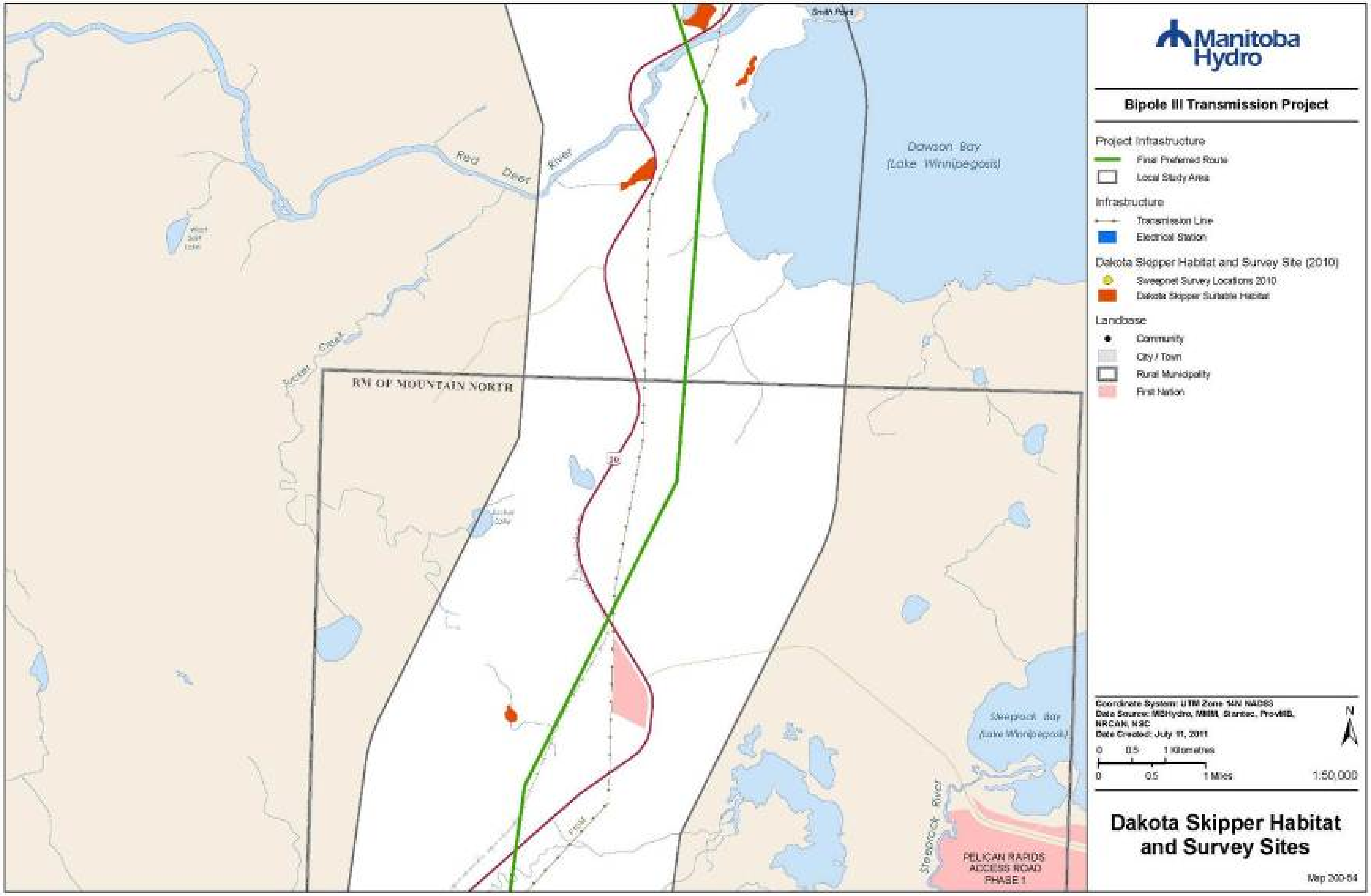
Map Series 200-13. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



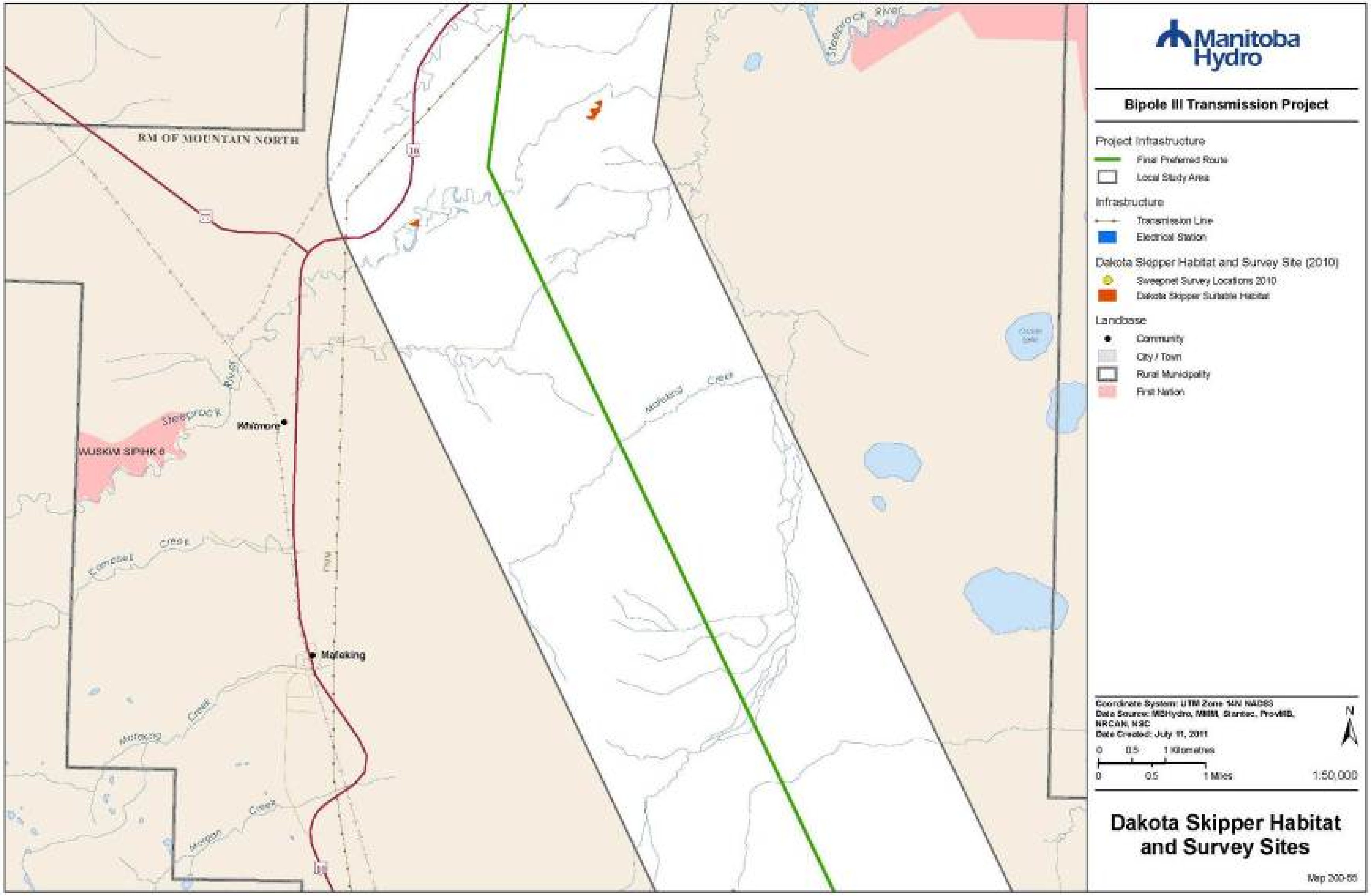
Map Series 200-14. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



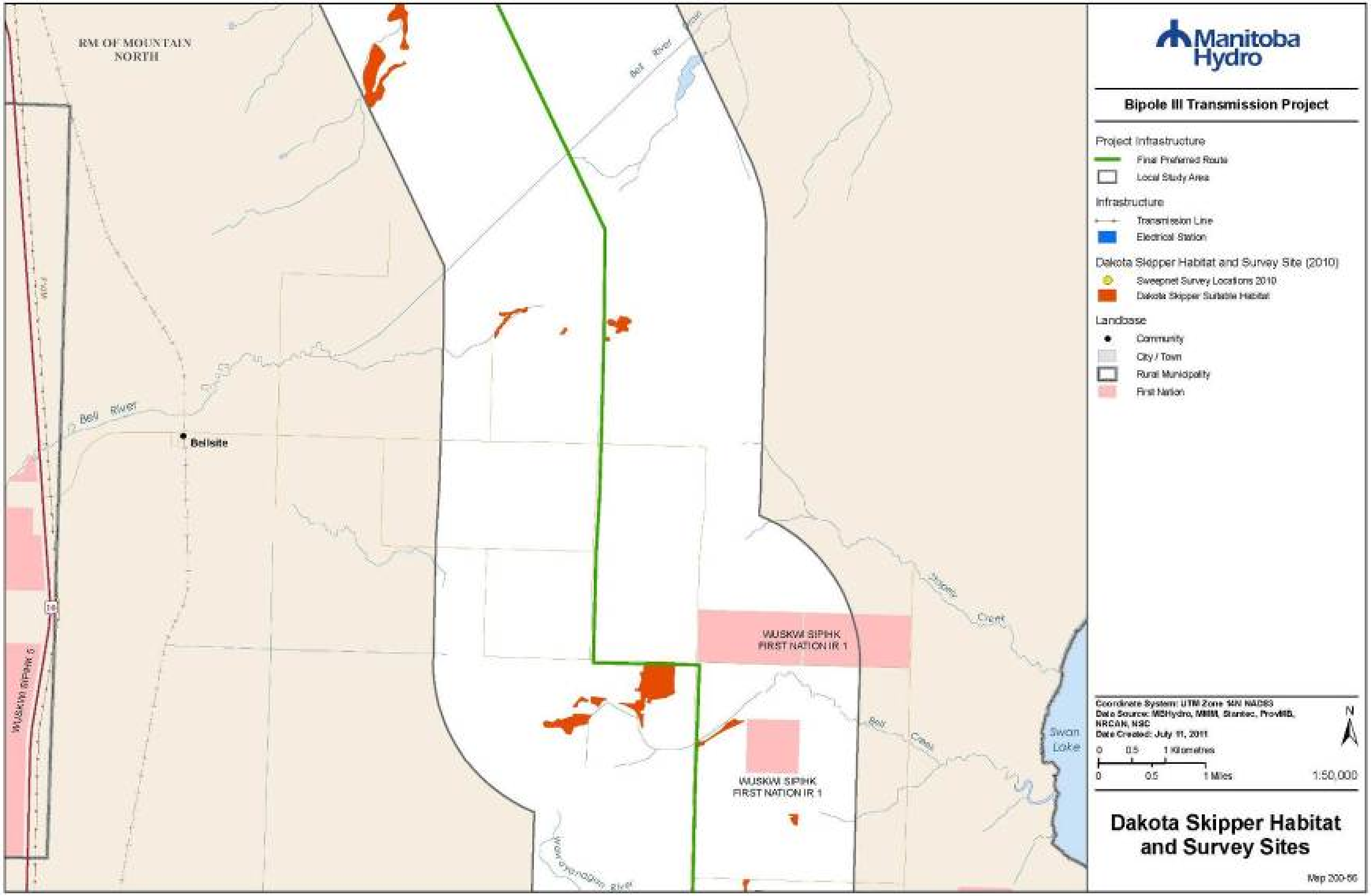
Map Series 200-15. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



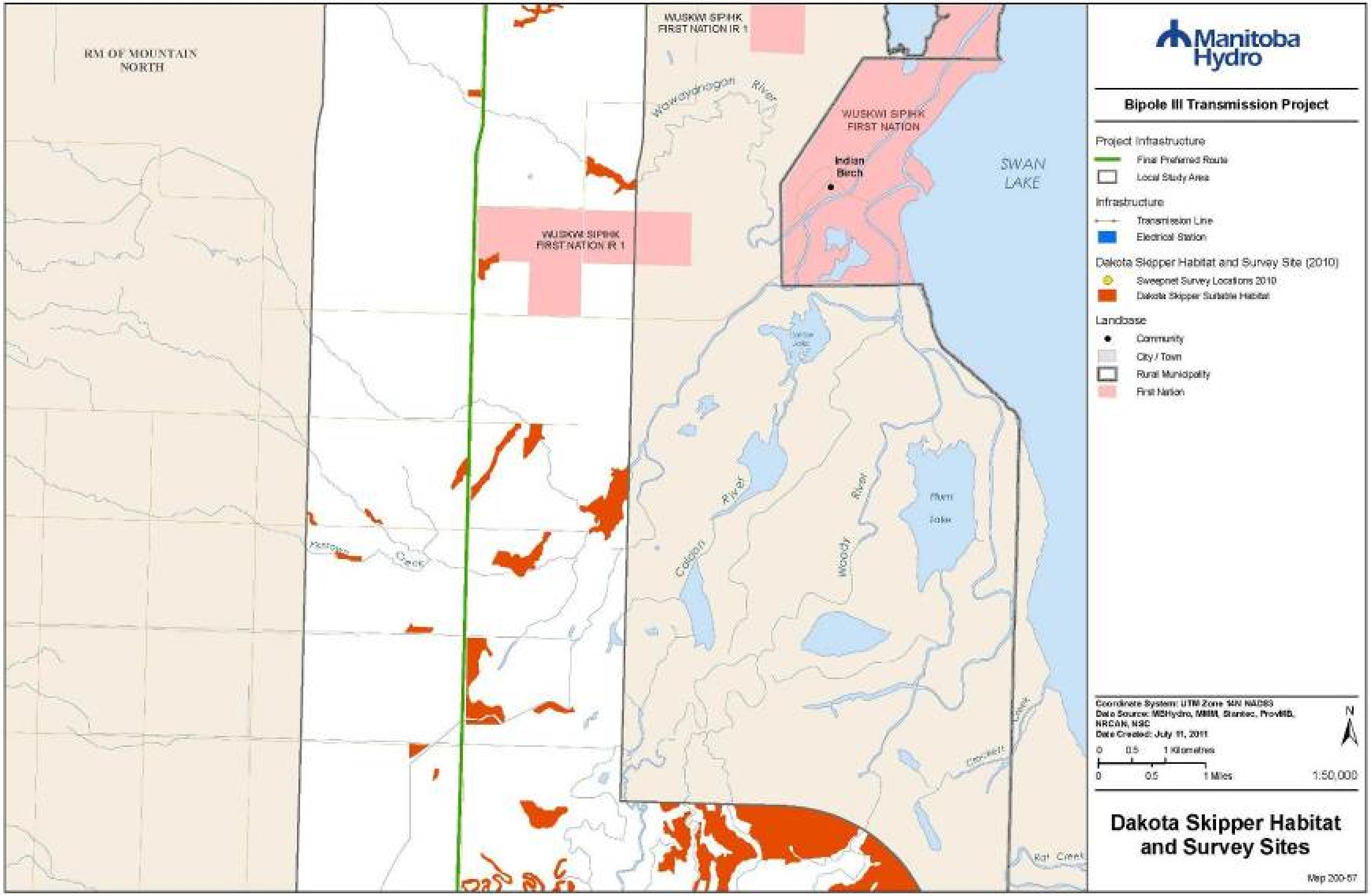
Map Series 200-16. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



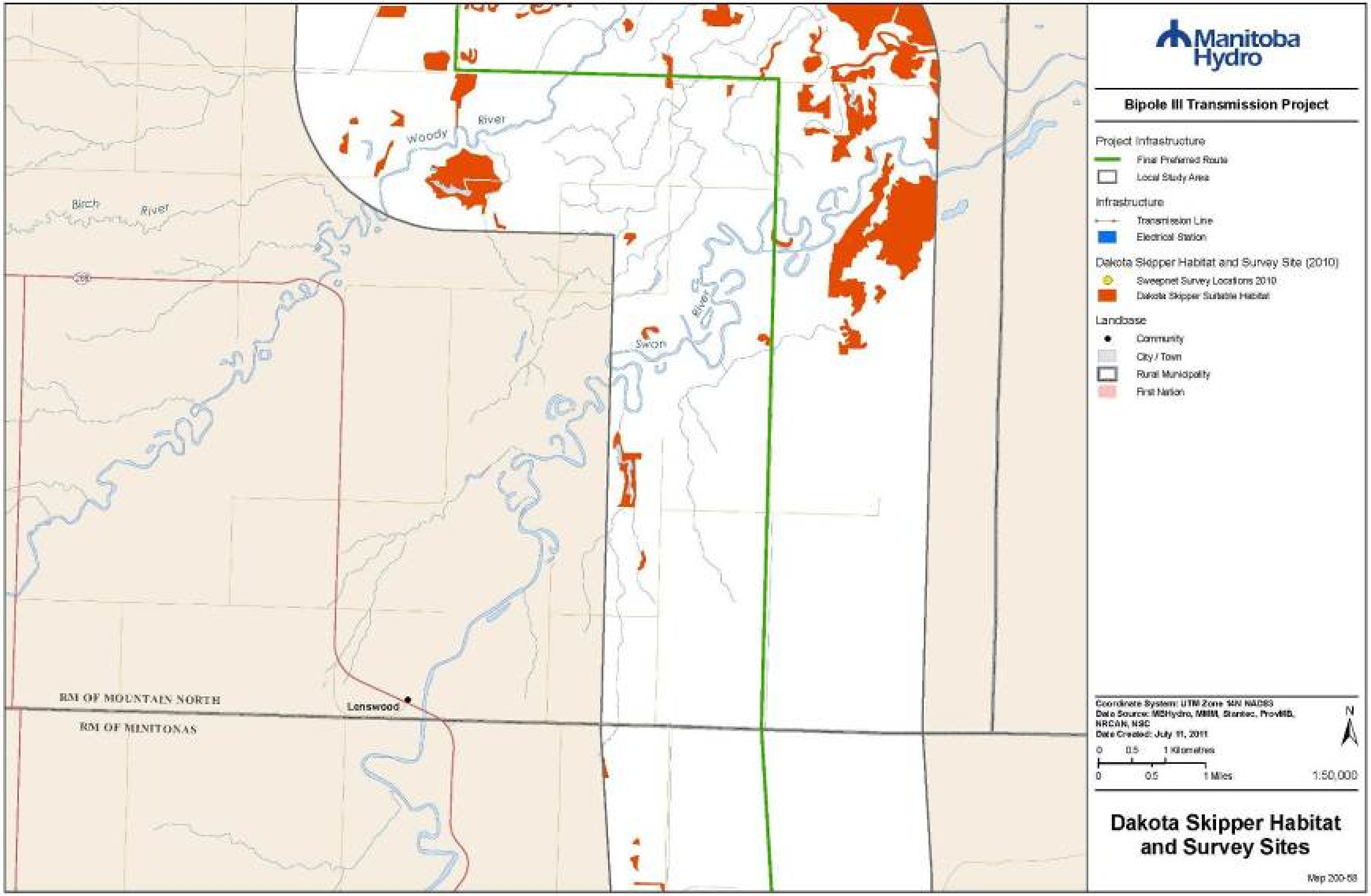
Map Series 200-17. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



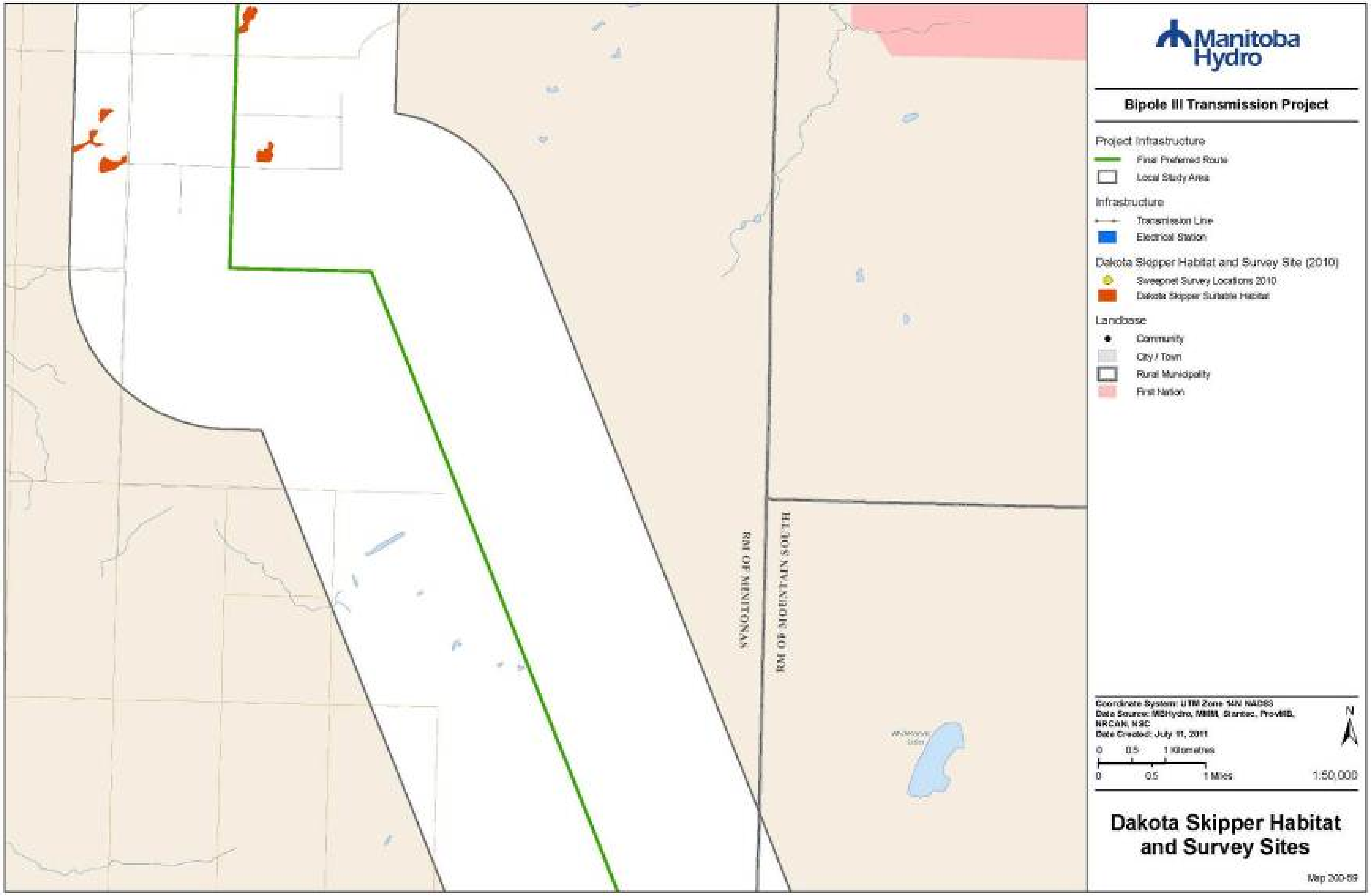
Map Series 200-18. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



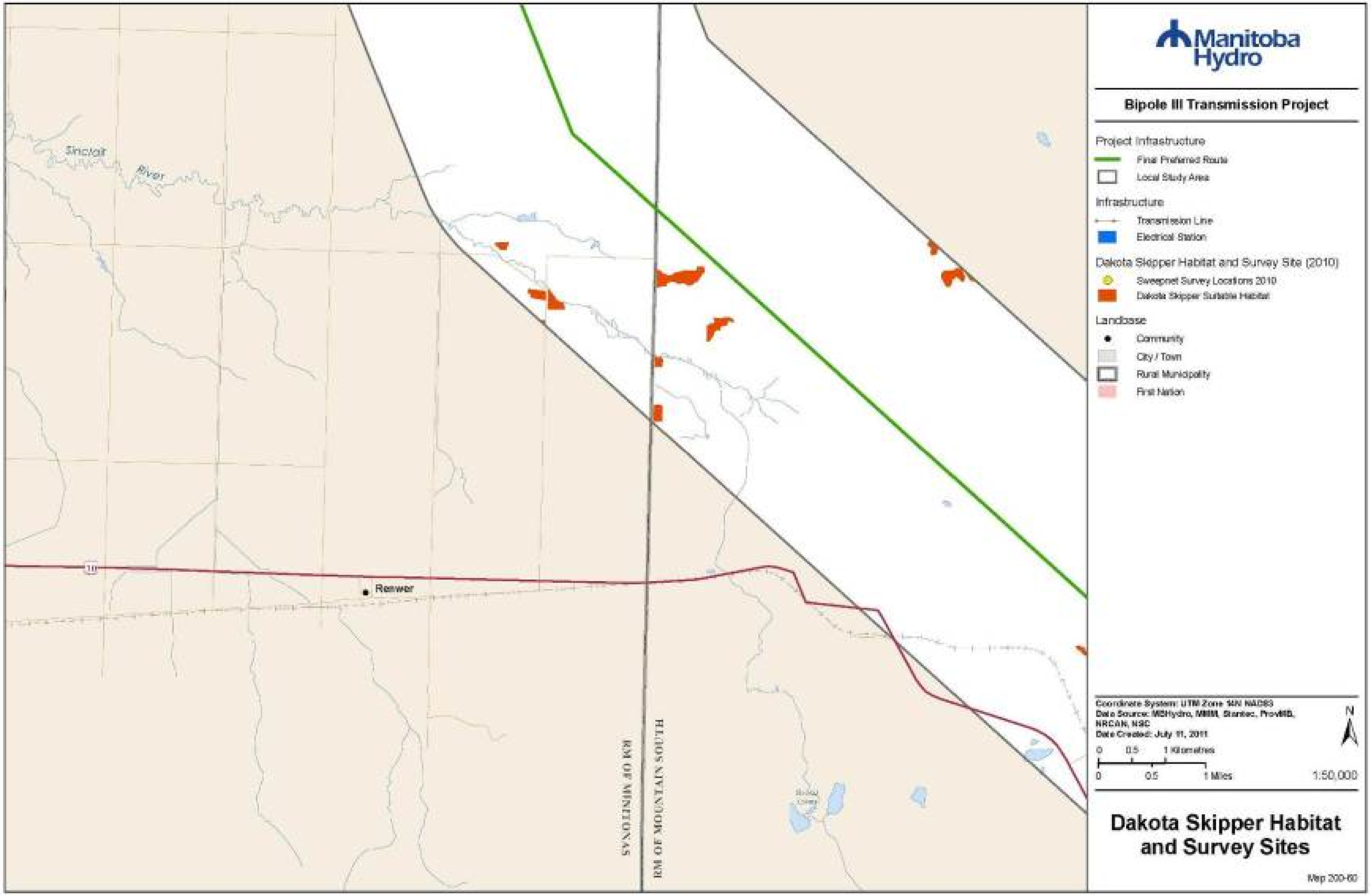
Map Series 200-19. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



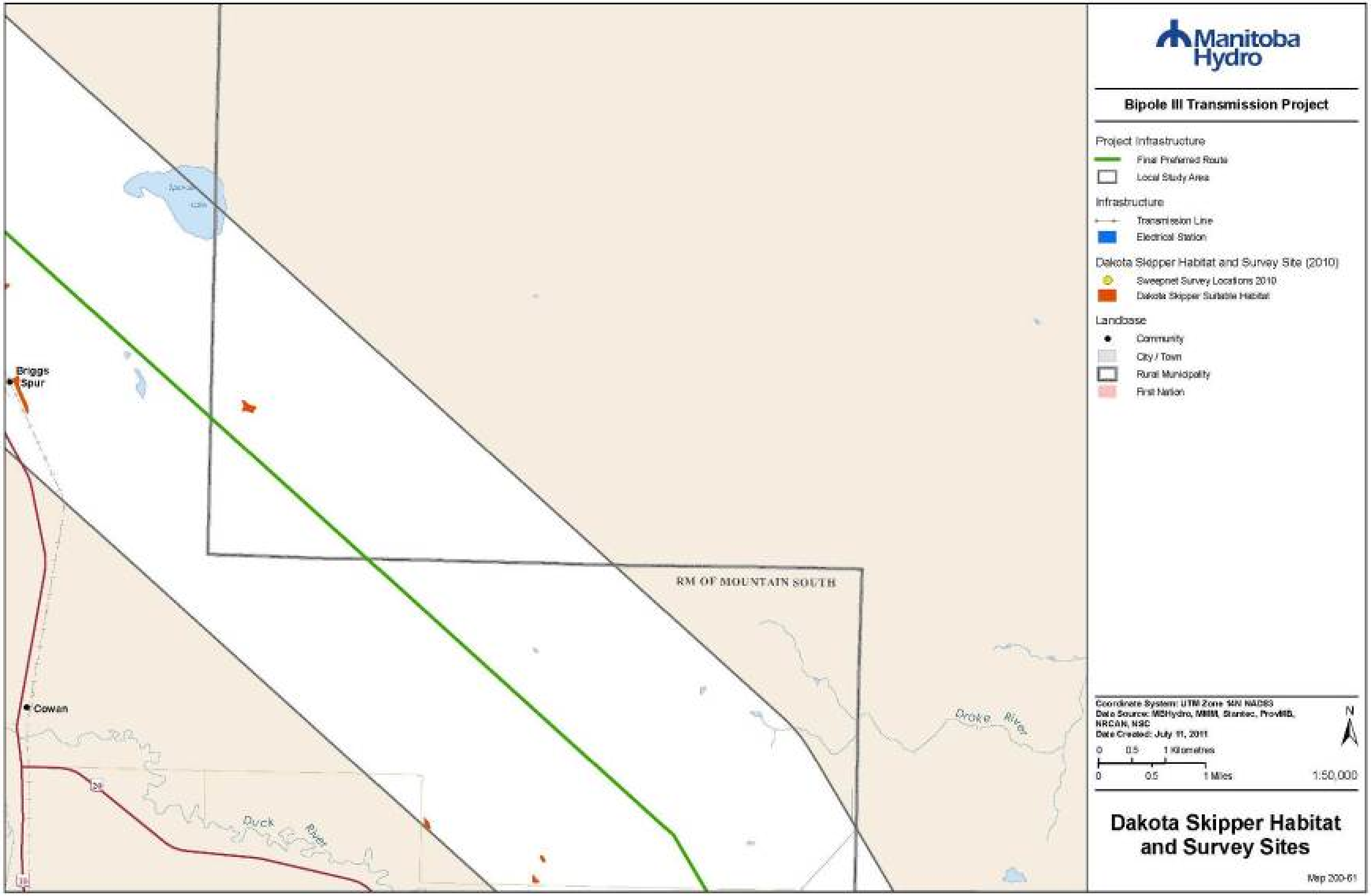
Map Series 200-20. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



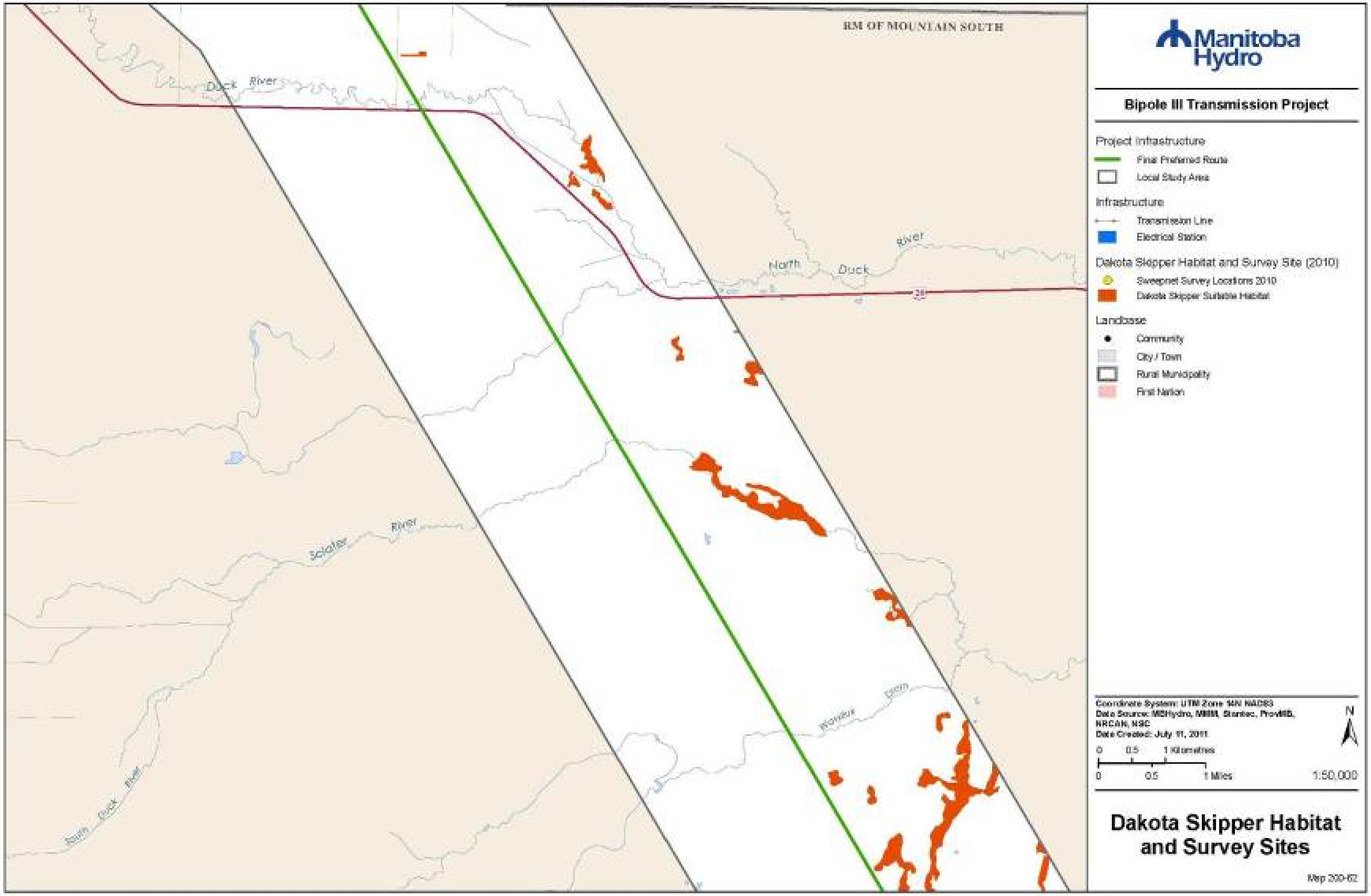
Map Series 200-21. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



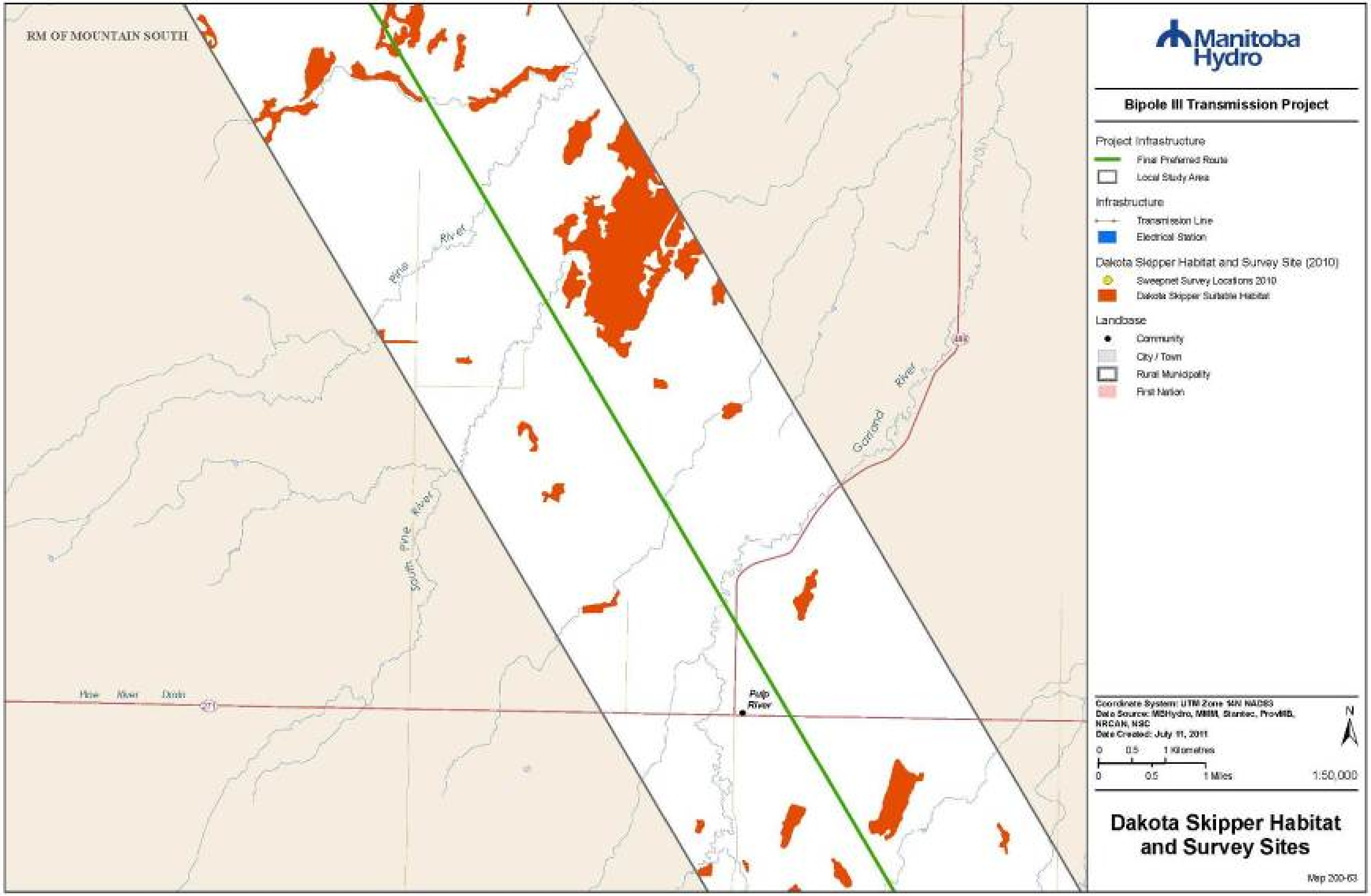
Map Series 200-22. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



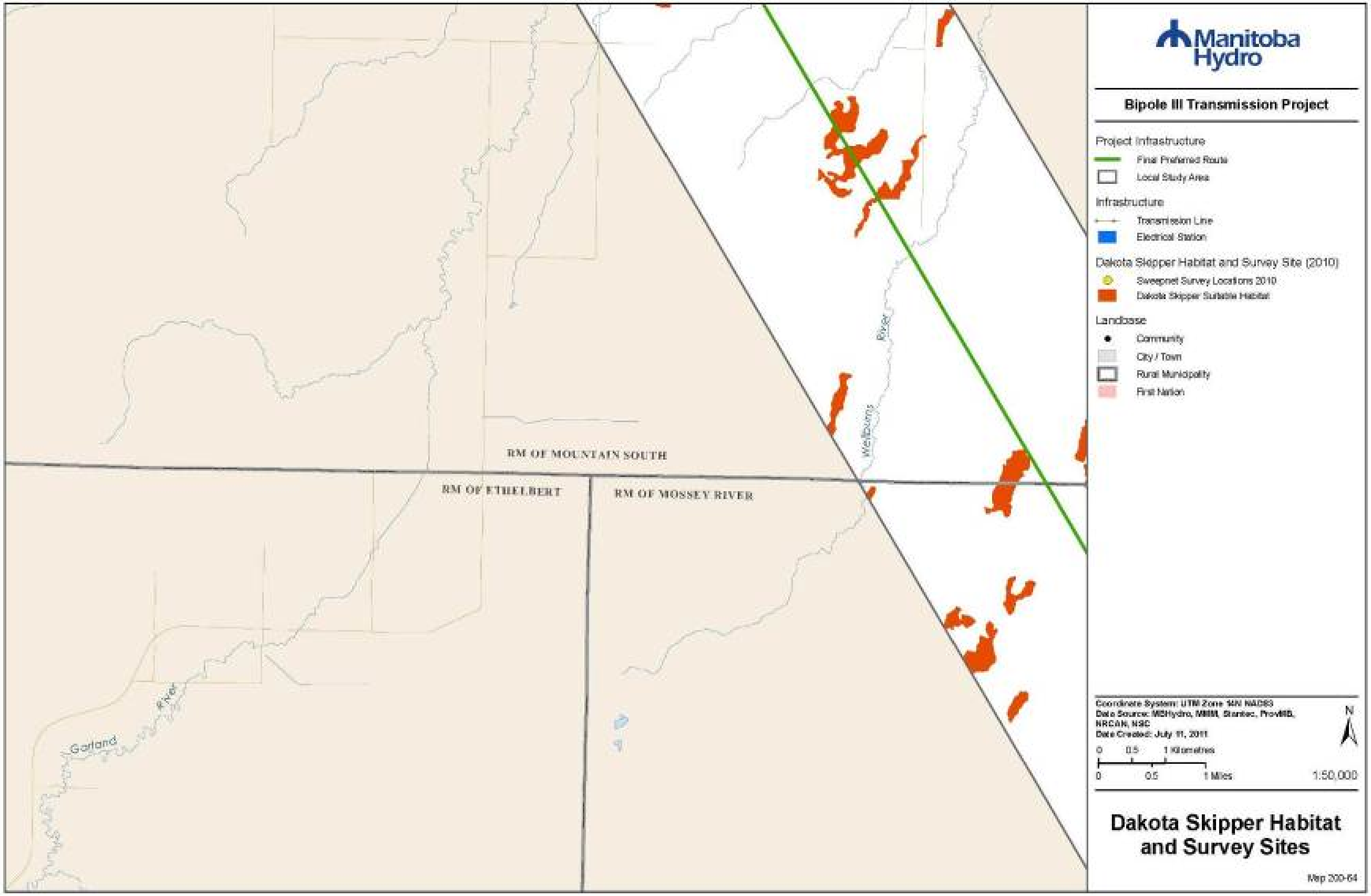
Map Series 200-23. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



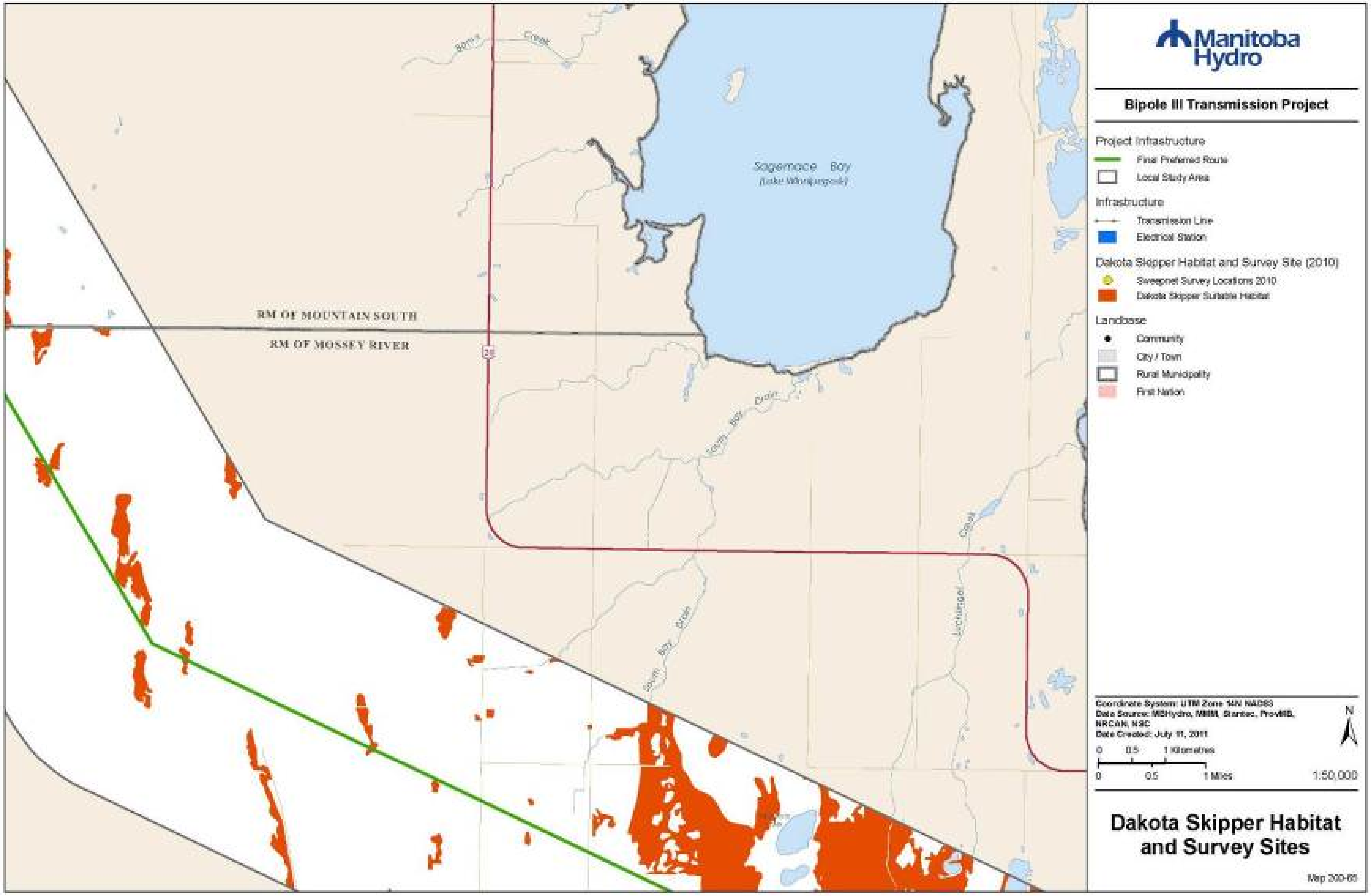
Map Series 200-24. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



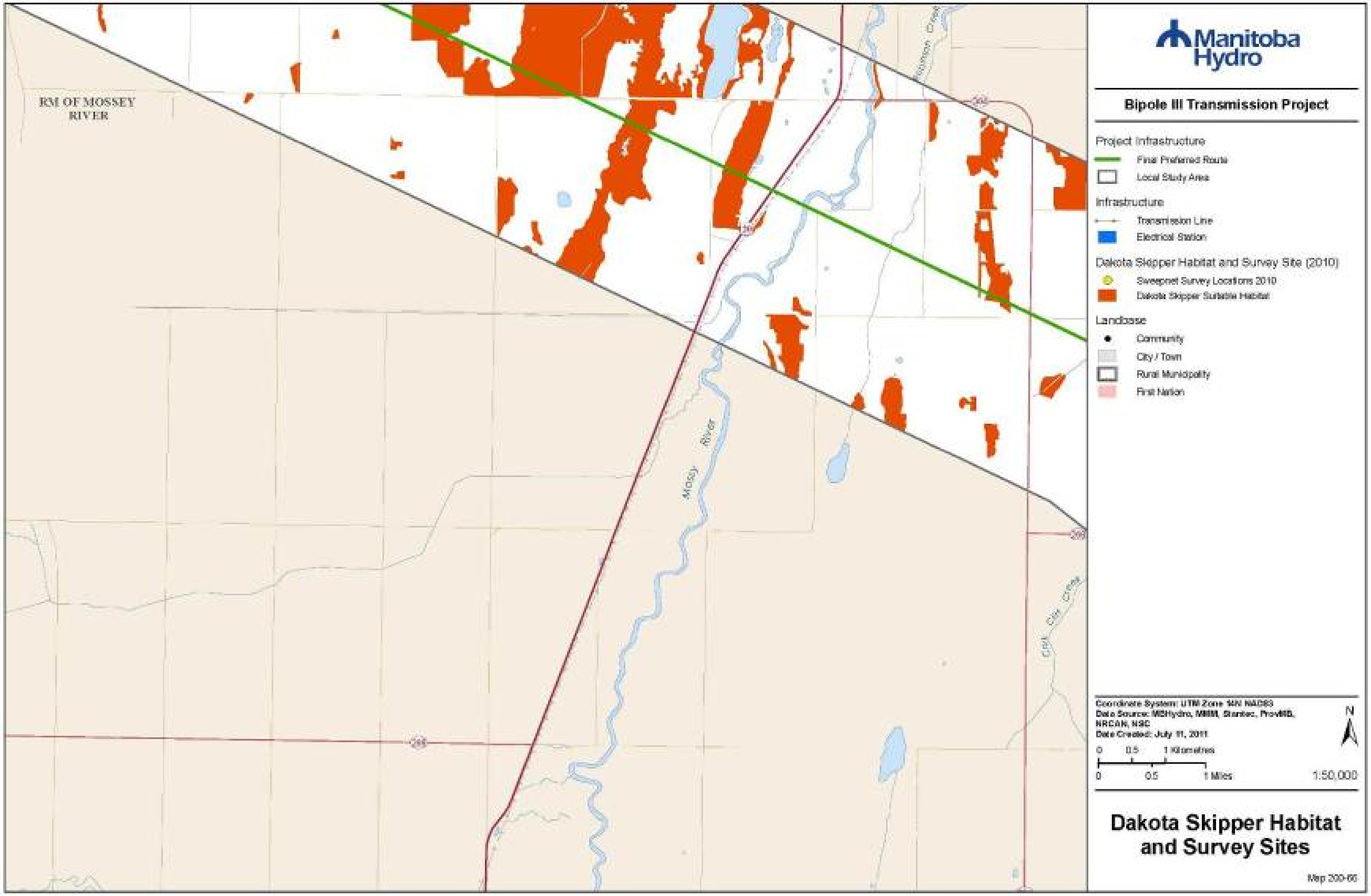
Map Series 200-25. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



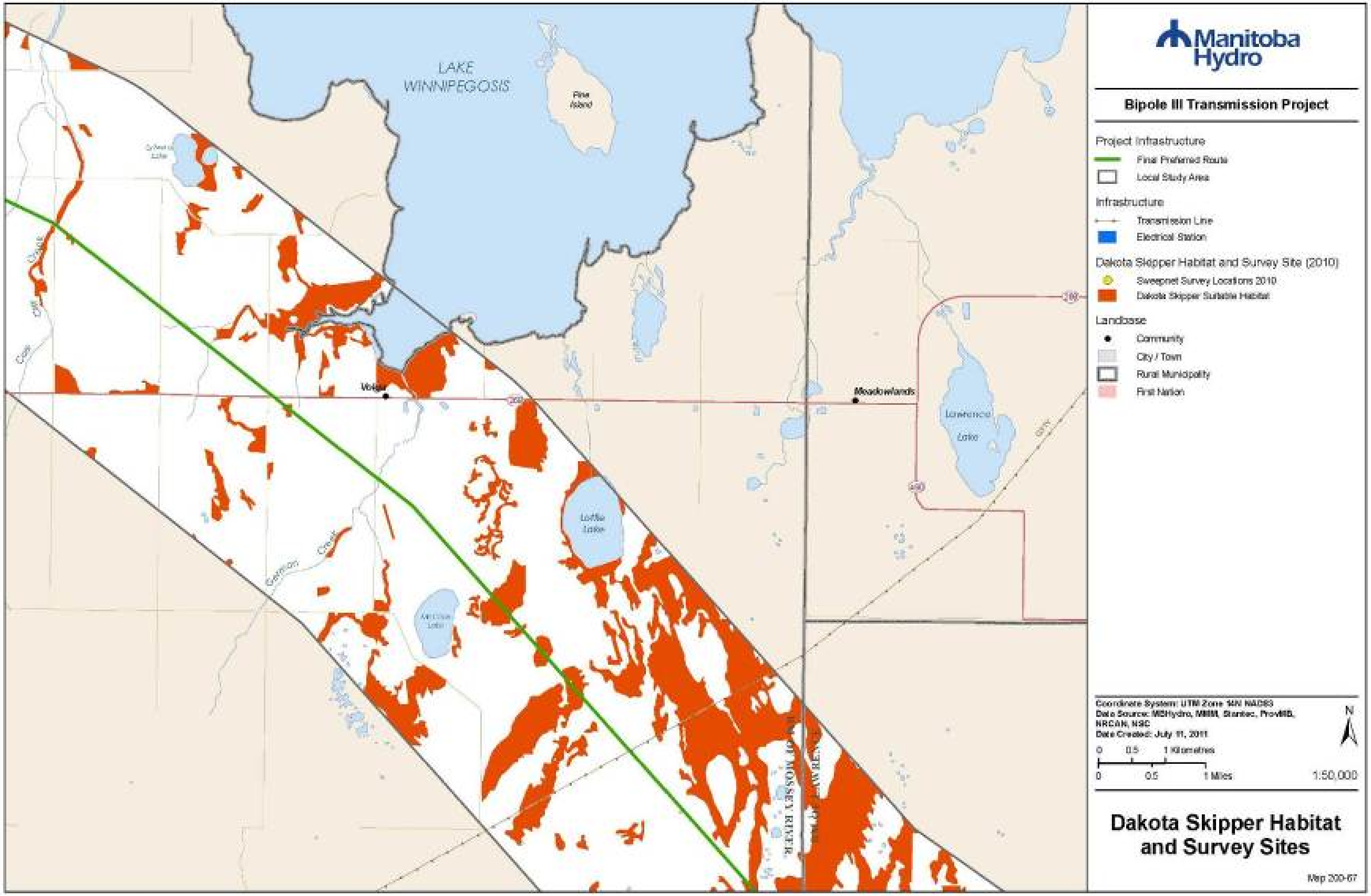
Map Series 200-26. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



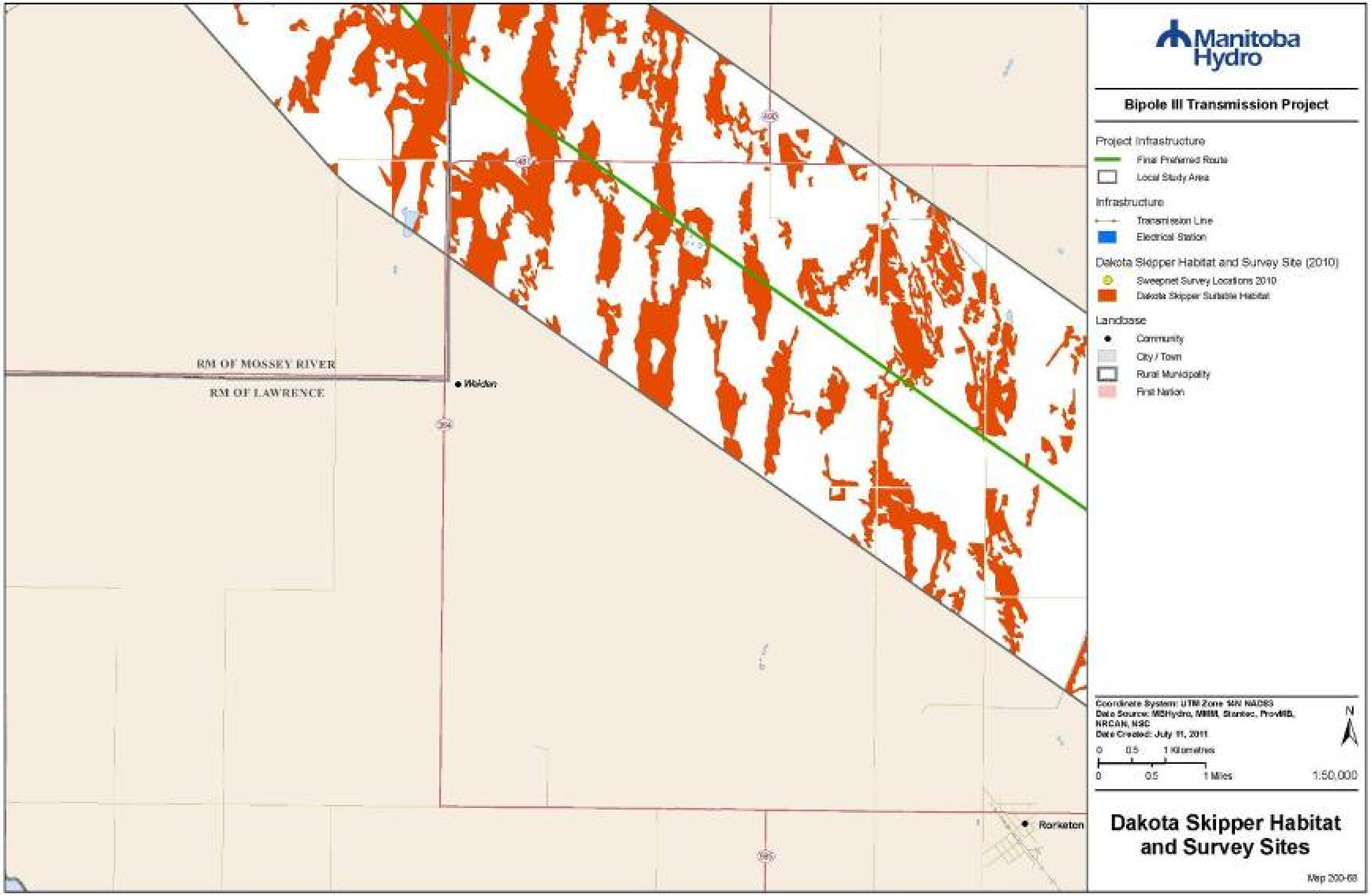
Map Series 200-27. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



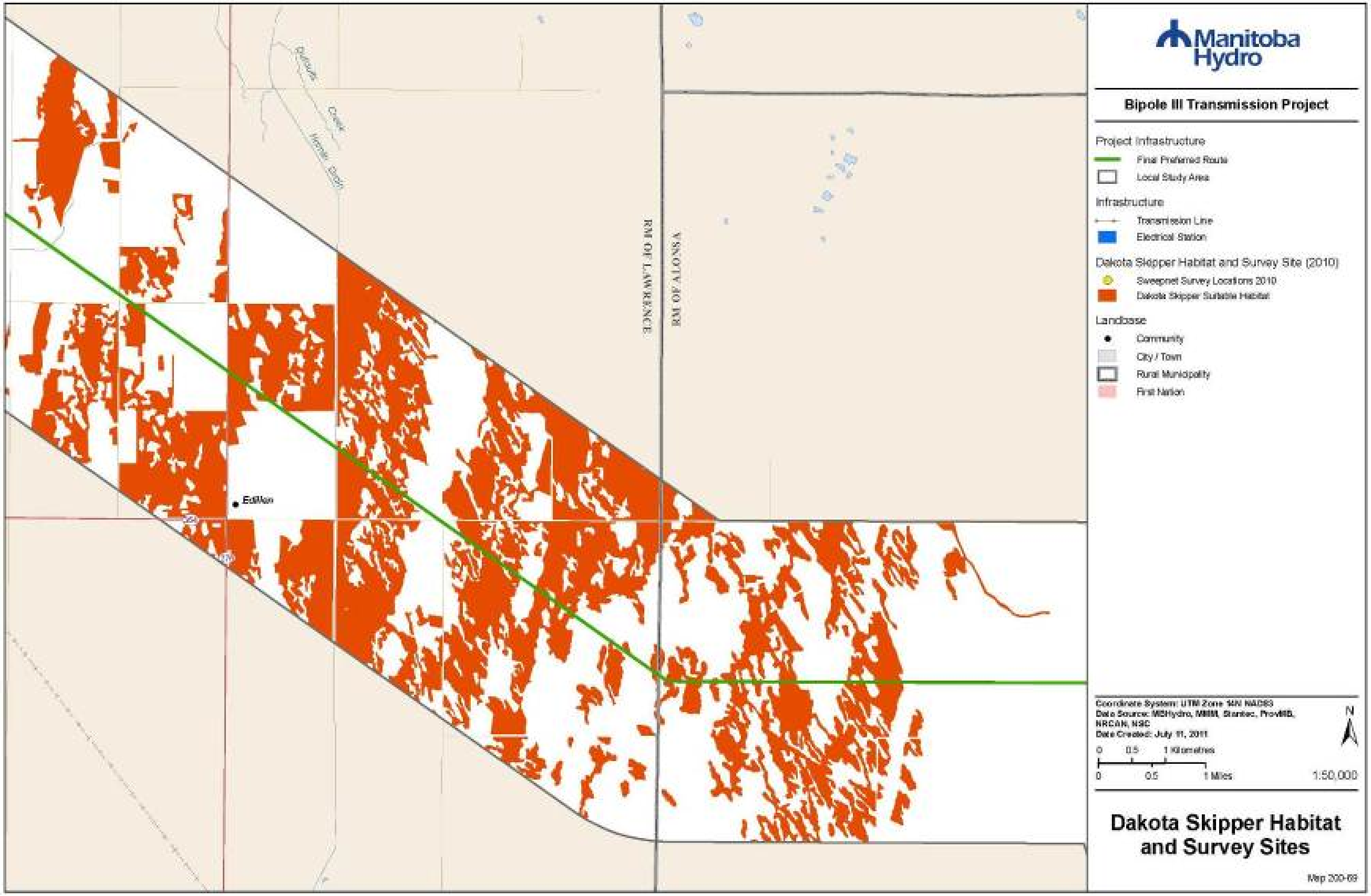
Map Series 200-28. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



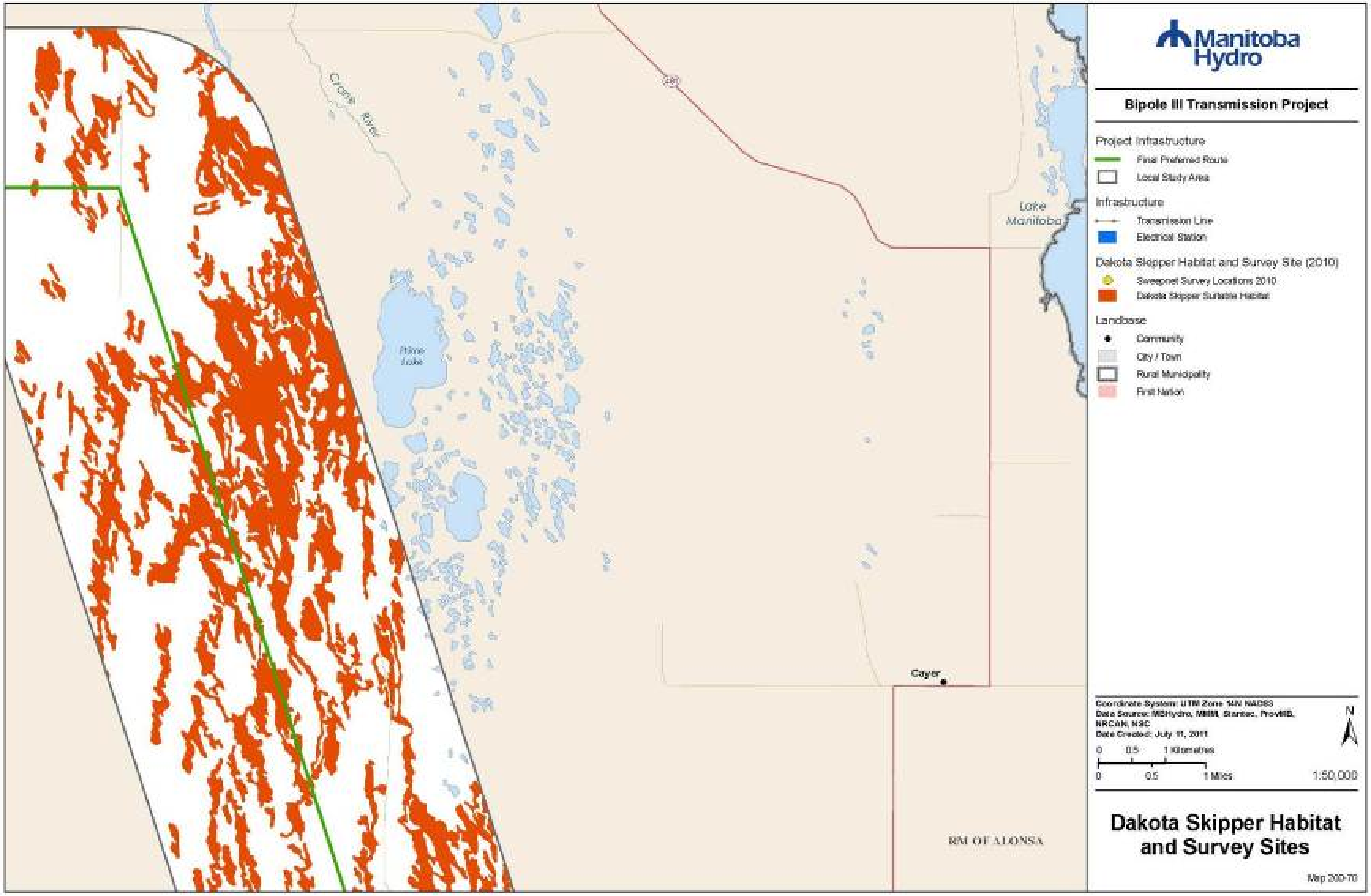
Map Series 200-29. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



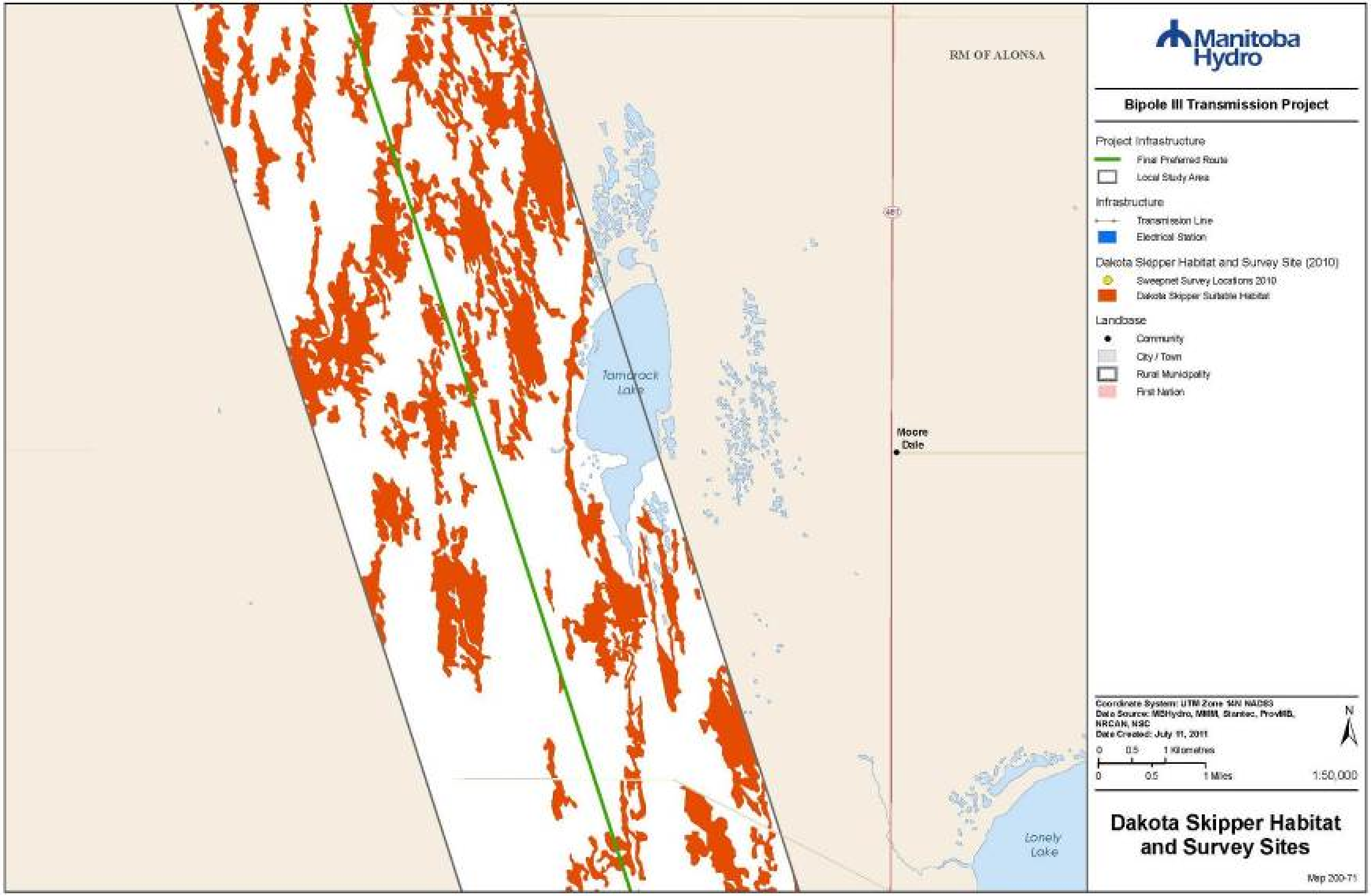
Map Series 200-30. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



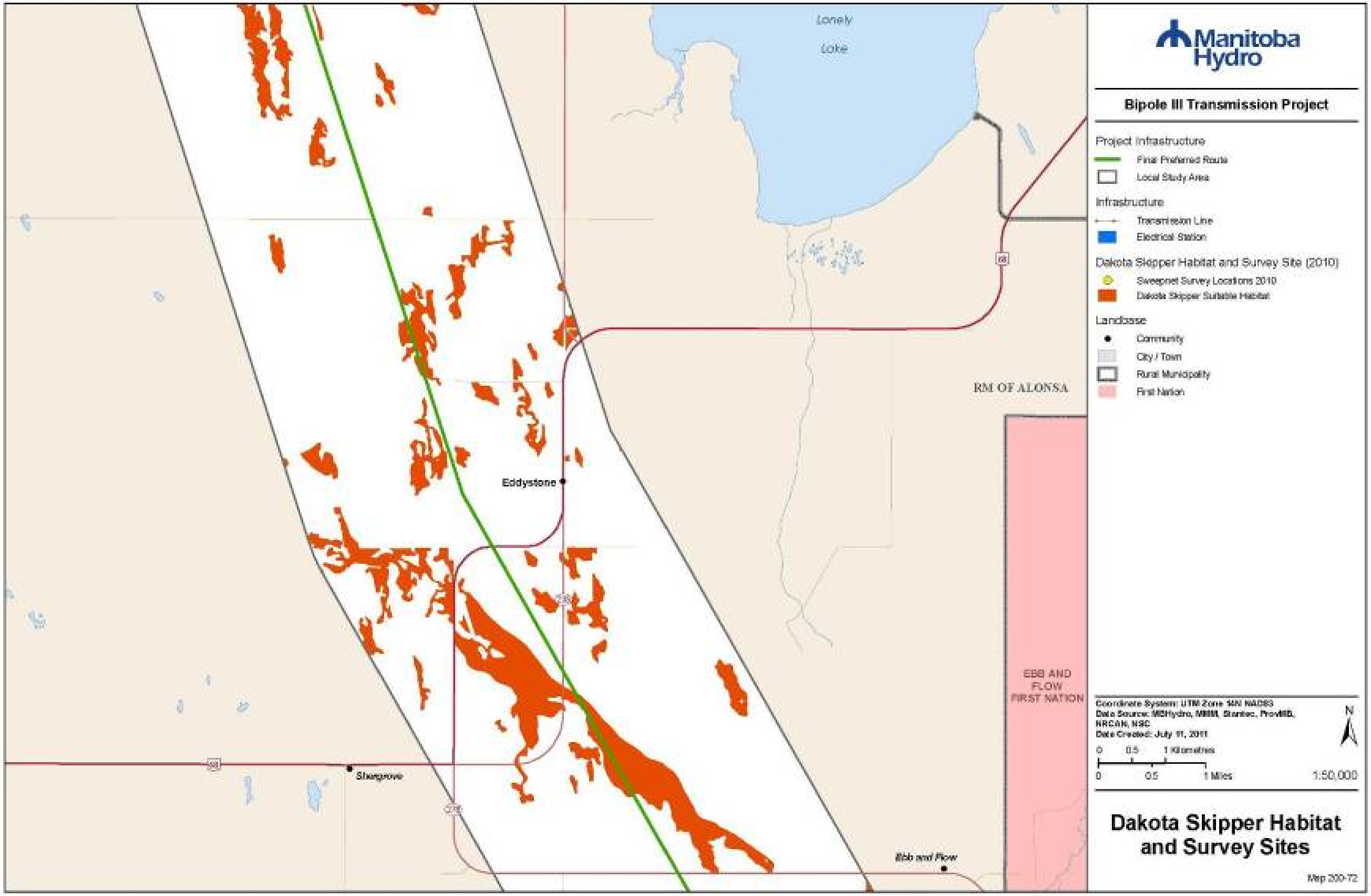
Map Series 200-31. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



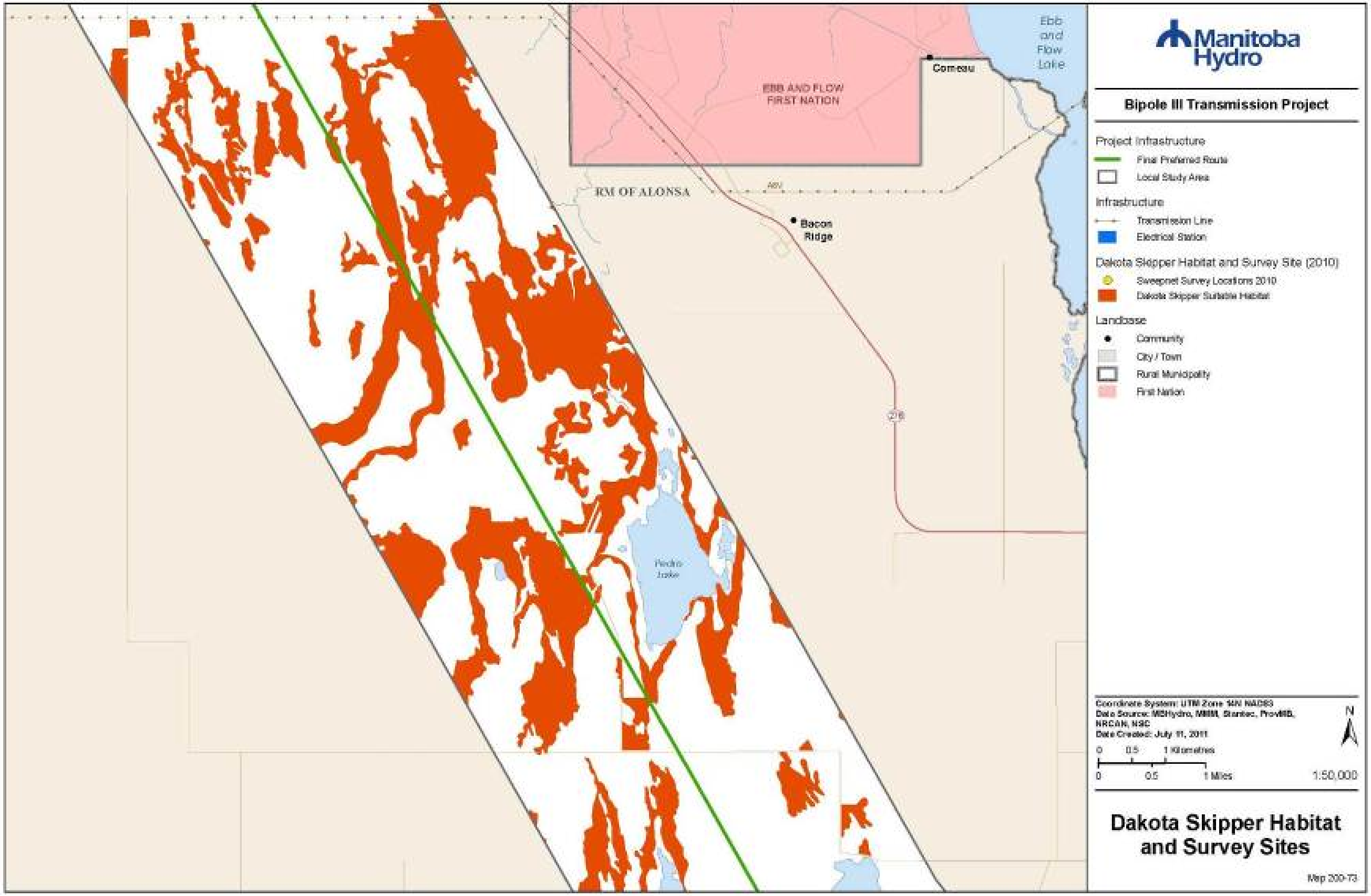
Map Series 200-32. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



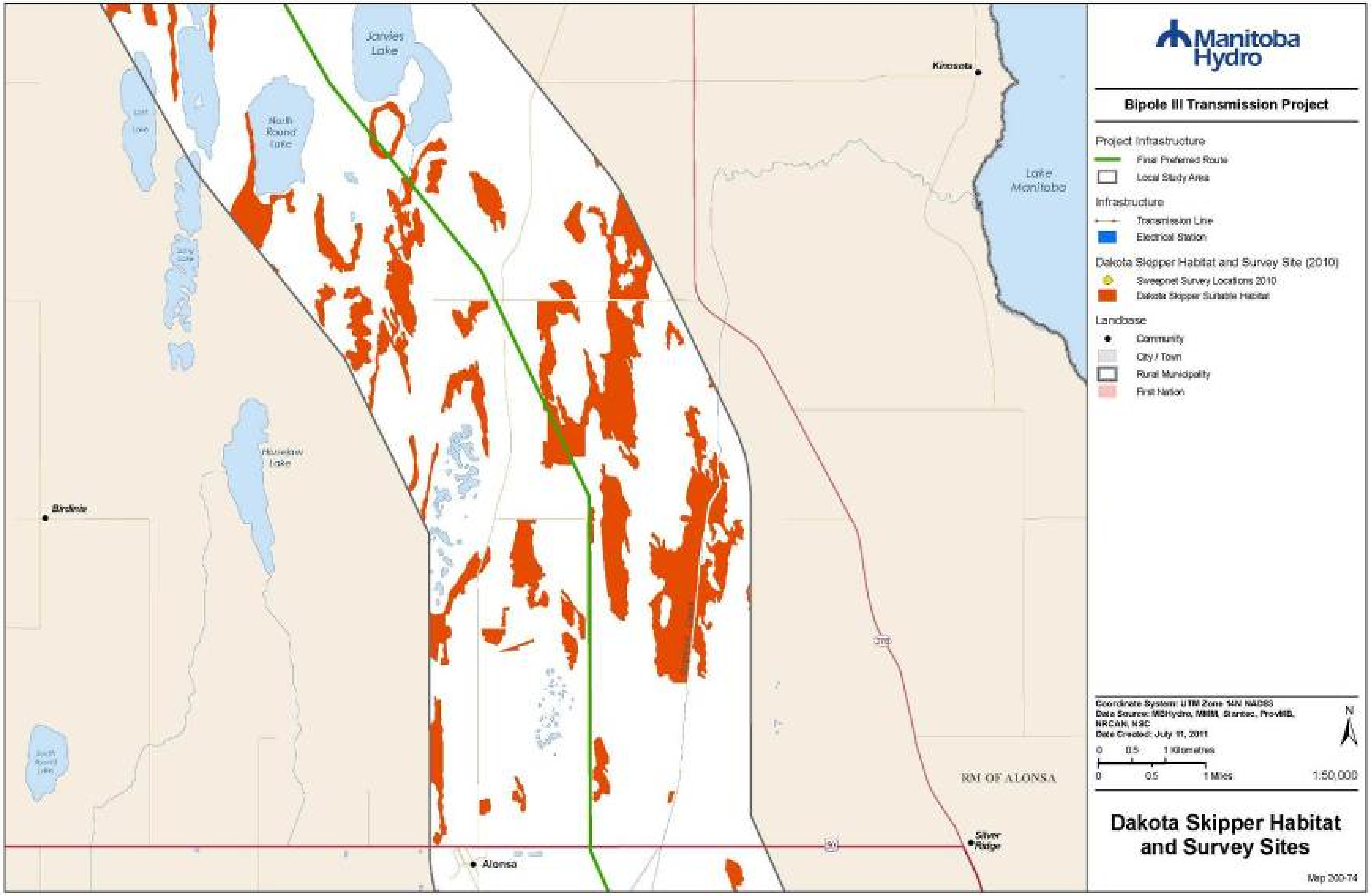
Map Series 200-33. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



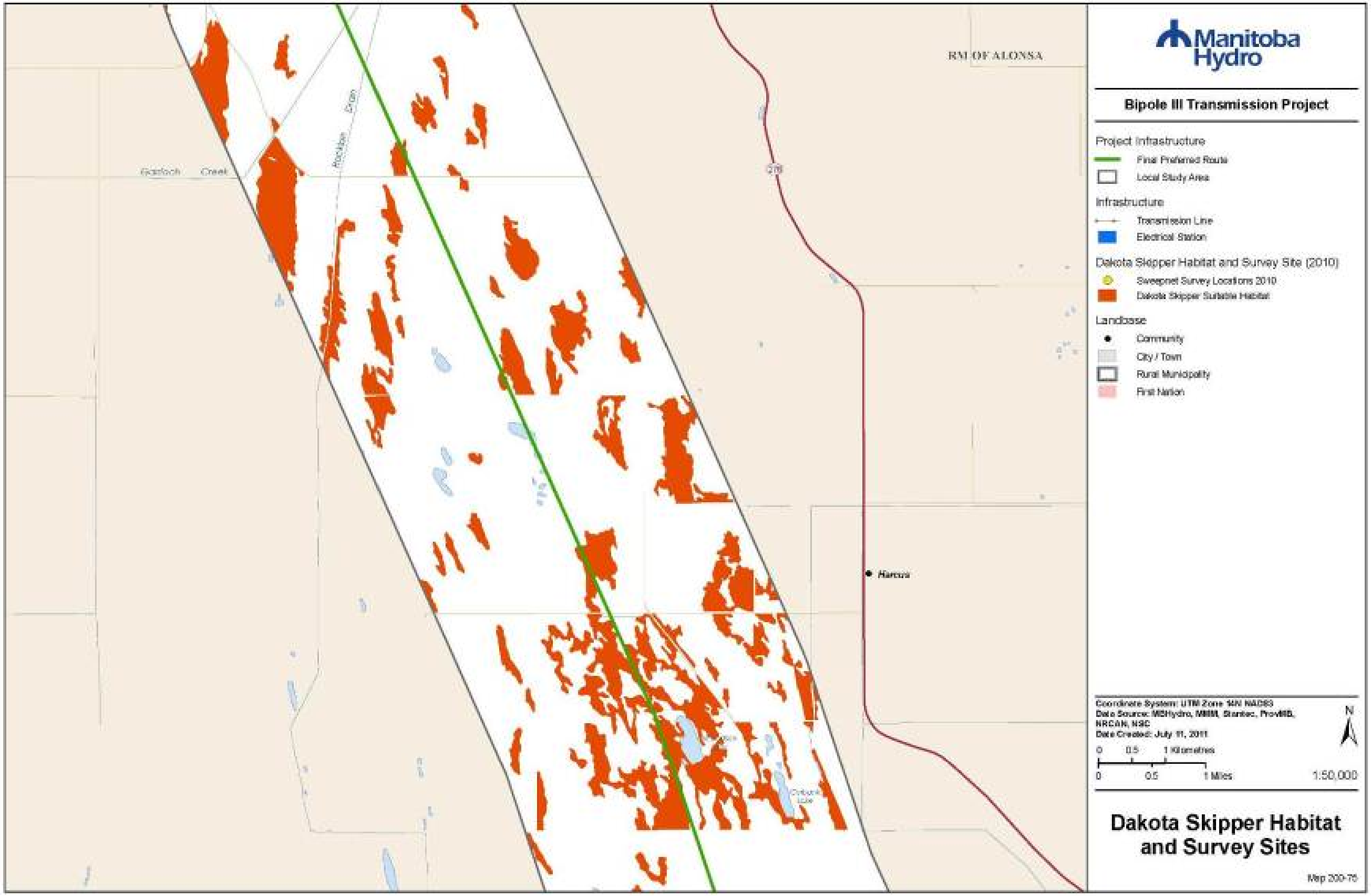
Map Series 200-34. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



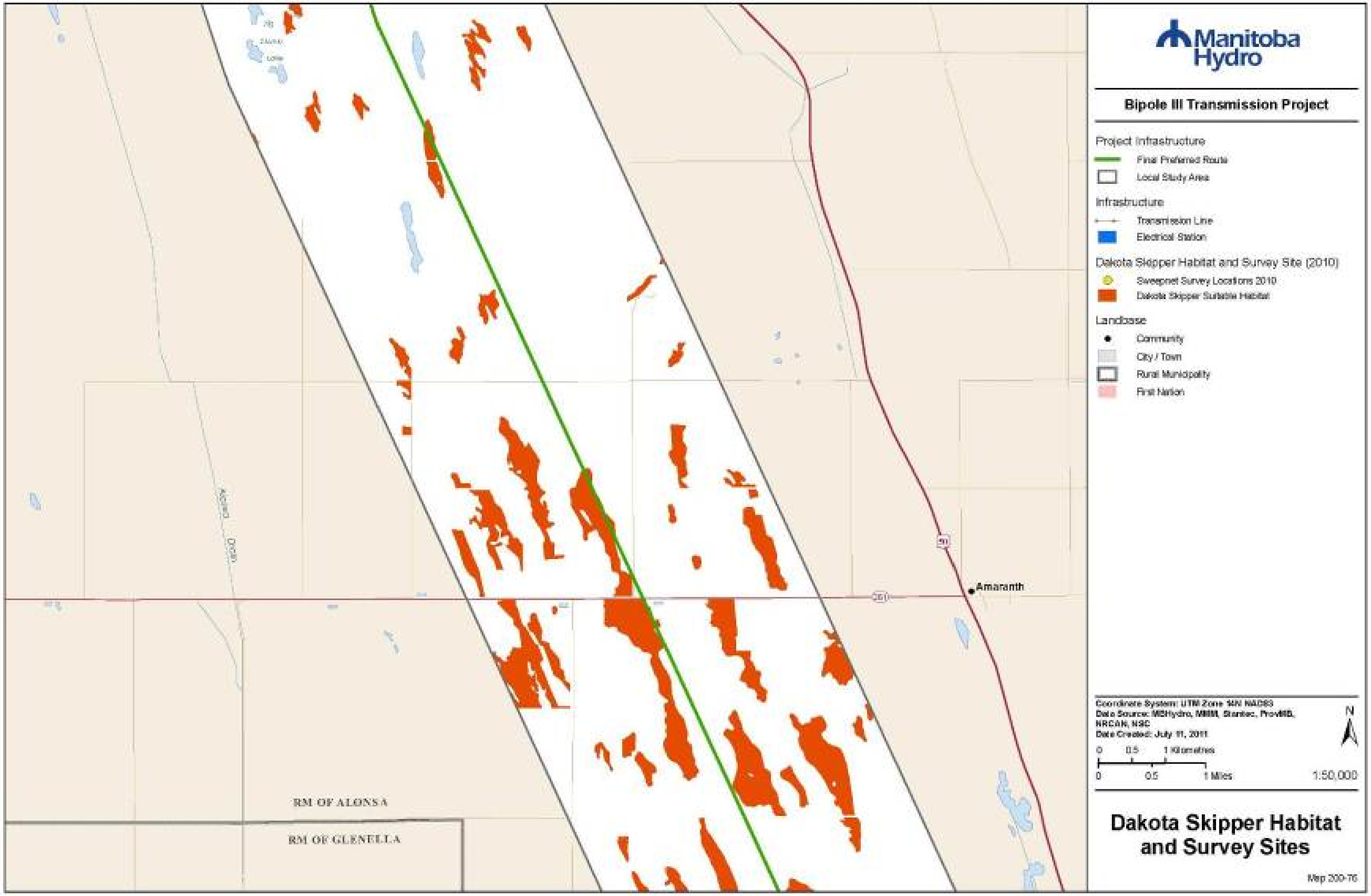
Map Series 200-35. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



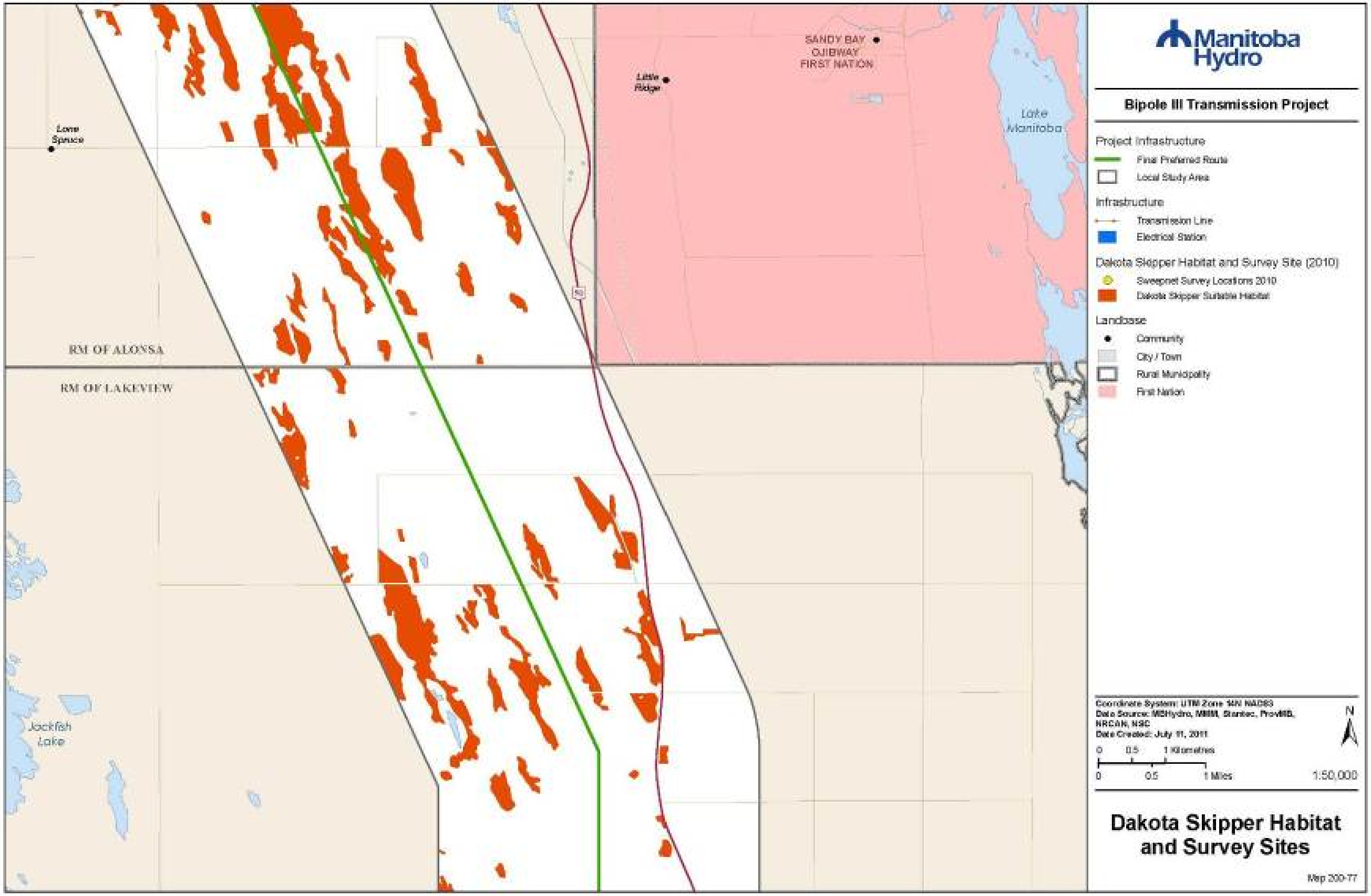
Map Series 200-36. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



Map Series 200-37. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.

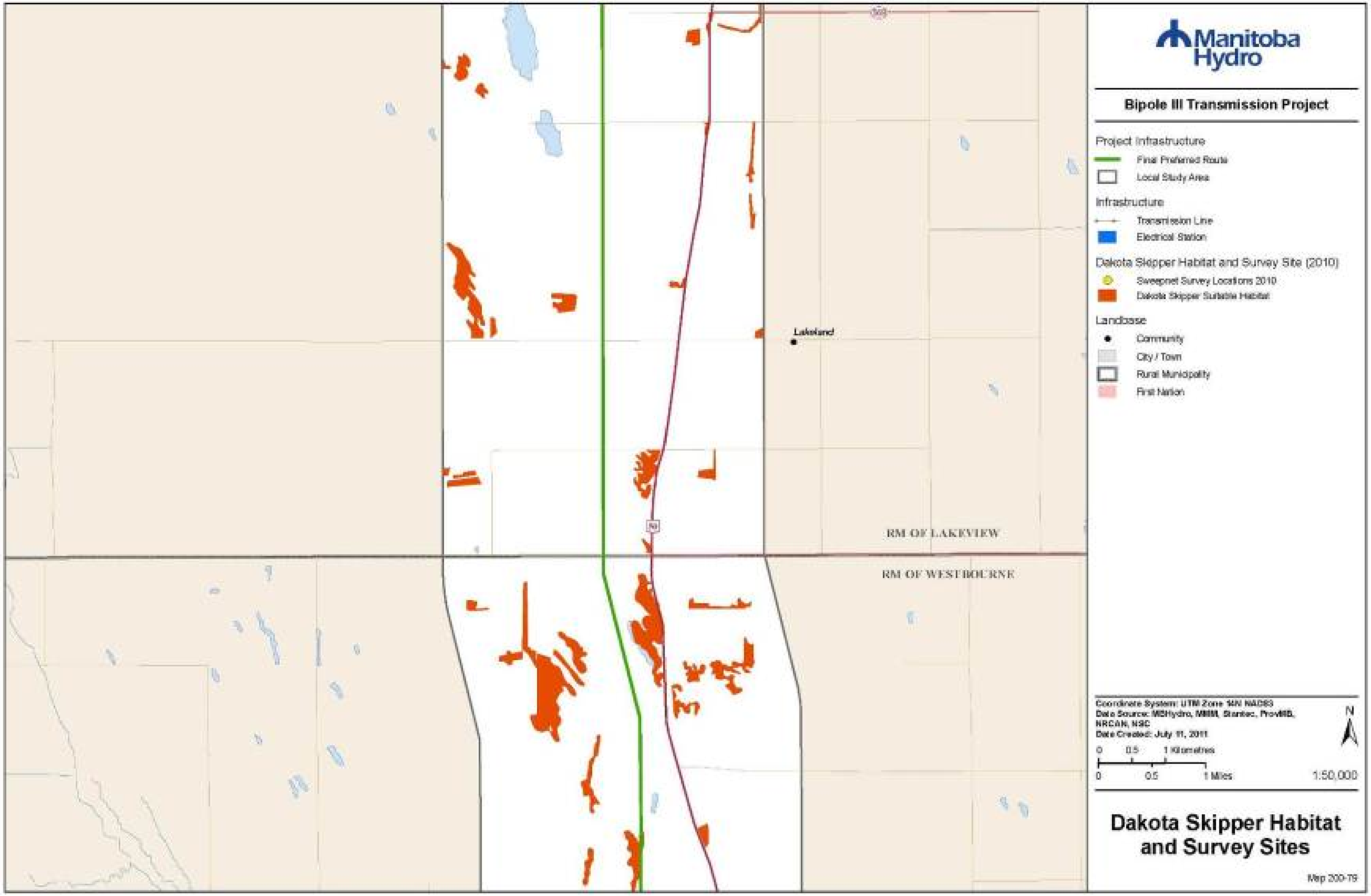


Map Series 200-38. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.

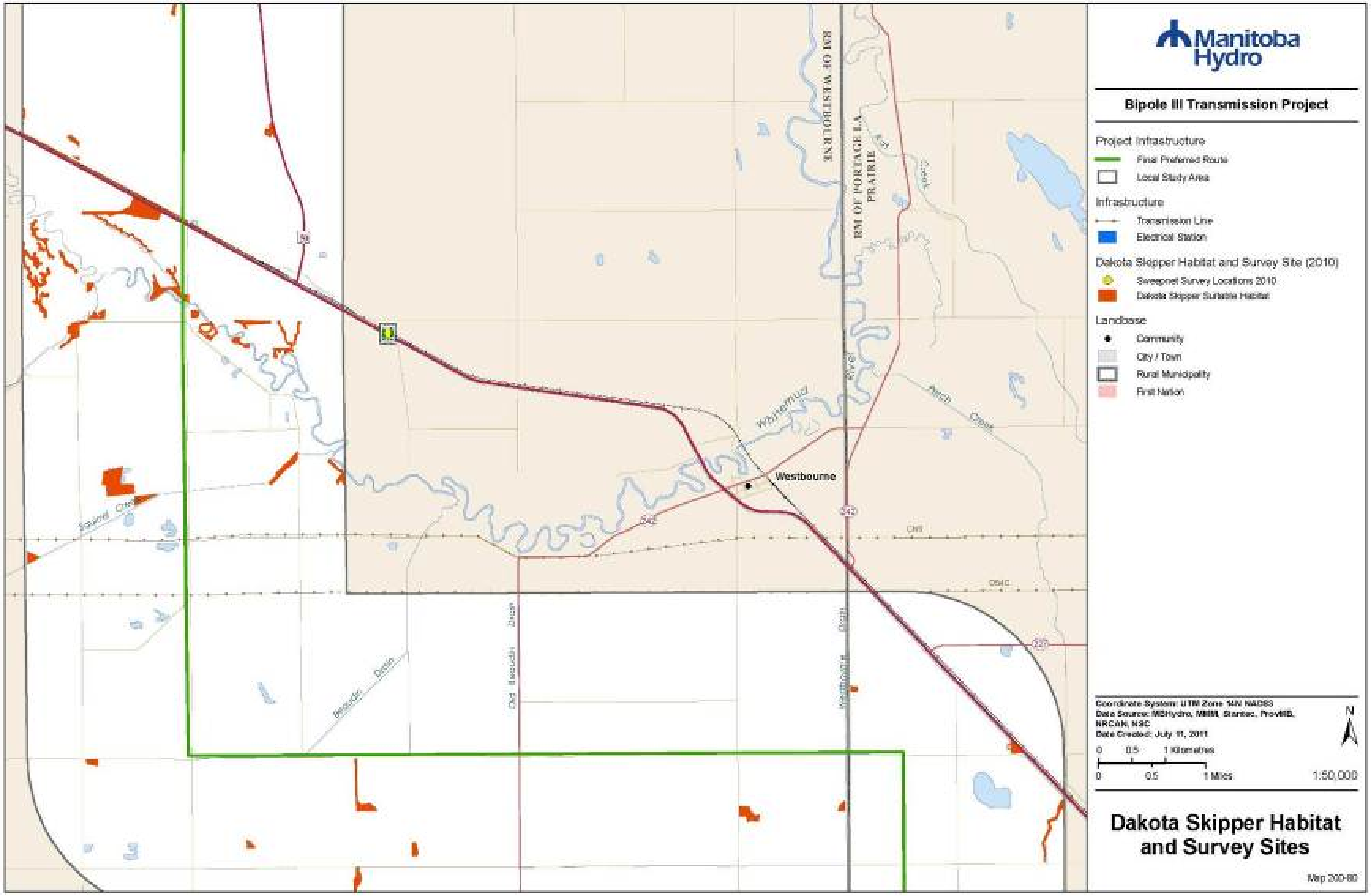


Map Series 200-39. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.

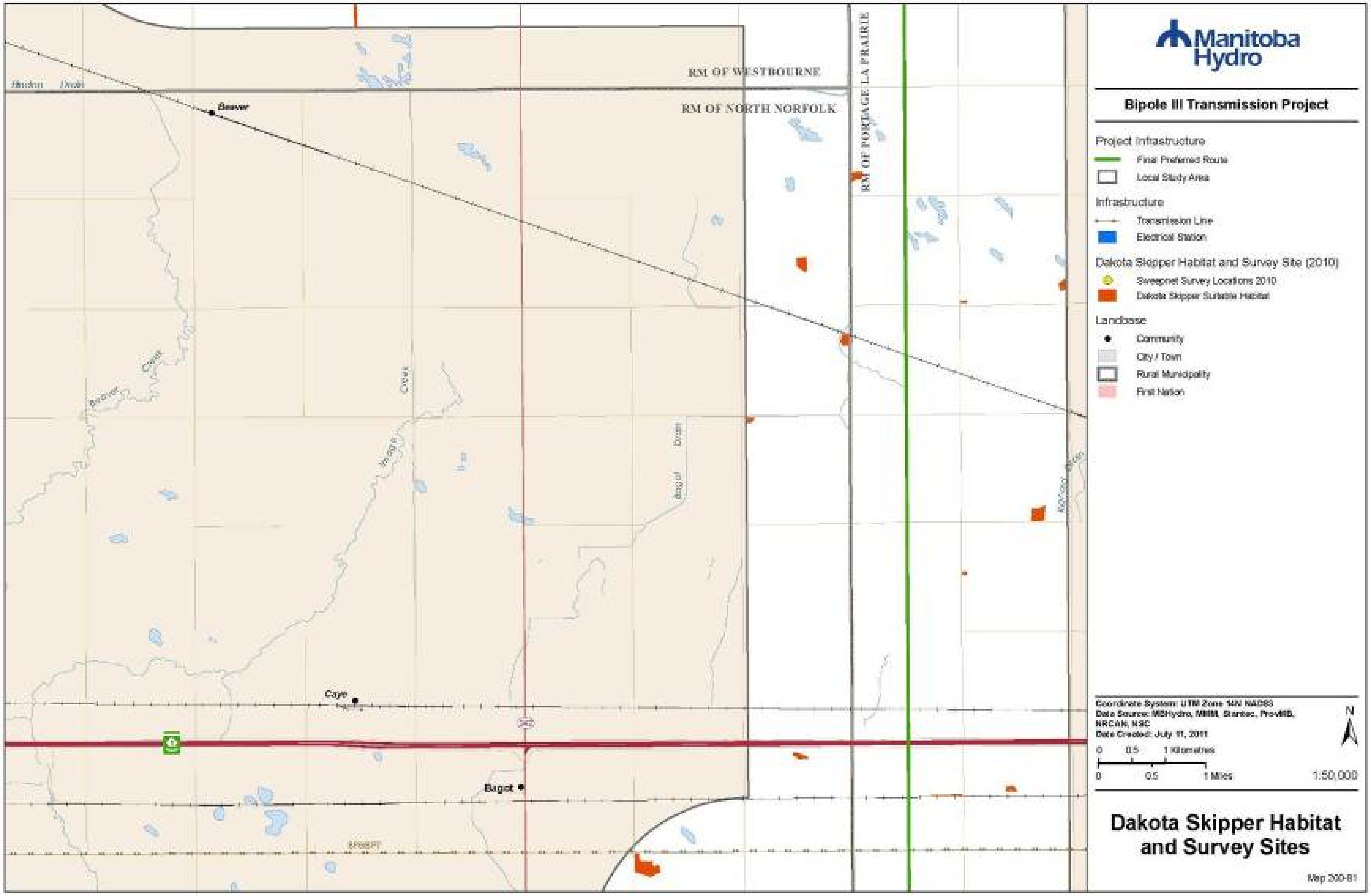
Map Series 200-40. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



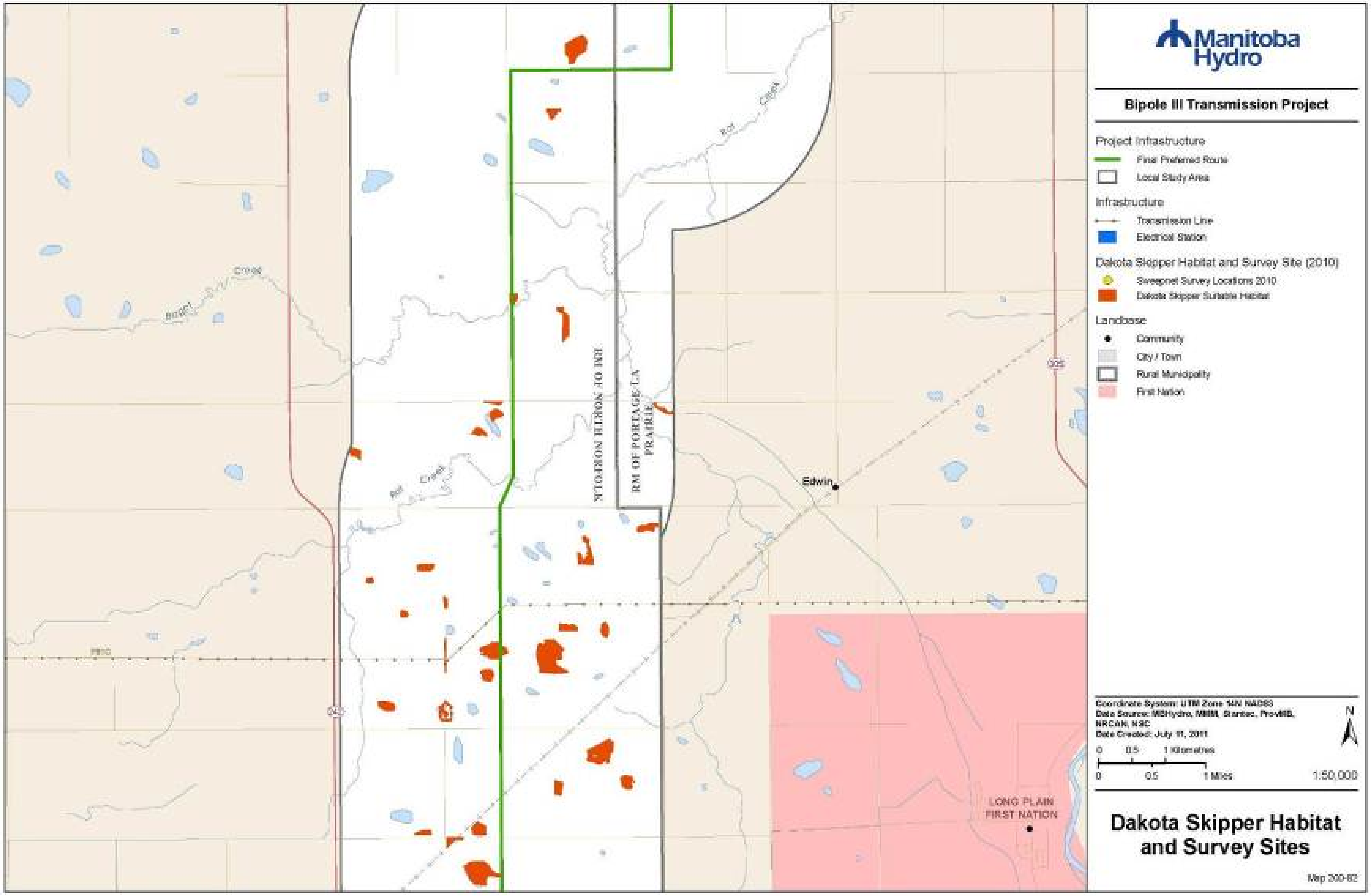
Map Series 200-41. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



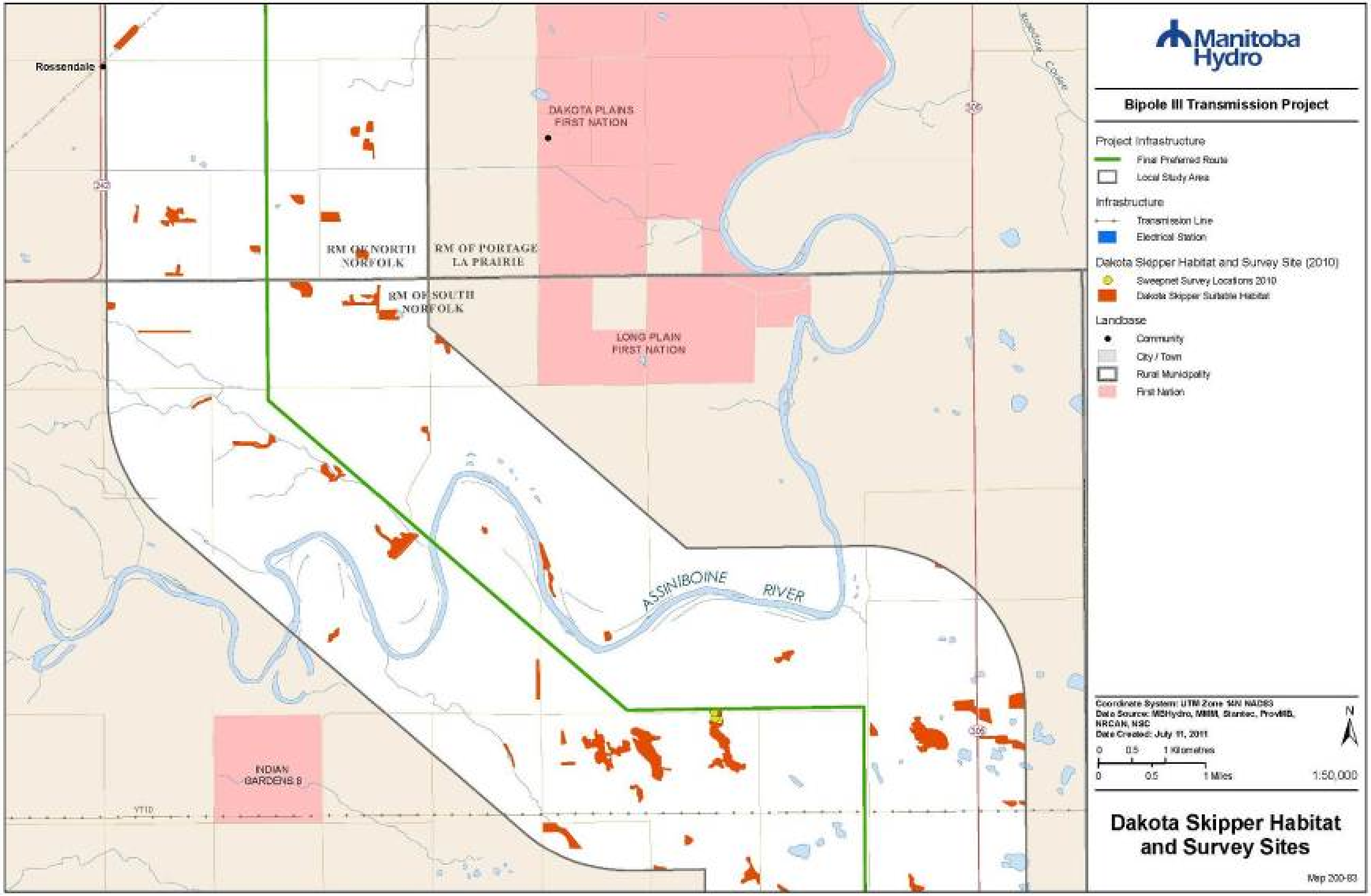
Map Series 200-42. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



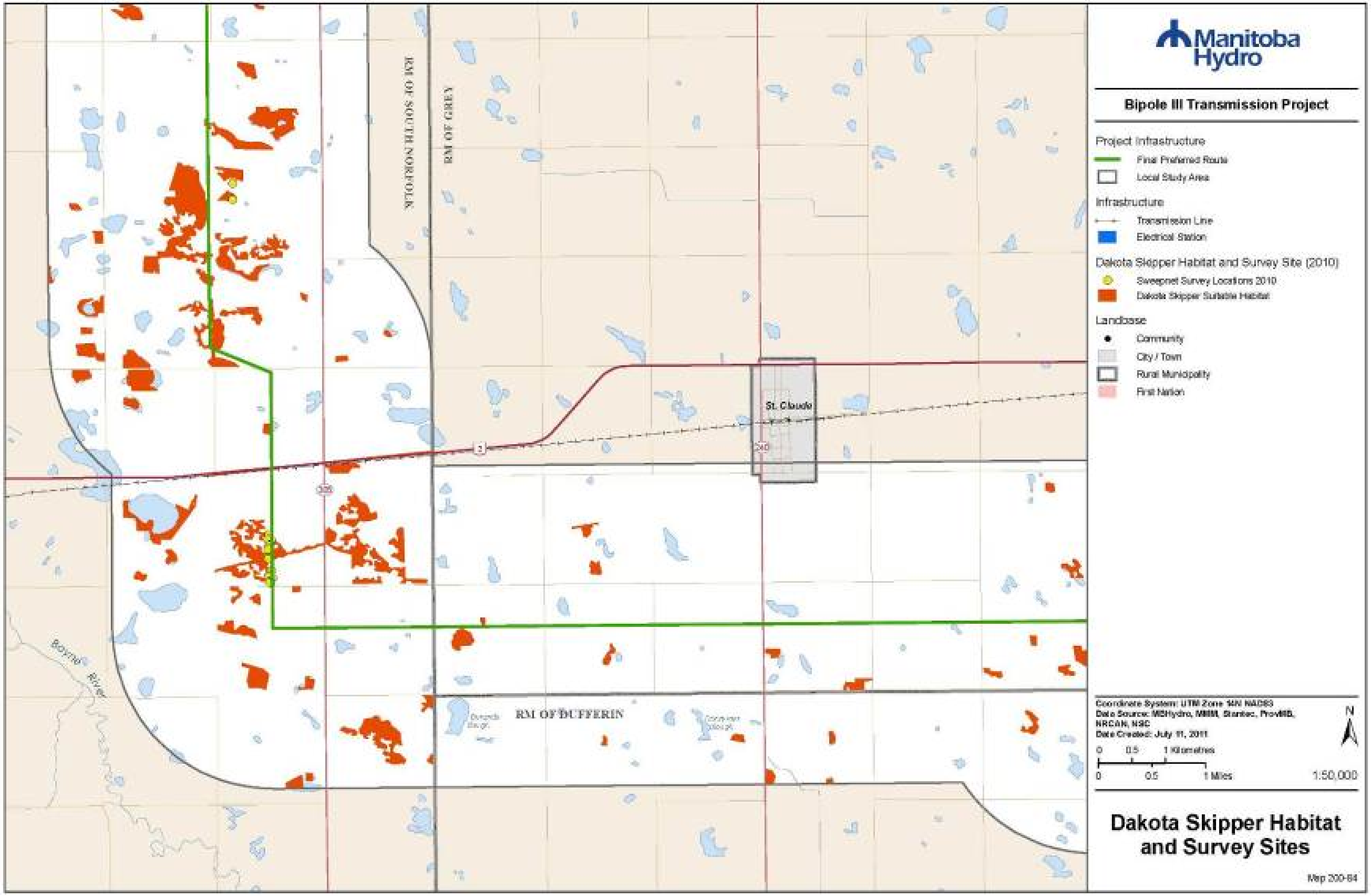
Map Series 200-43. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



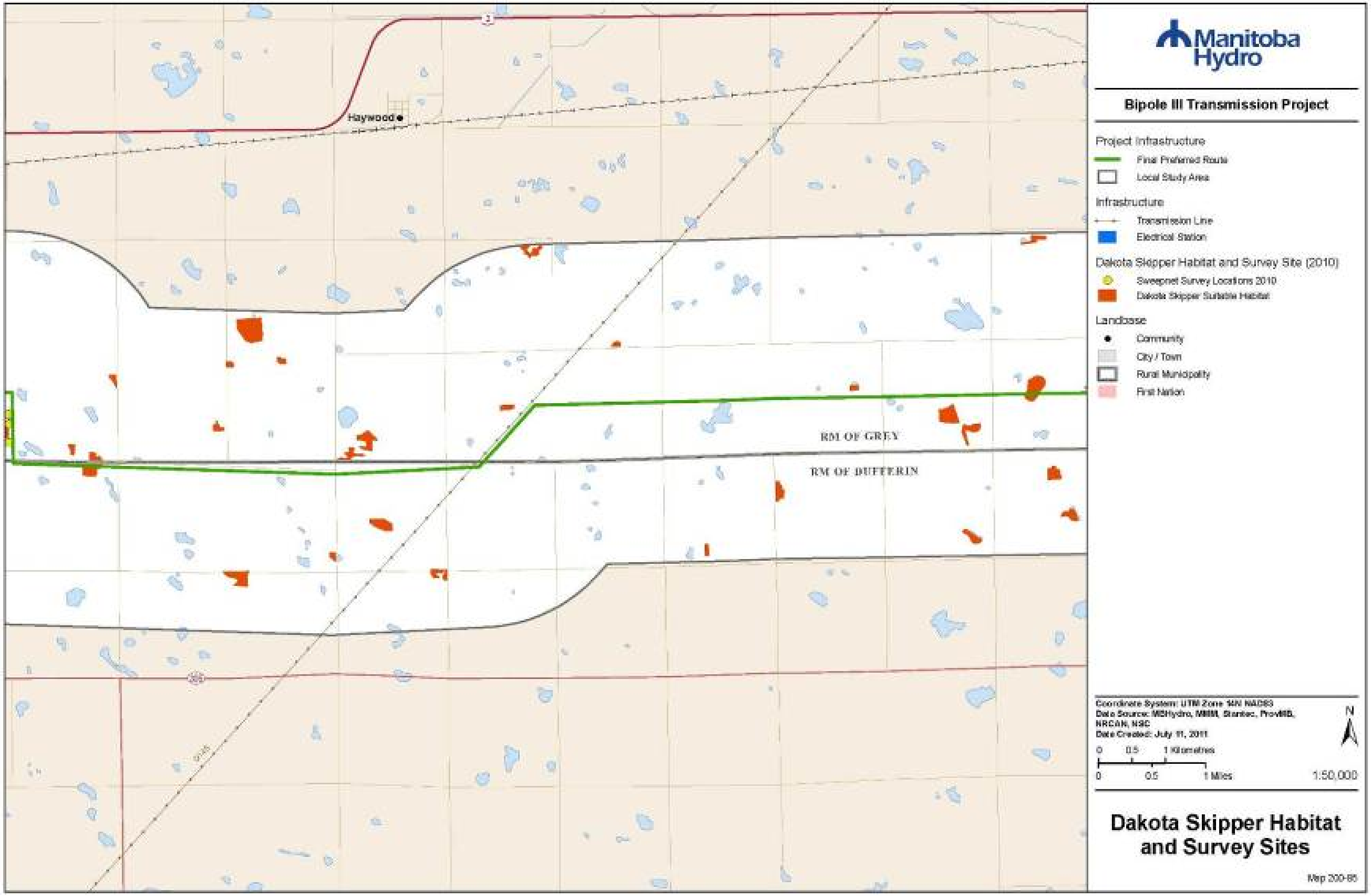
Map Series 200-44. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



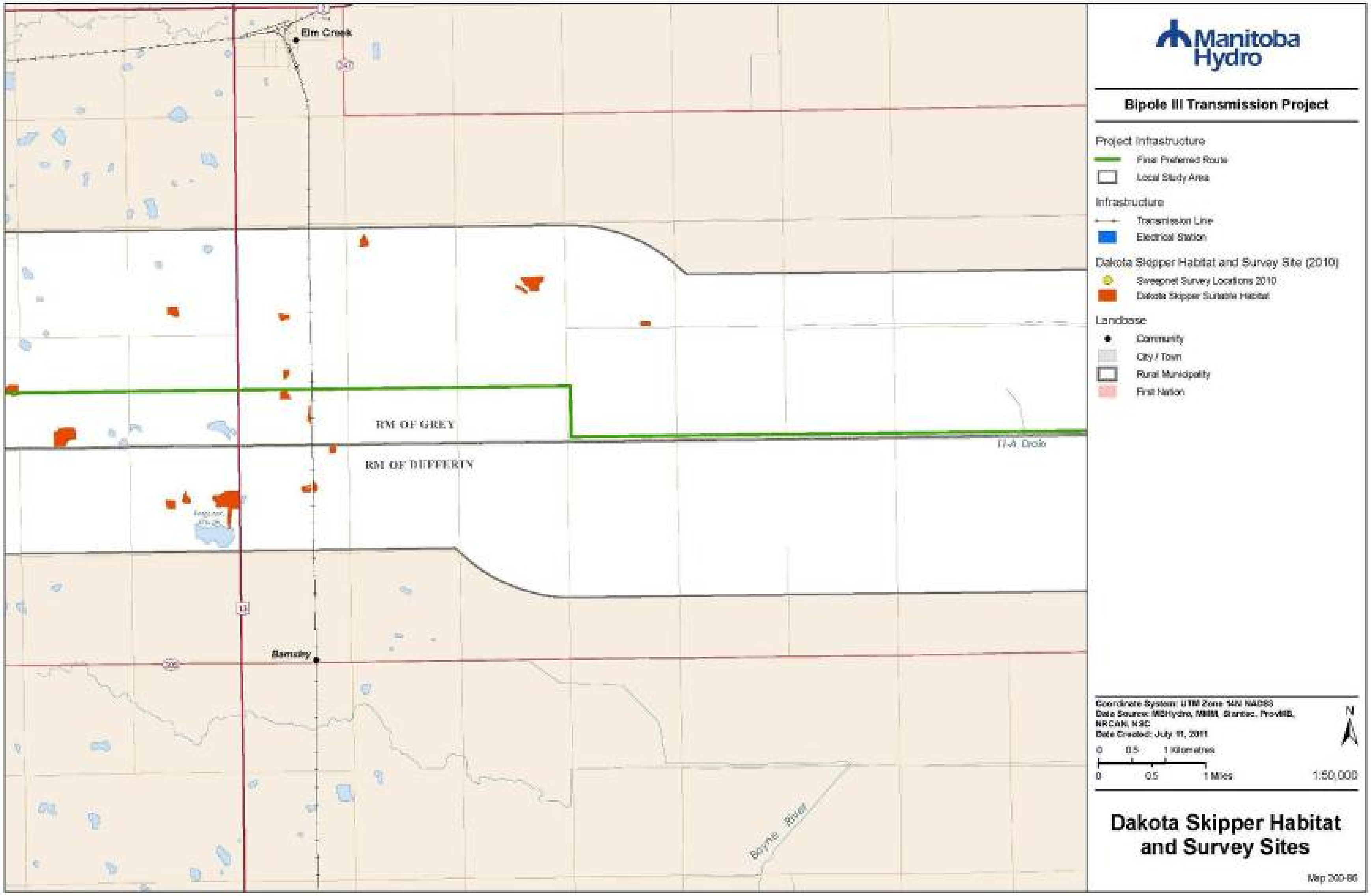
Map Series 200-45. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



Map Series 200-46. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.

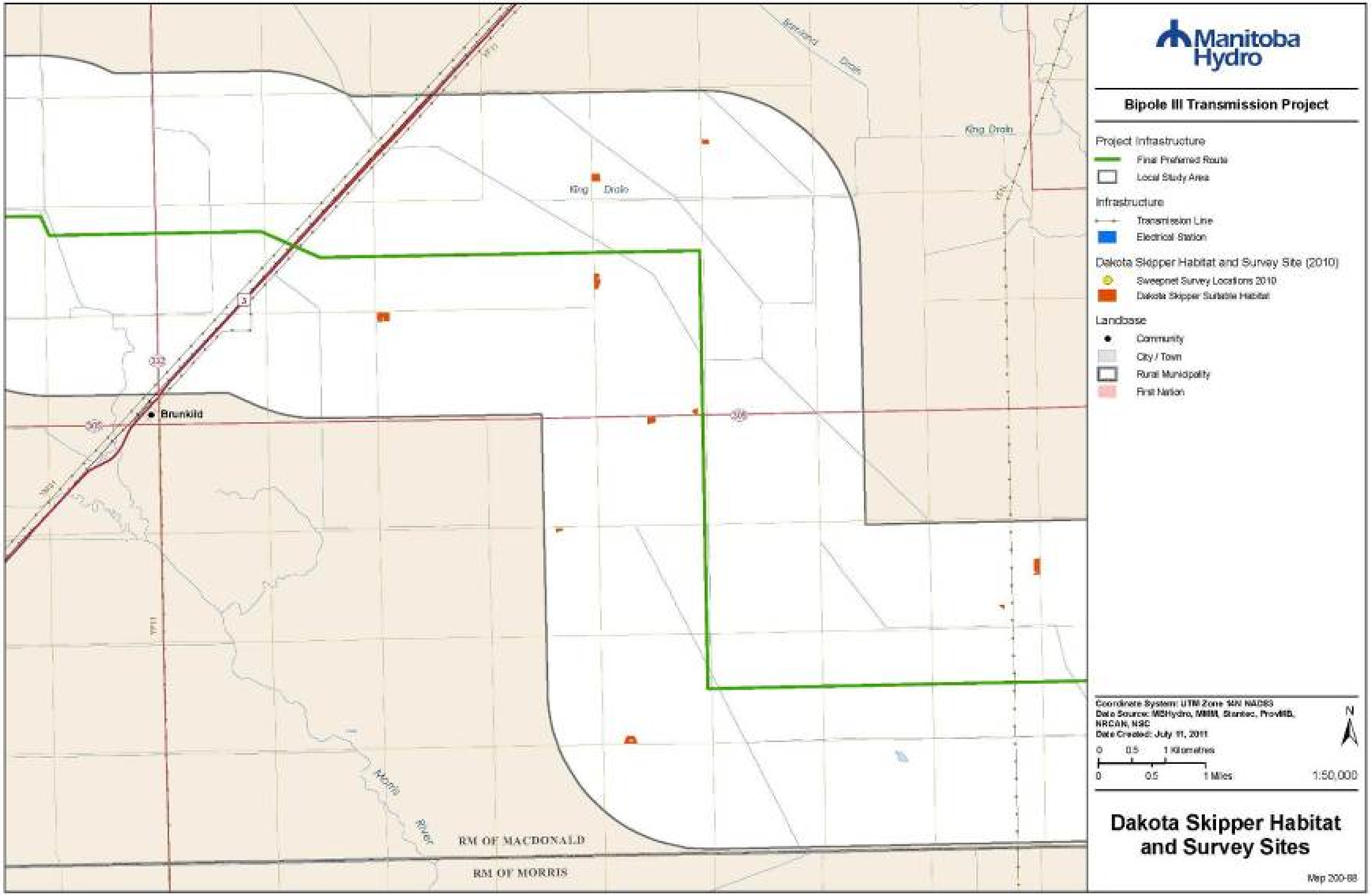


Map Series 200-47. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.

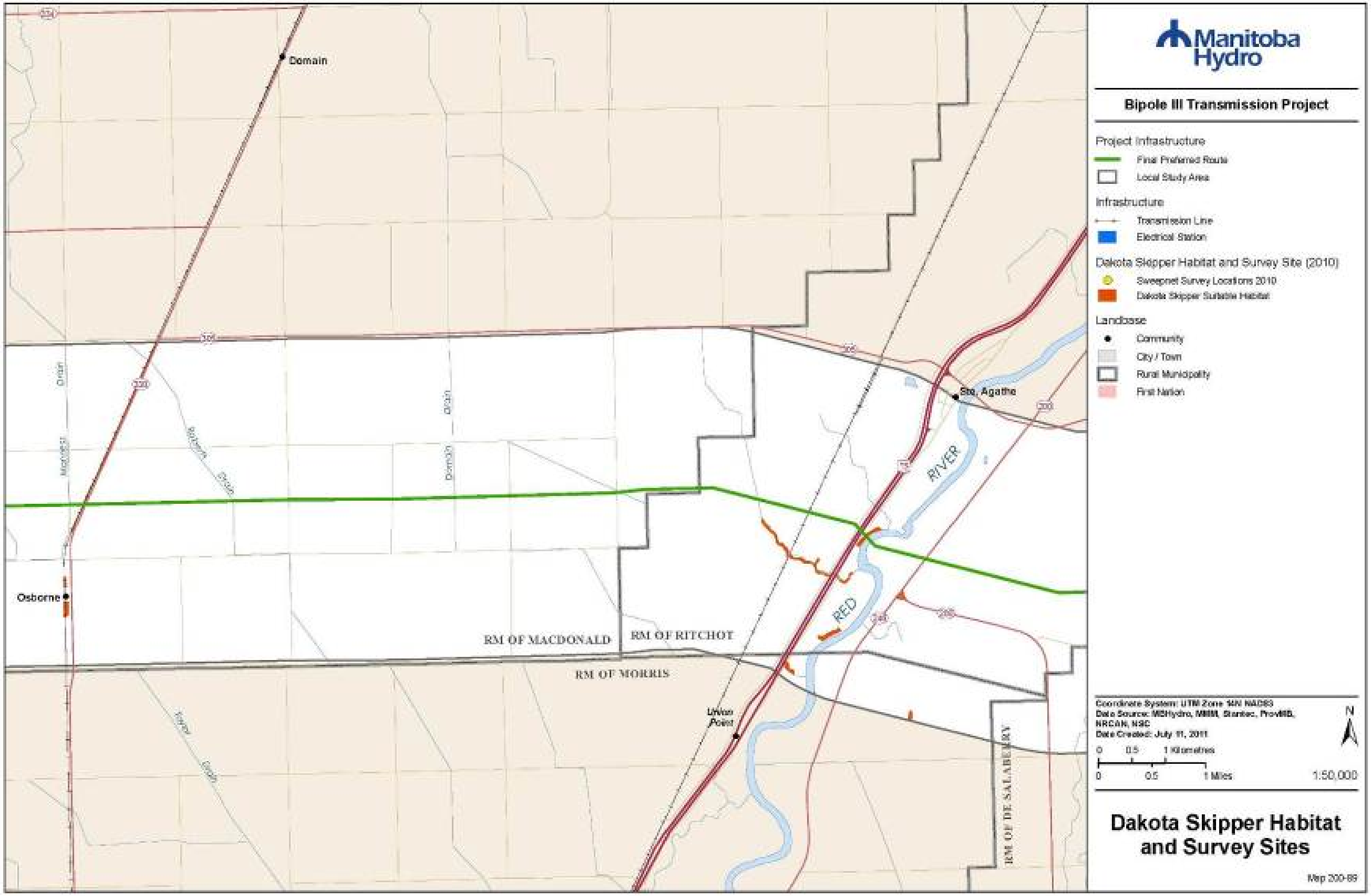


Map Series 200-48. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.

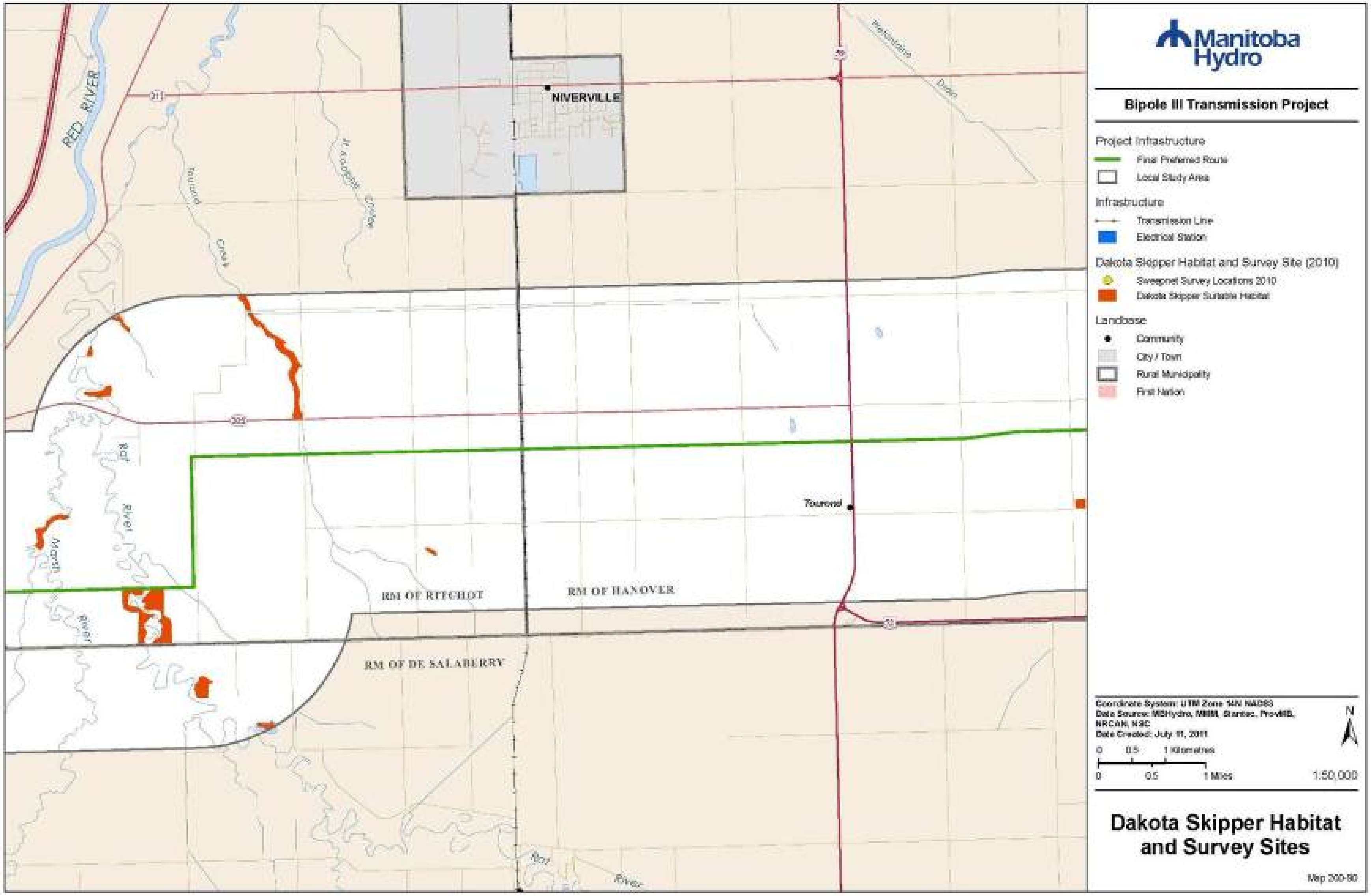
Map Series 200-49. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



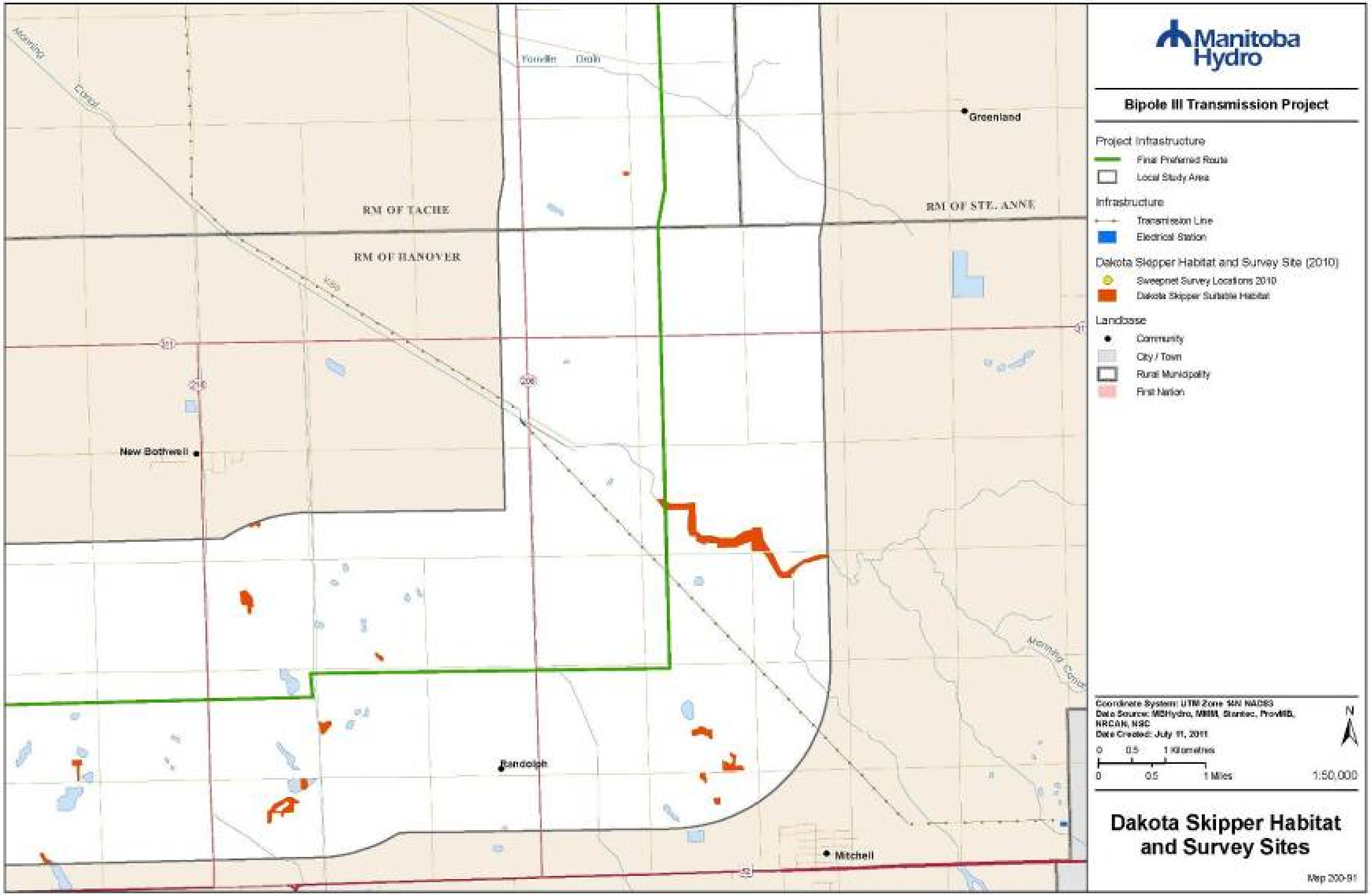
Map Series 200-50. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



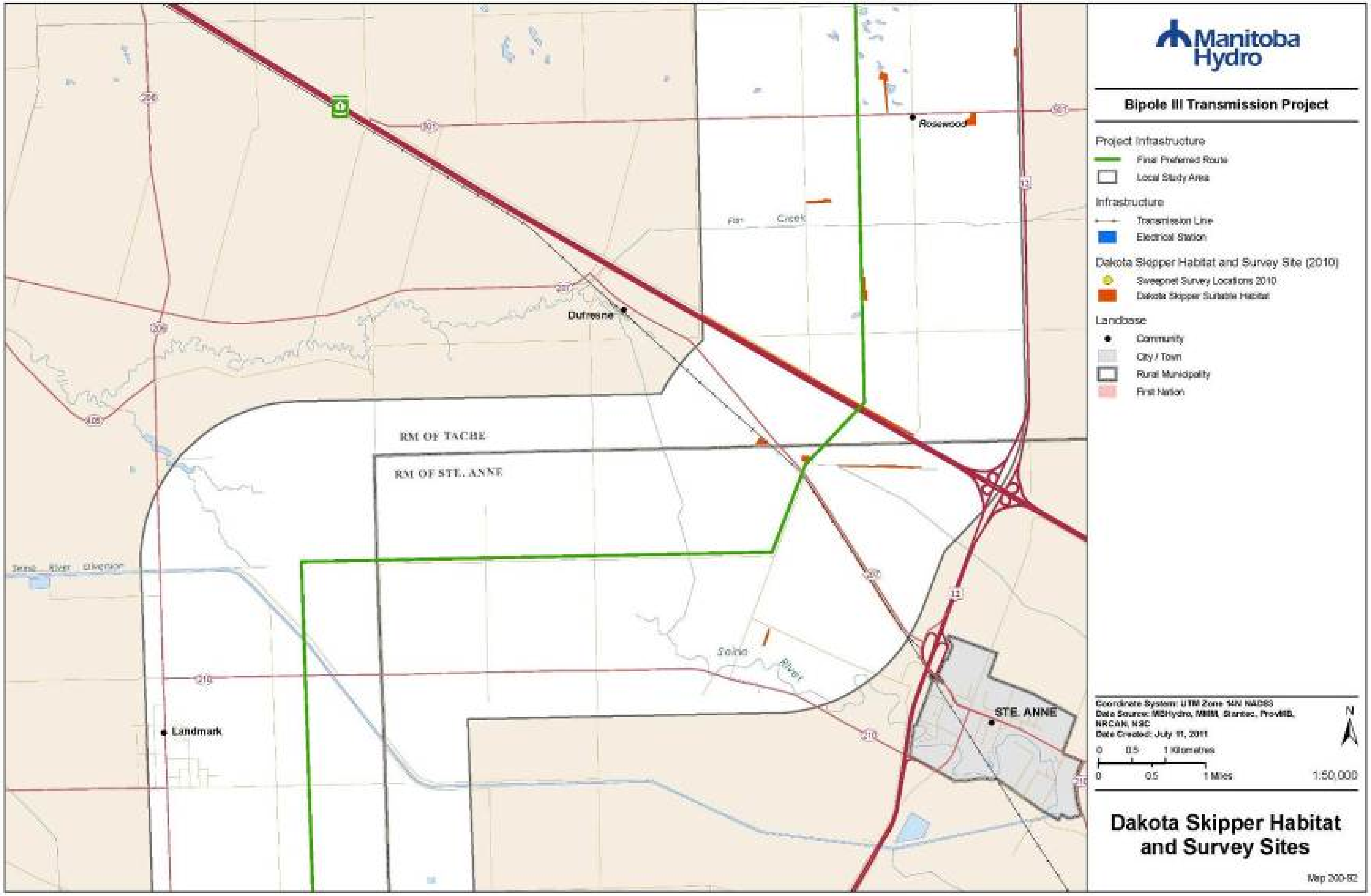
Map Series 200-51. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



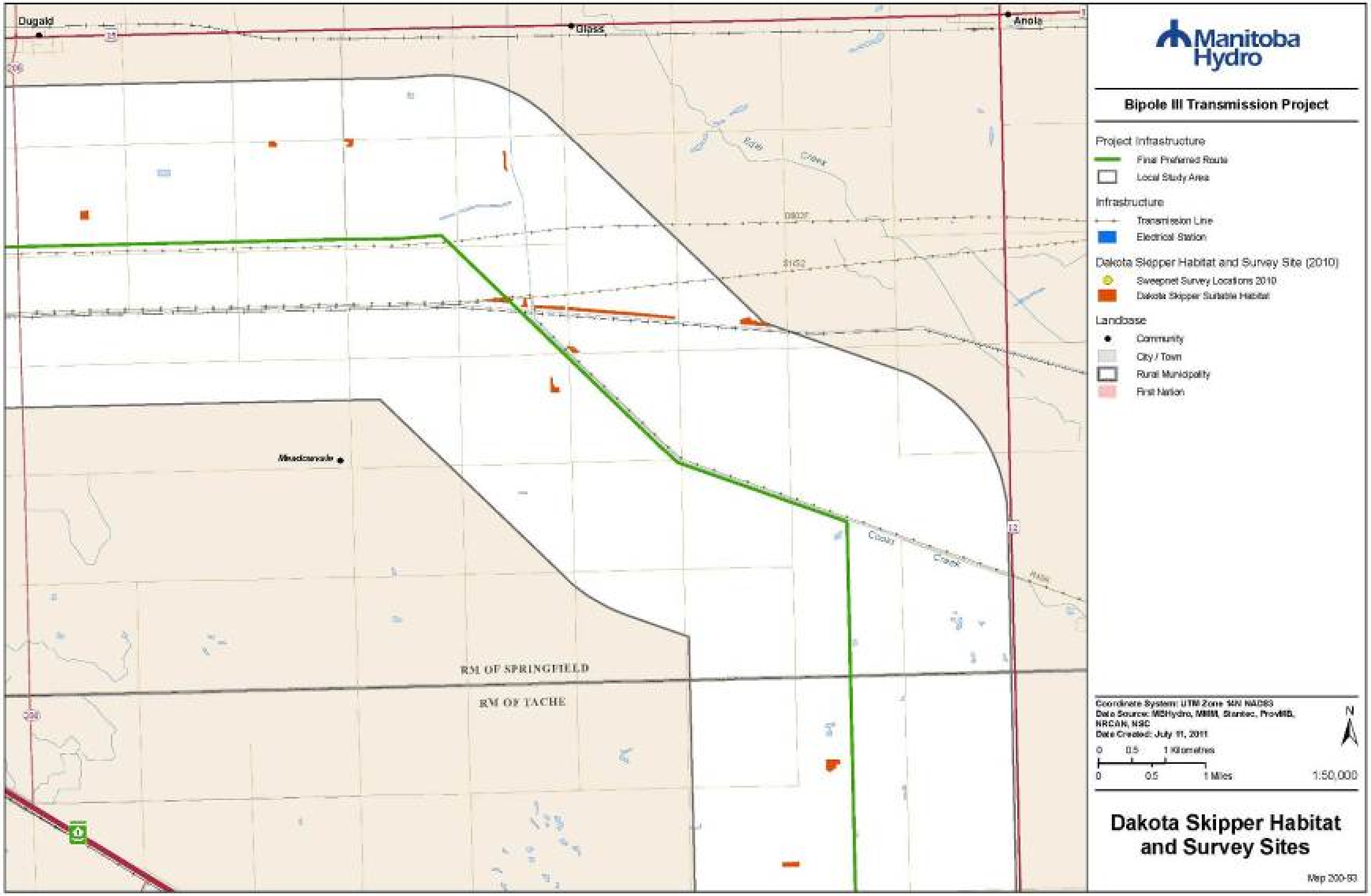
Map Series 200-52. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



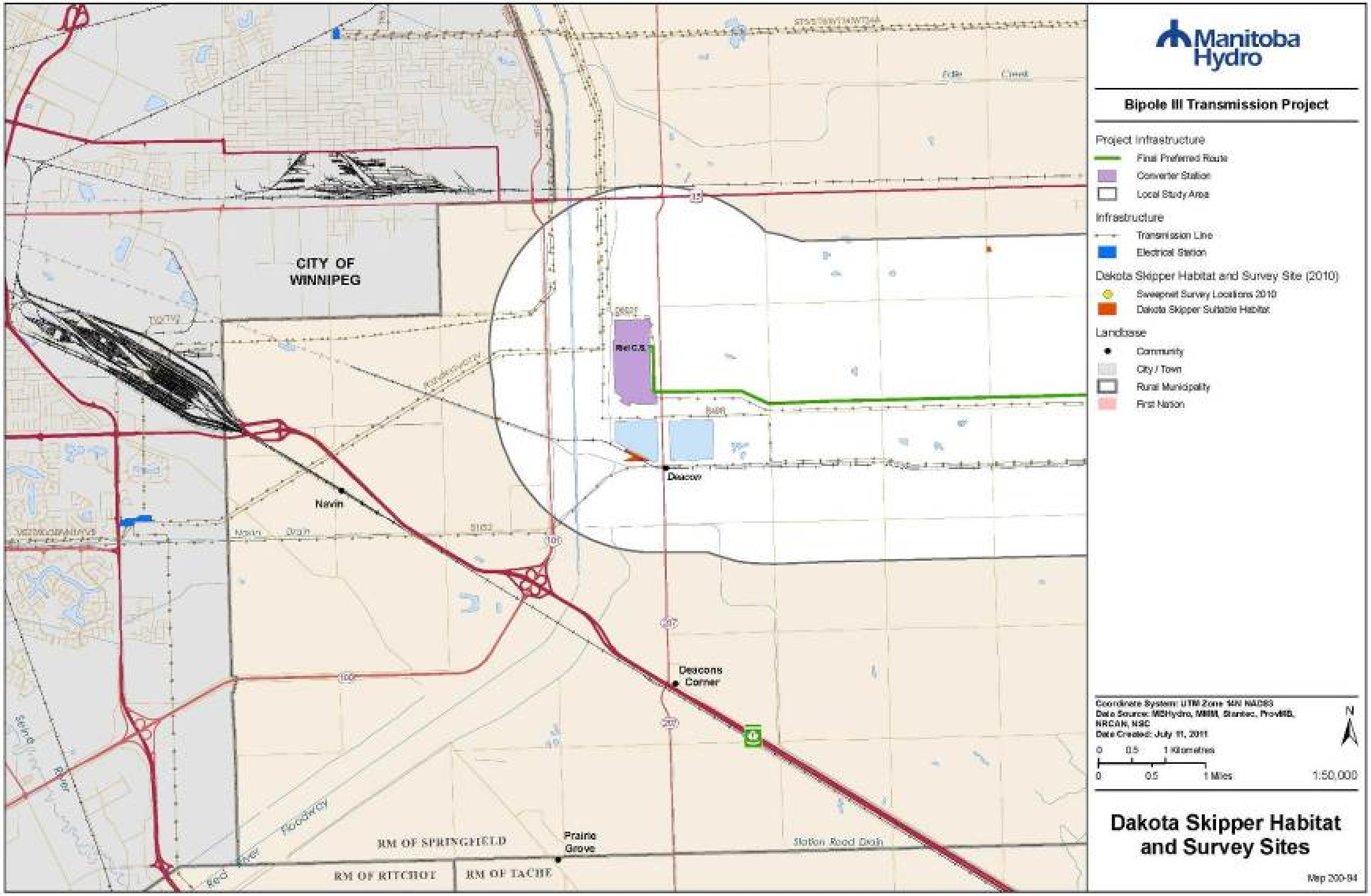
Map Series 200-53. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



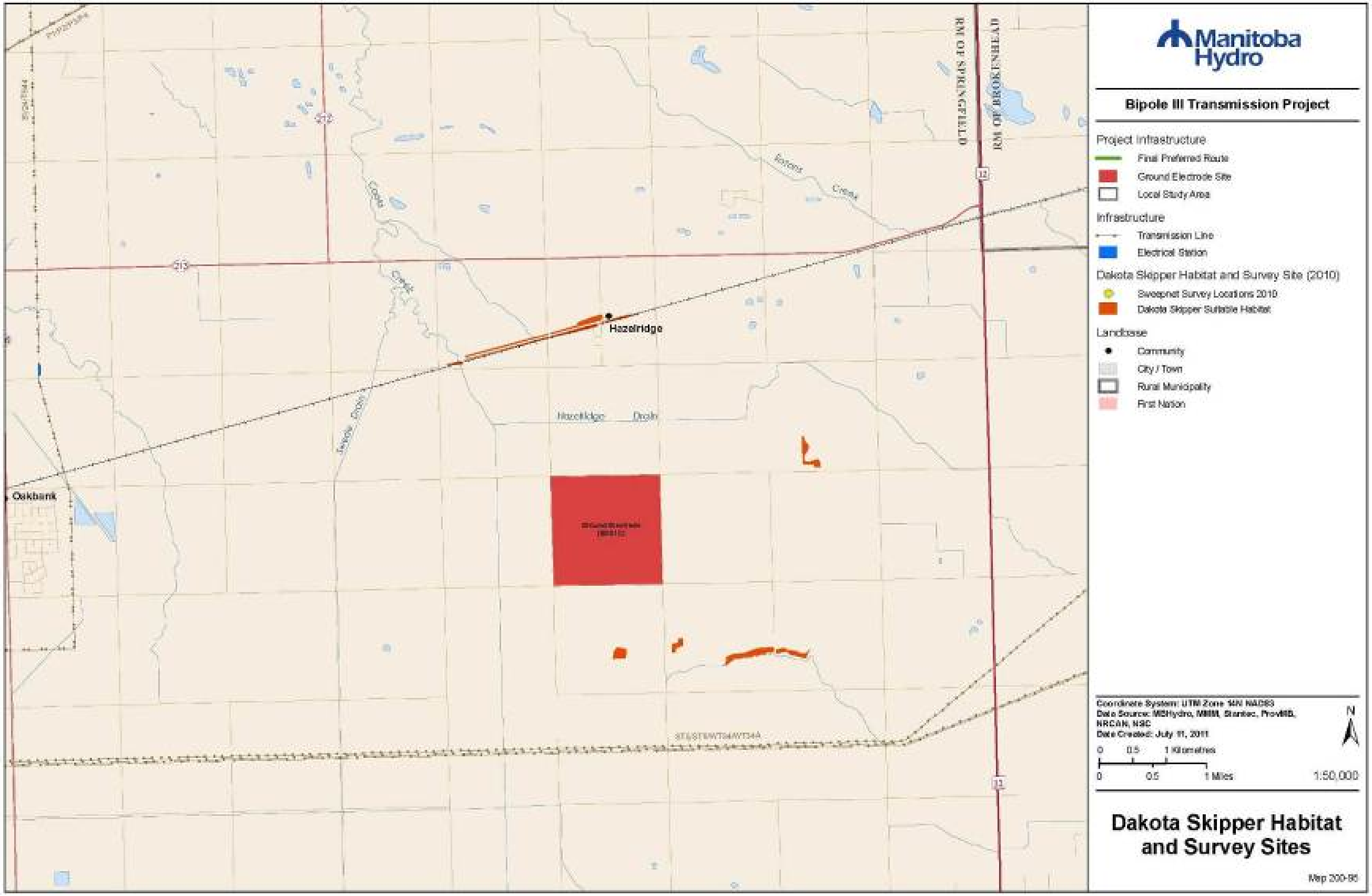
Map Series 200-54. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



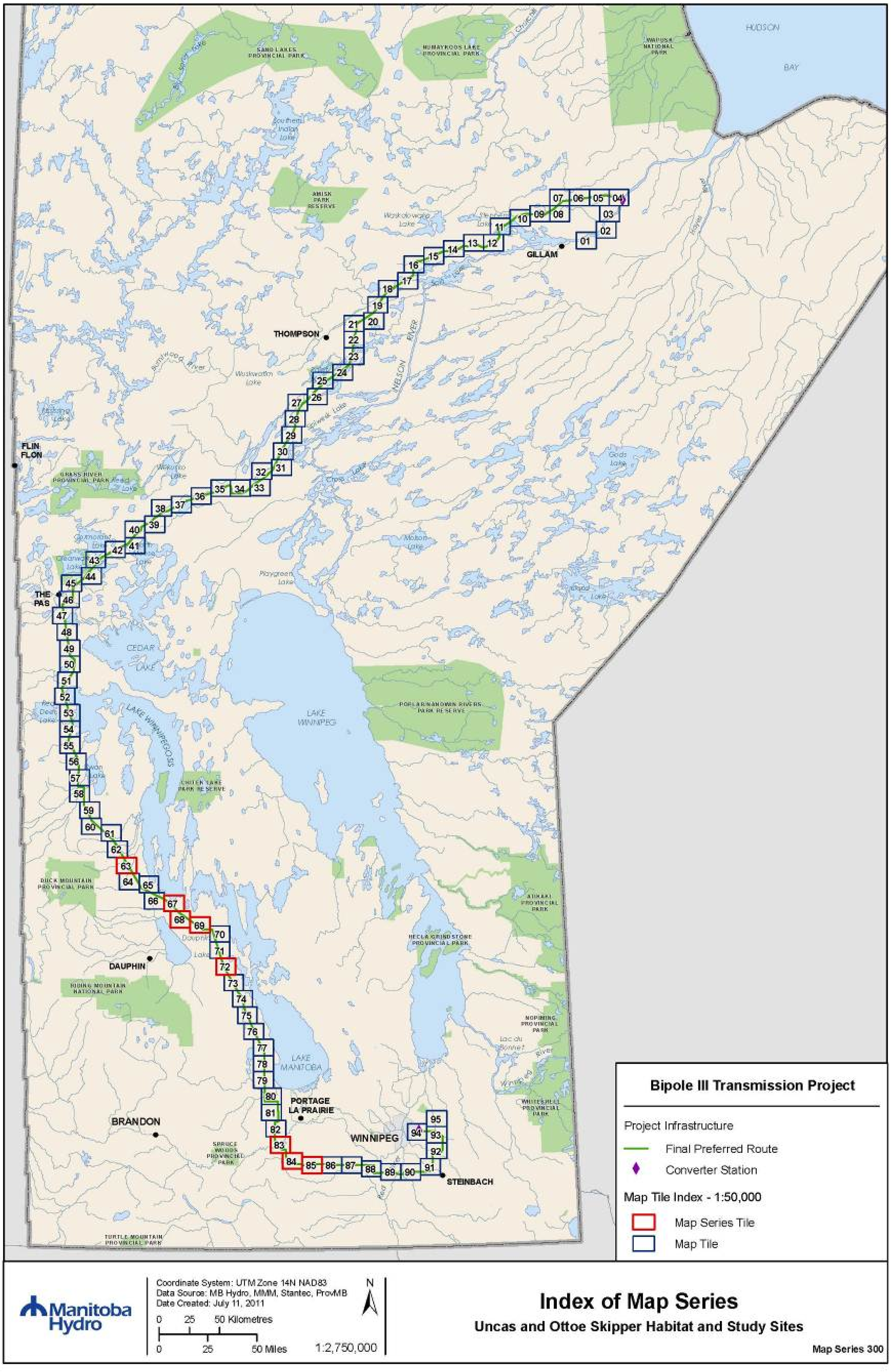
Map Series 200-55. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



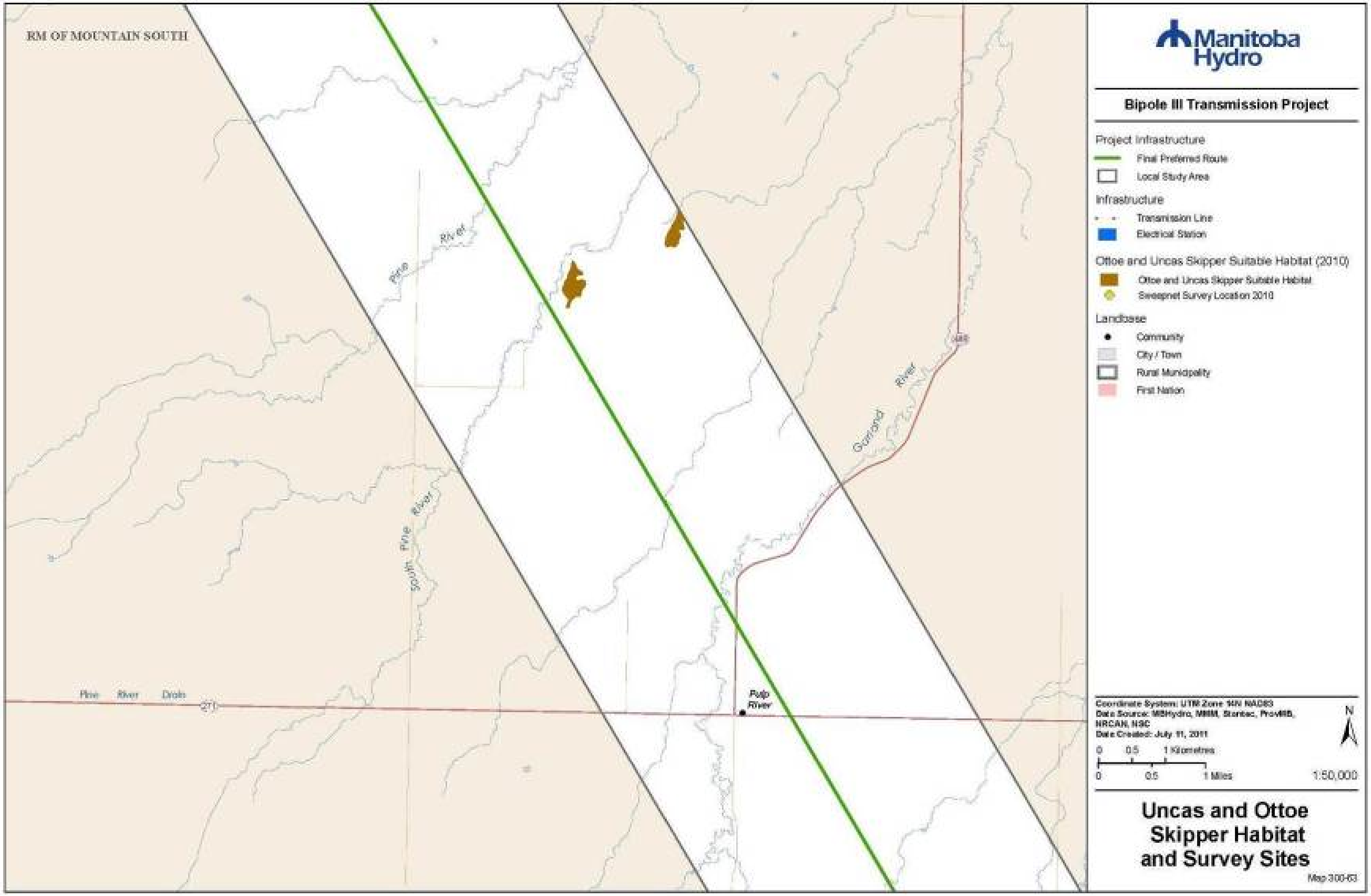
Map Series 200-56. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



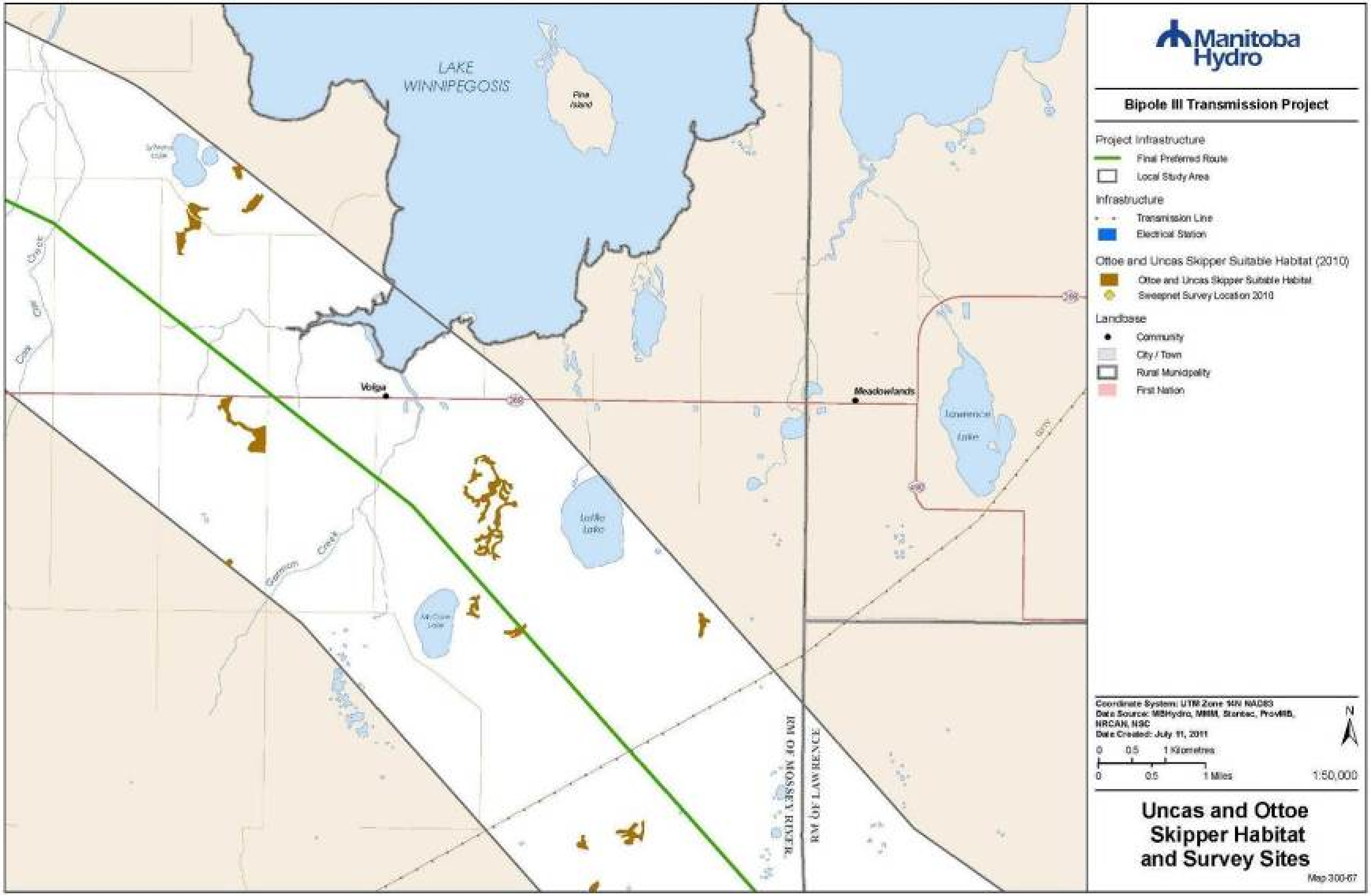
Map Series 200-57. Dakota Skipper modeled habitat and study sites overlapping distribution range within the Bipole III Project Study Area Prairie Ecozone.



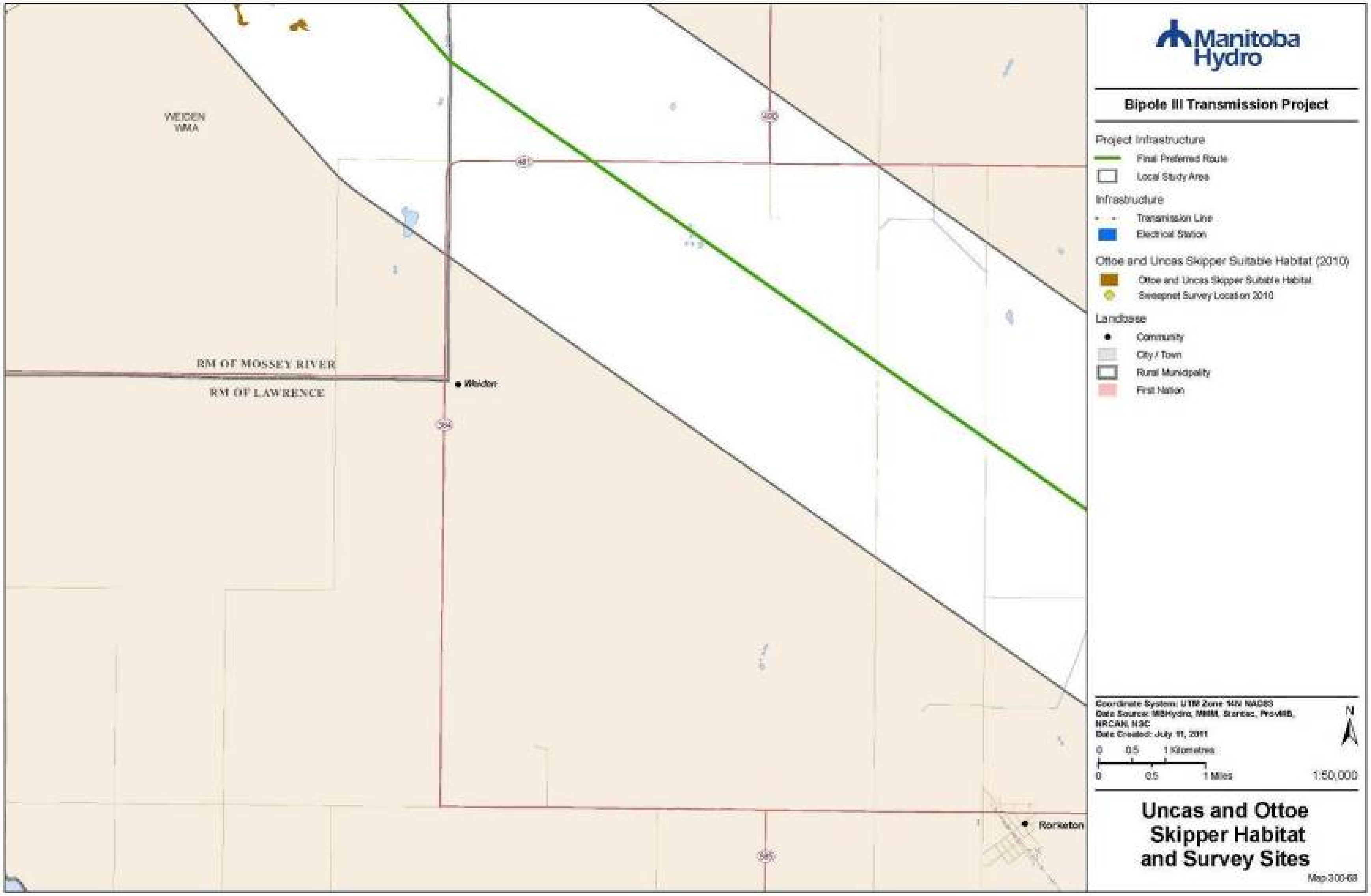
Map Series 300. Index map for Uncas and Ottoe Skipper modeled habitat within the Bipole III Project Study Area Prairie Ecozone.



Map Series 300-1. Uncas and Ottoe Skipper modeled habitat and study sites within the Bipole III Project Study Area Prairie Ecozone.

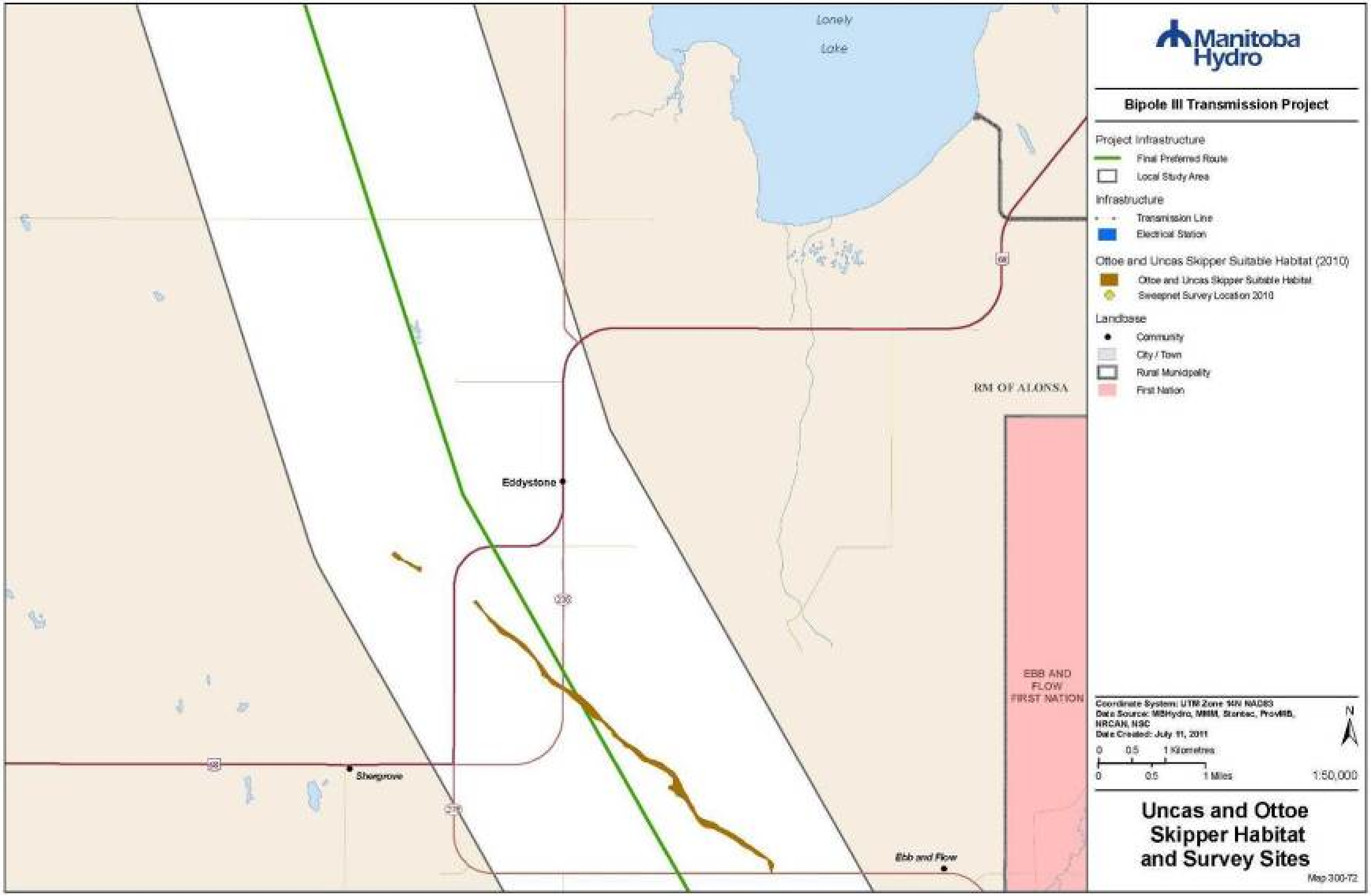


Map Series 300-2. Uncas and Ottoe Skipper modeled habitat and study sites within the Bipole III Project Study Area Prairie Ecozone.

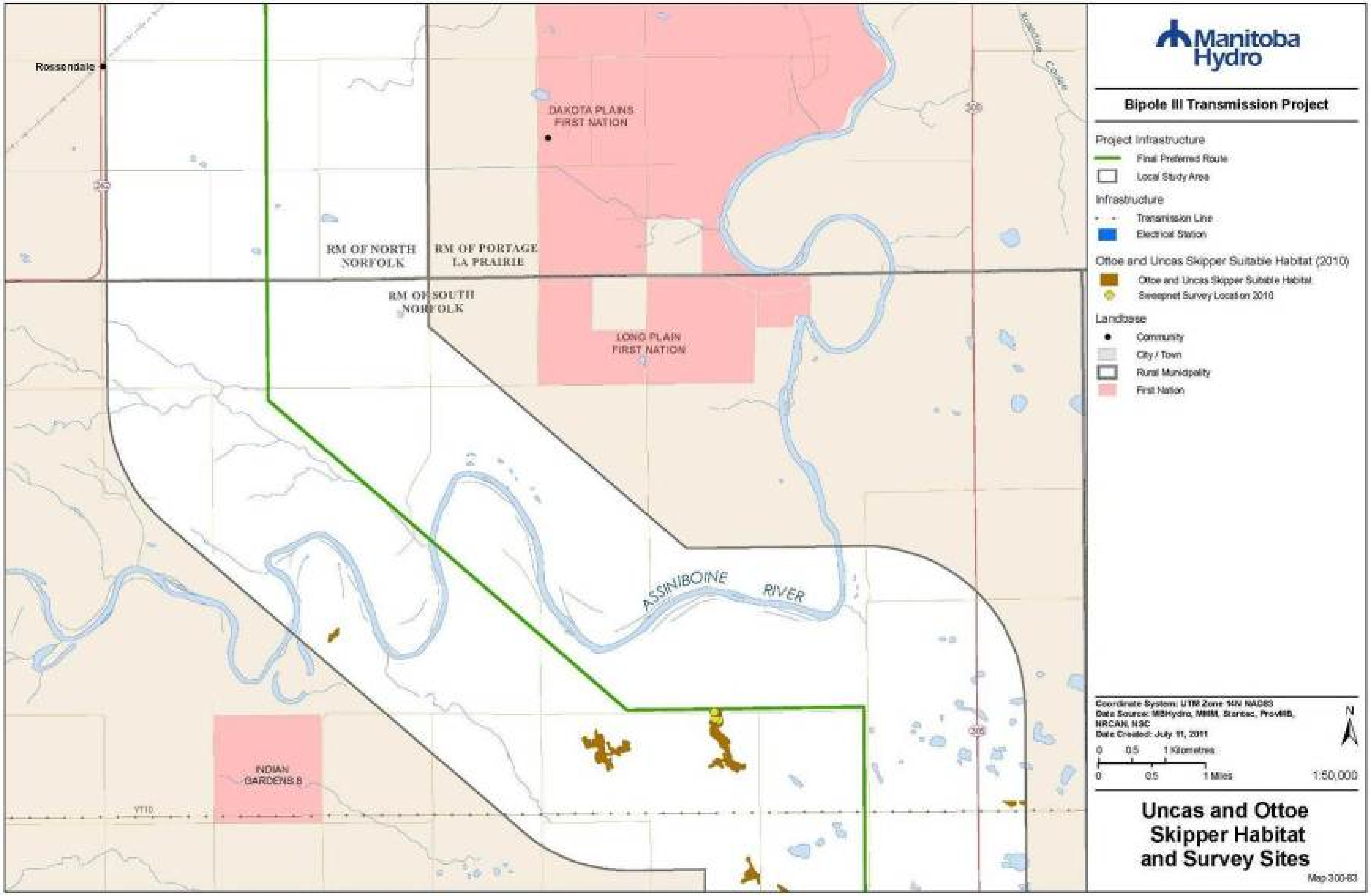


Map Series 300-3. Uncas and Ottoe Skipper modeled habitat and study sites within the Bipole III Project Study Area Prairie Ecozone.

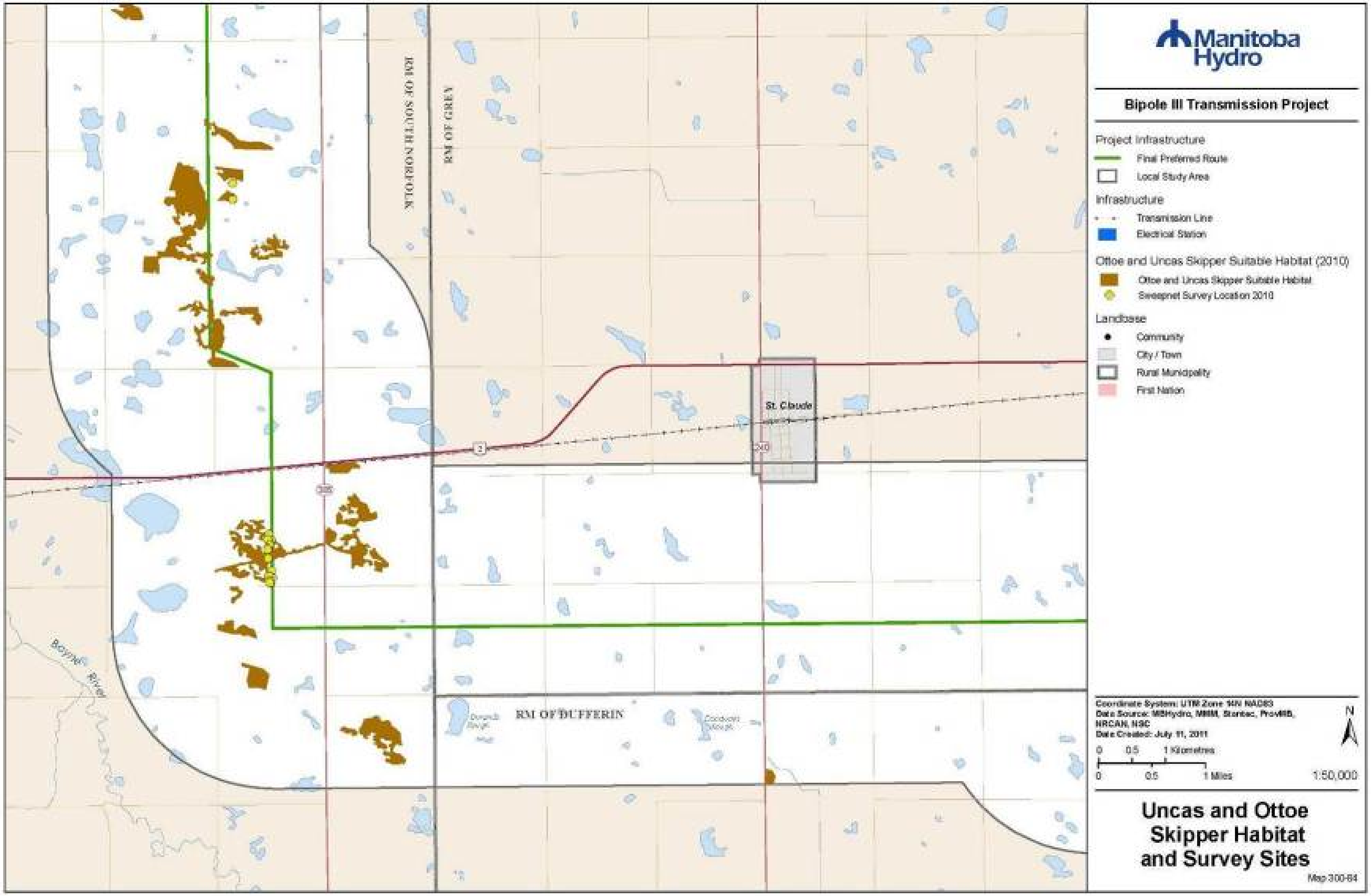
Map Series 300-4. Uncas and Ottoe Skipper modeled habitat and study sites within the Bipole III Project Study Area Prairie Ecozone.



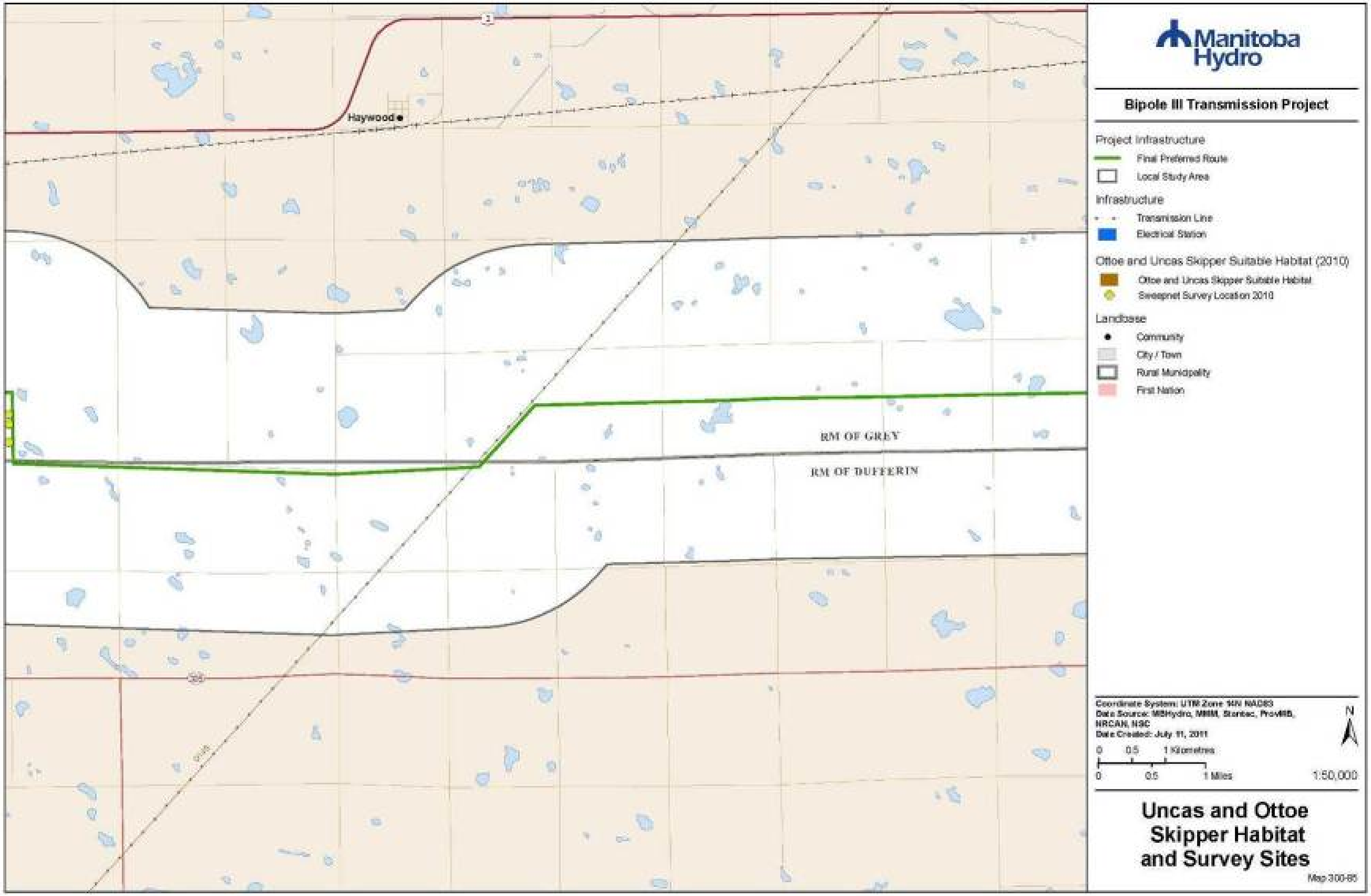
Map Series 300-5. Uncas and Ottoe Skipper modeled habitat and study sites within the Bipole III Project Study Area Prairie Ecozone.



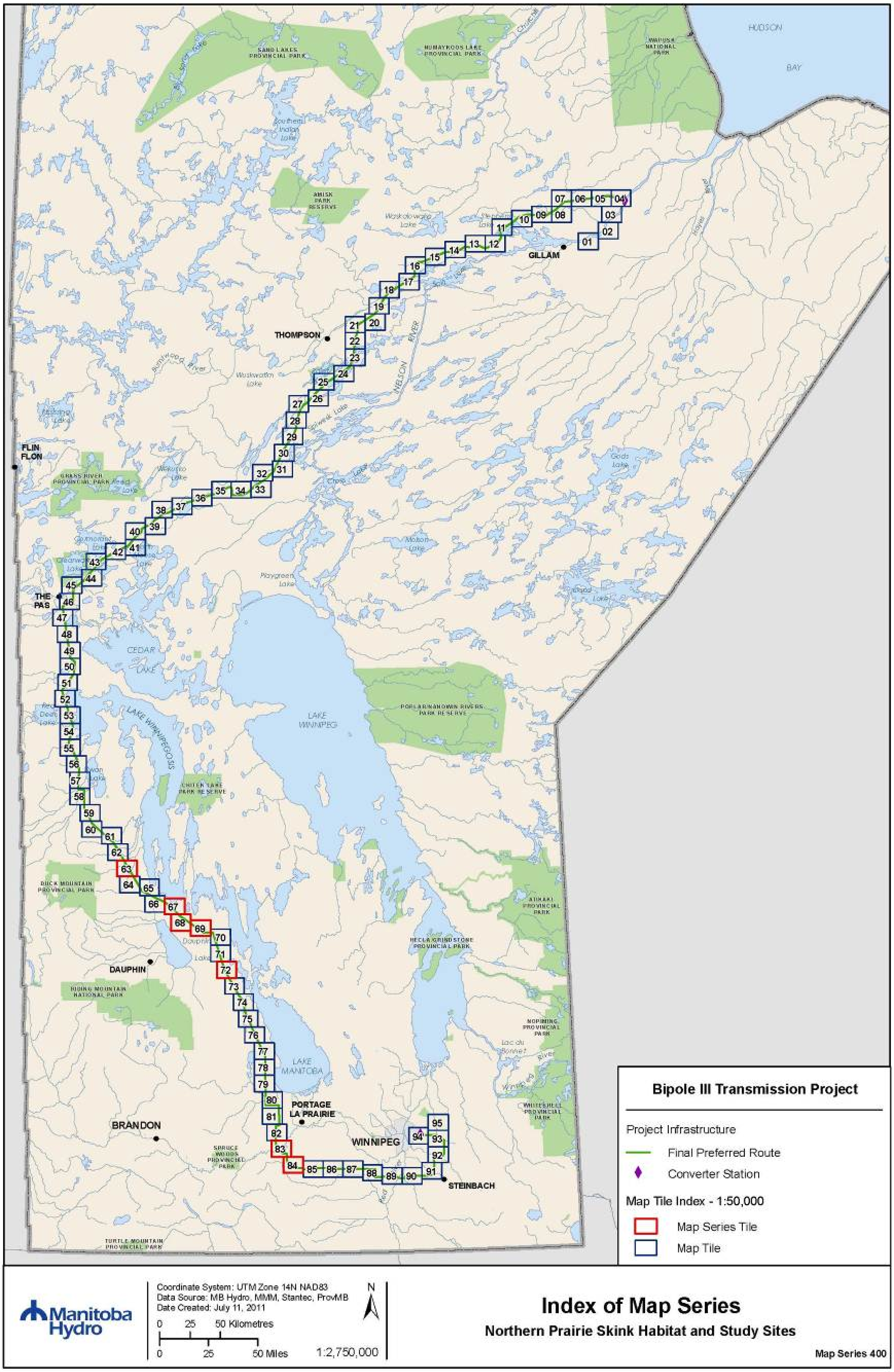
Map Series 300-6. Uncas and Ottoe Skipper modeled habitat and study sites within the Bipole III Project Study Area Prairie Ecozone.



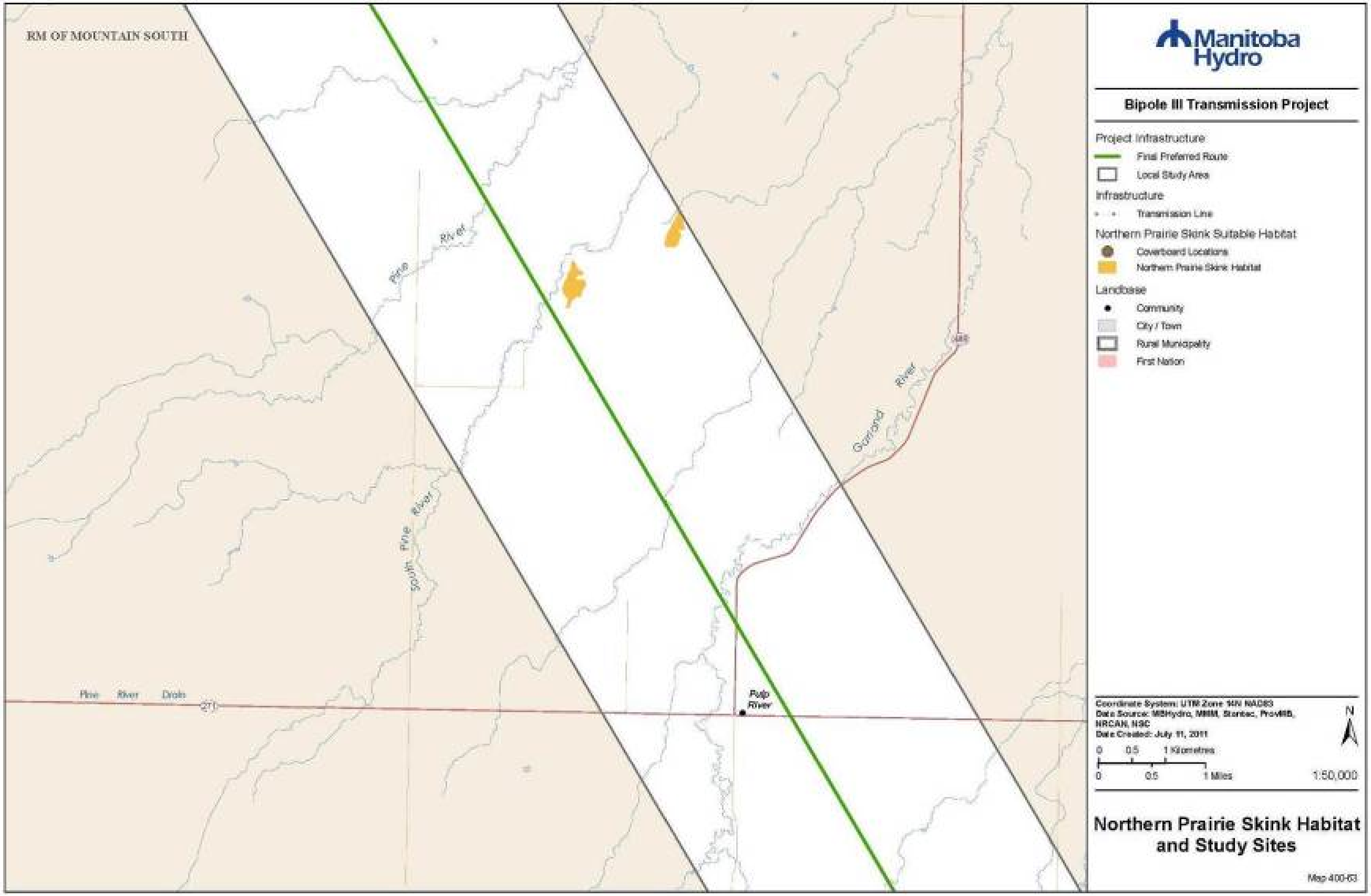
Map Series 300-7. Uncas and Ottoe Skipper modeled habitat and study sites within the Bipole III Project Study Area Prairie Ecozone.



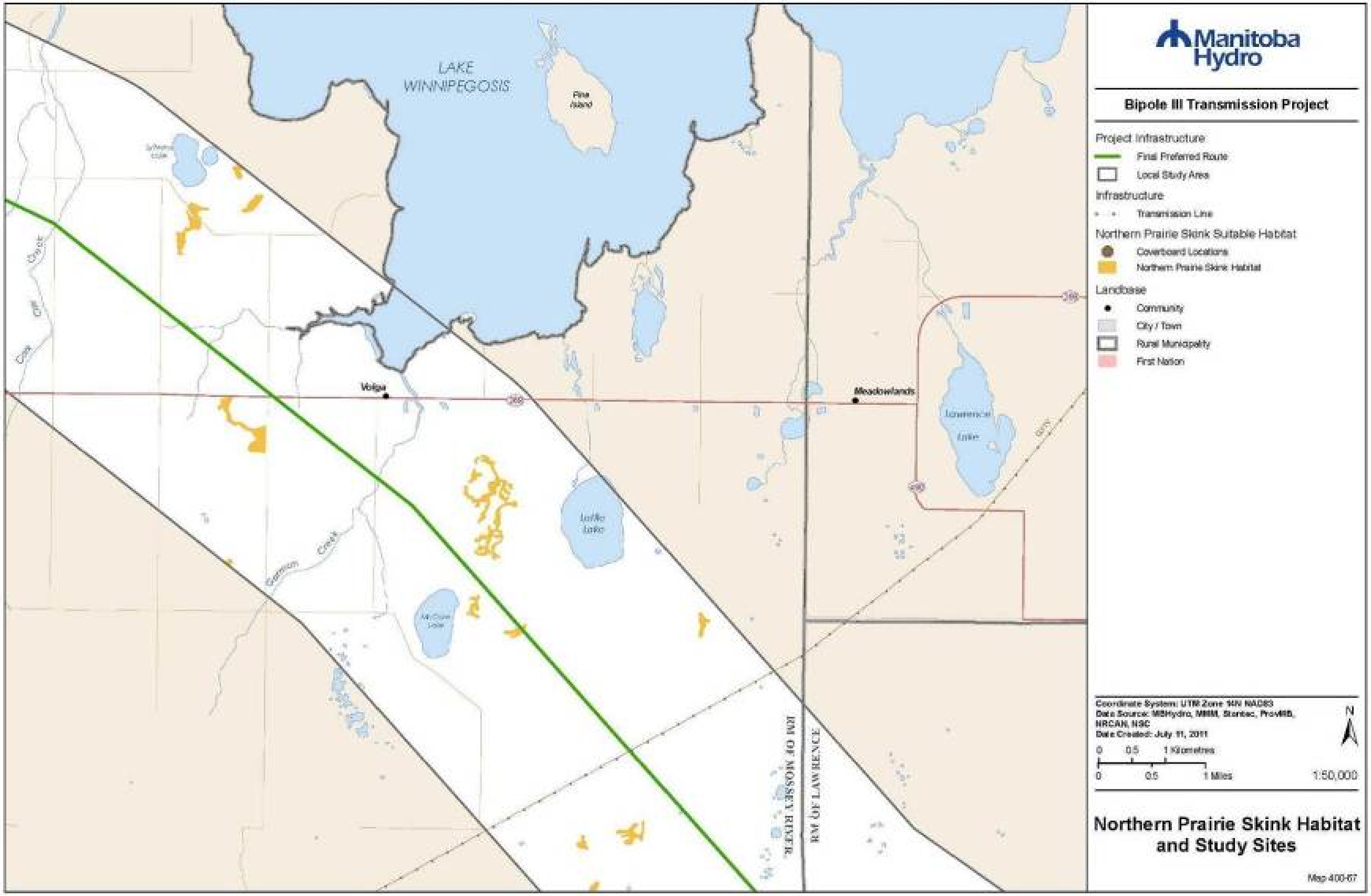
Map Series 300-8. Uncas and Ottoe Skipper modeled habitat and study sites within the Bipole III Project Study Area Prairie Ecozone.



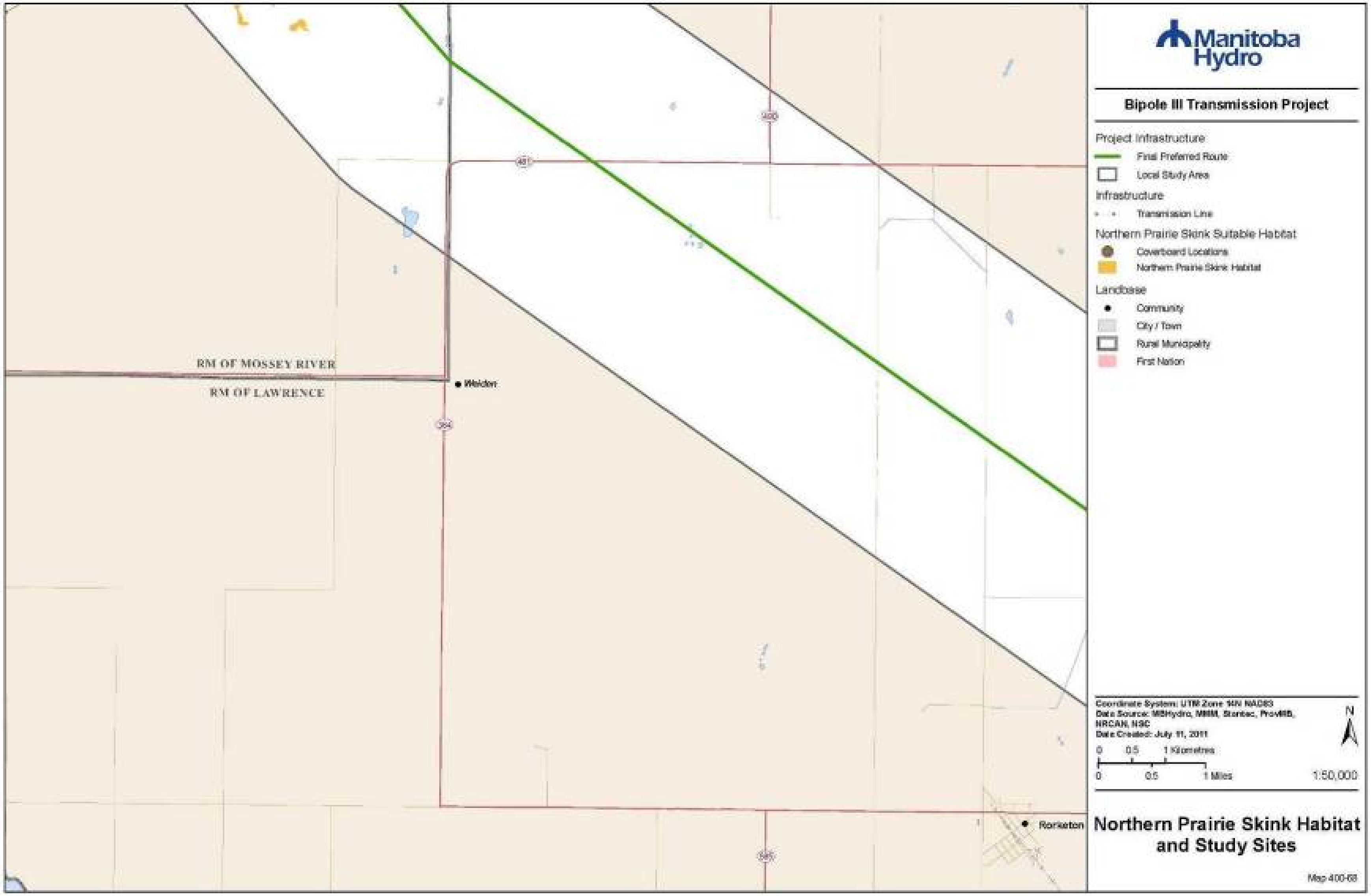
Map Series 400. Index map for northern prairie skink modeled habitat present within the Bipole III Project Study Area.



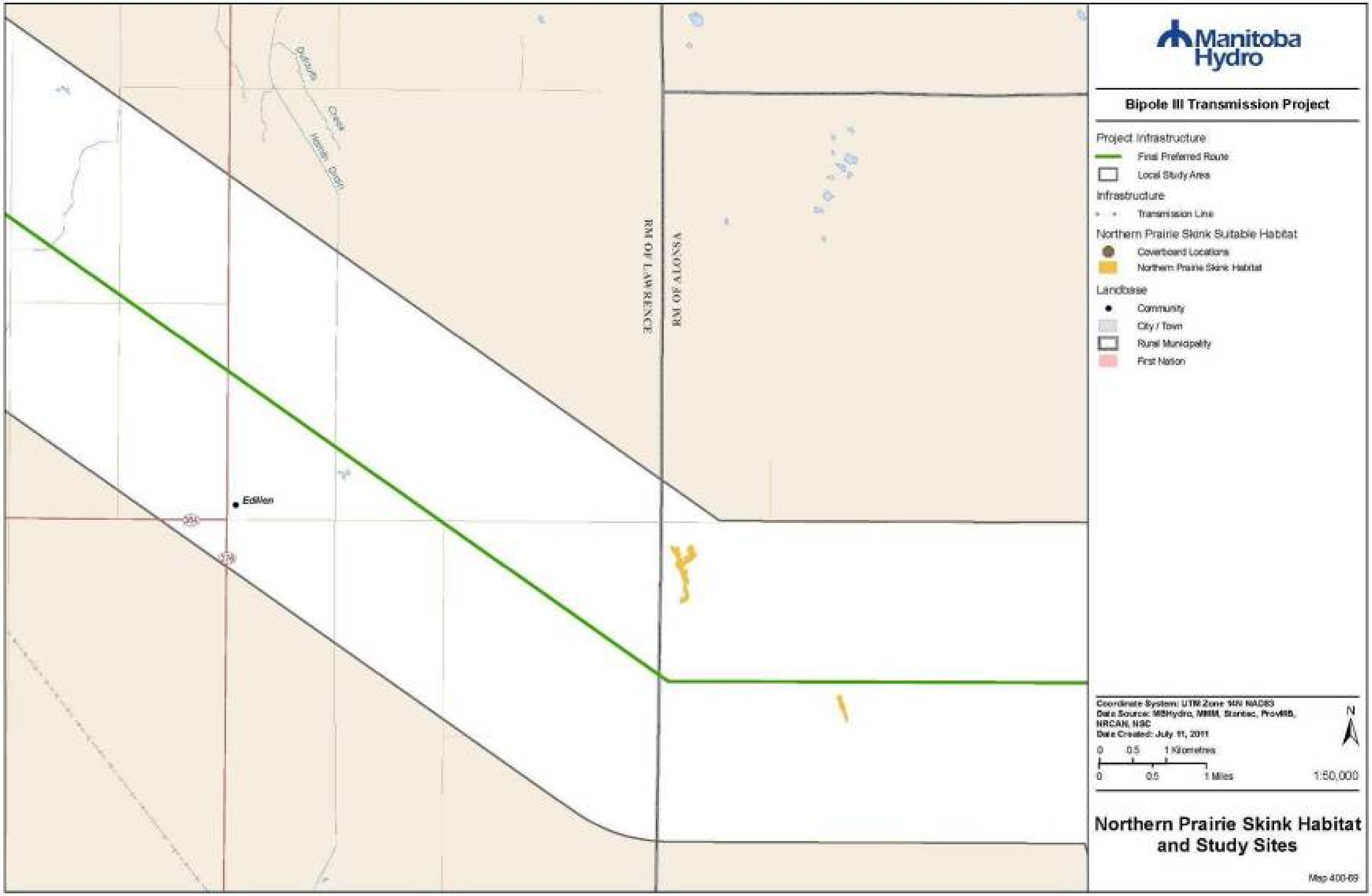
Map Series 400-1. Prairie skink modeled habitat and study sites within the Bipole III Project Study Area.



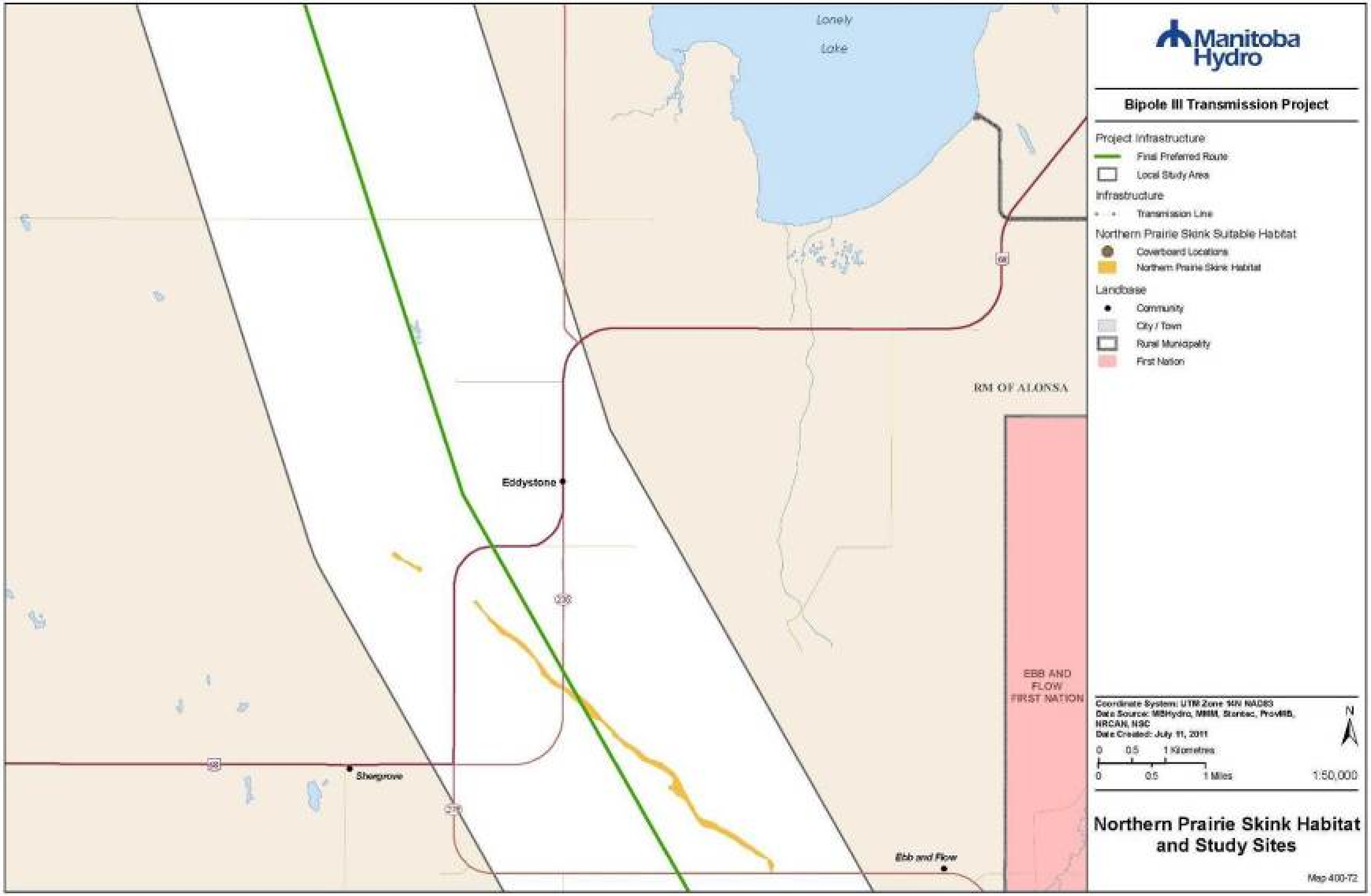
Map Series 400-2. Prairie skink modeled habitat and study sites within the Bipole III Project Study Area.



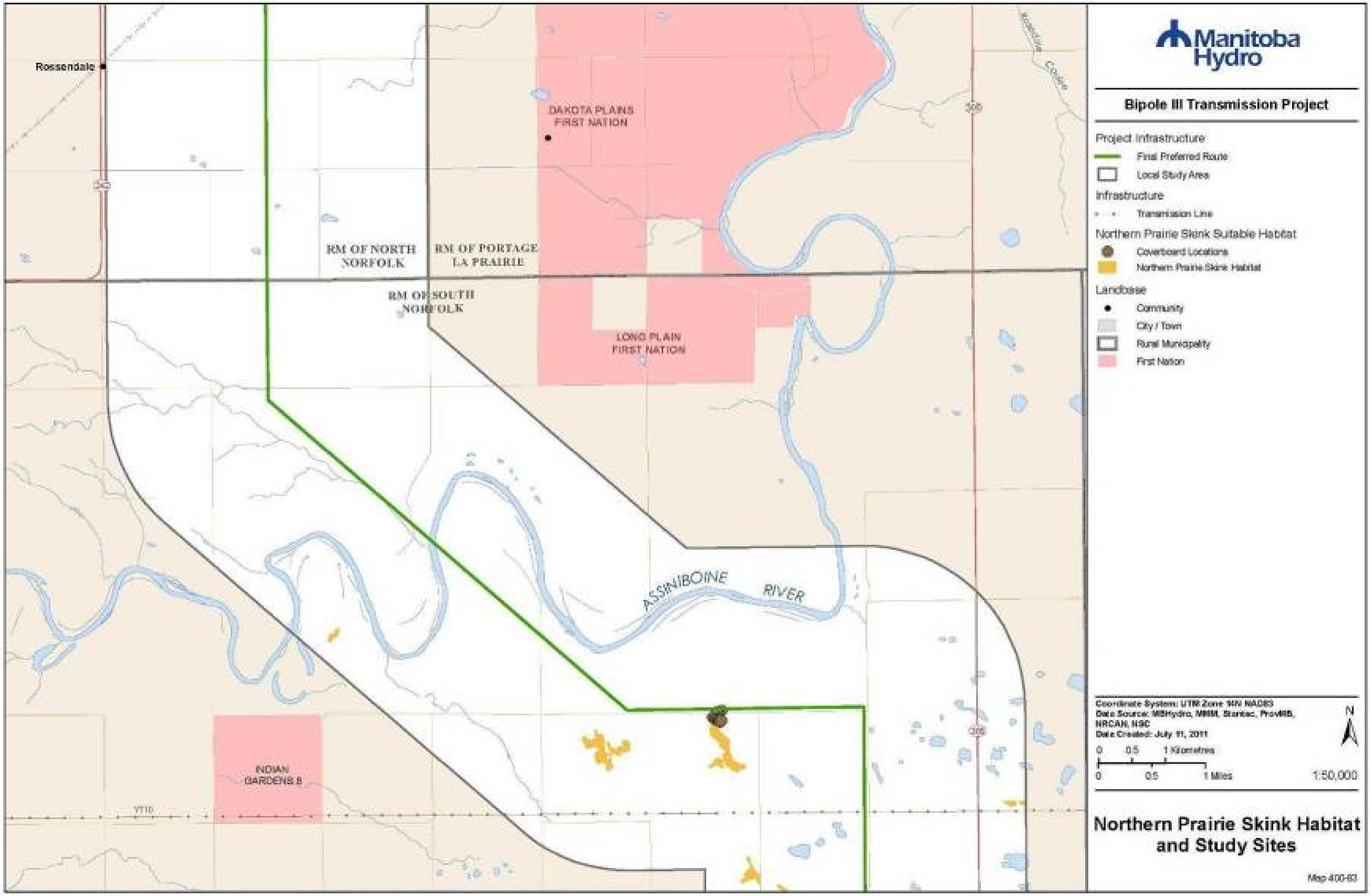
Map Series 400-3. Prairie skink modeled habitat and study sites within the Bipole III Project Study Area.



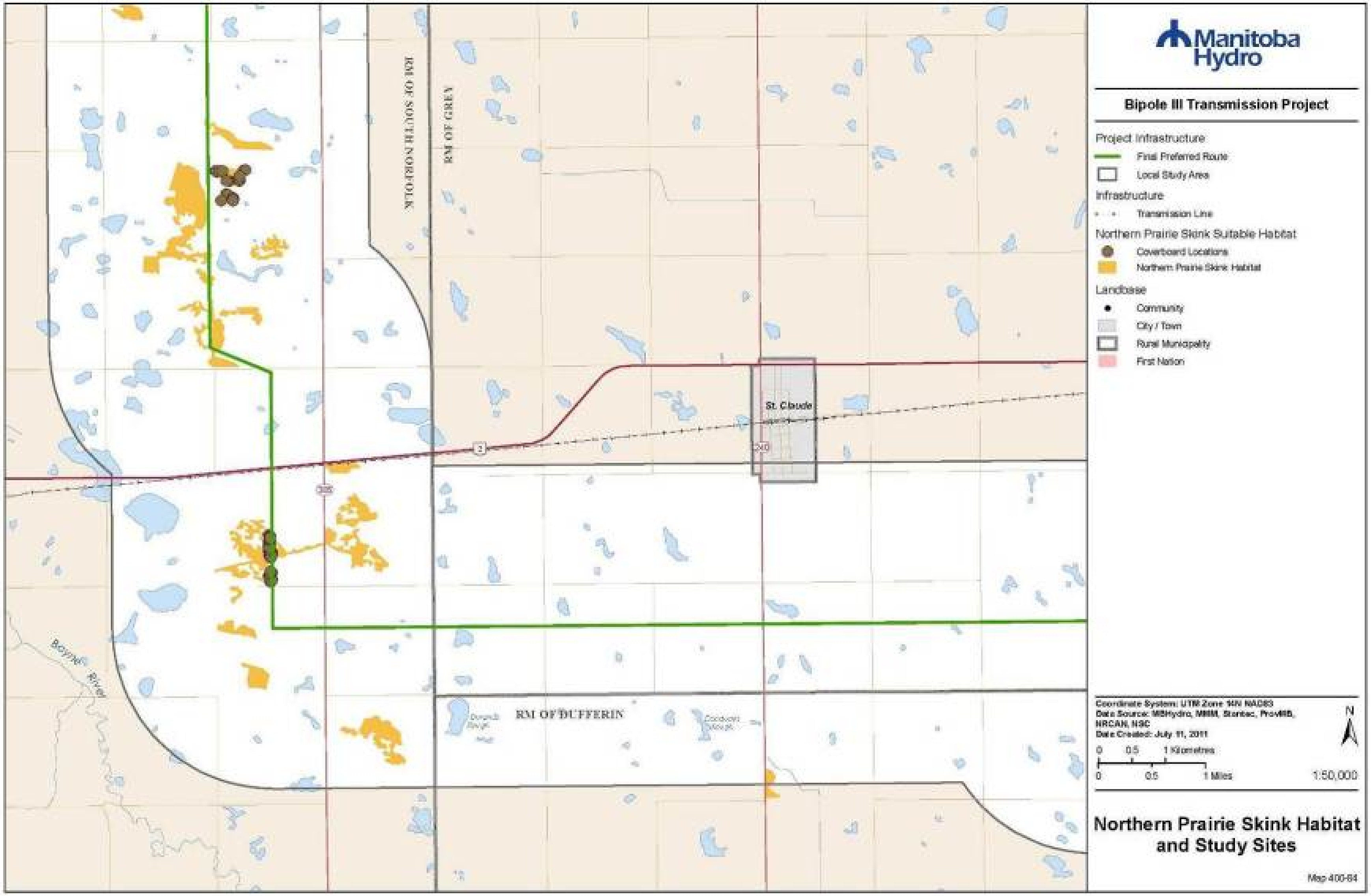
Map Series 400-4. Prairie skink modeled habitat and study sites within the Bipole III Project Study Area.



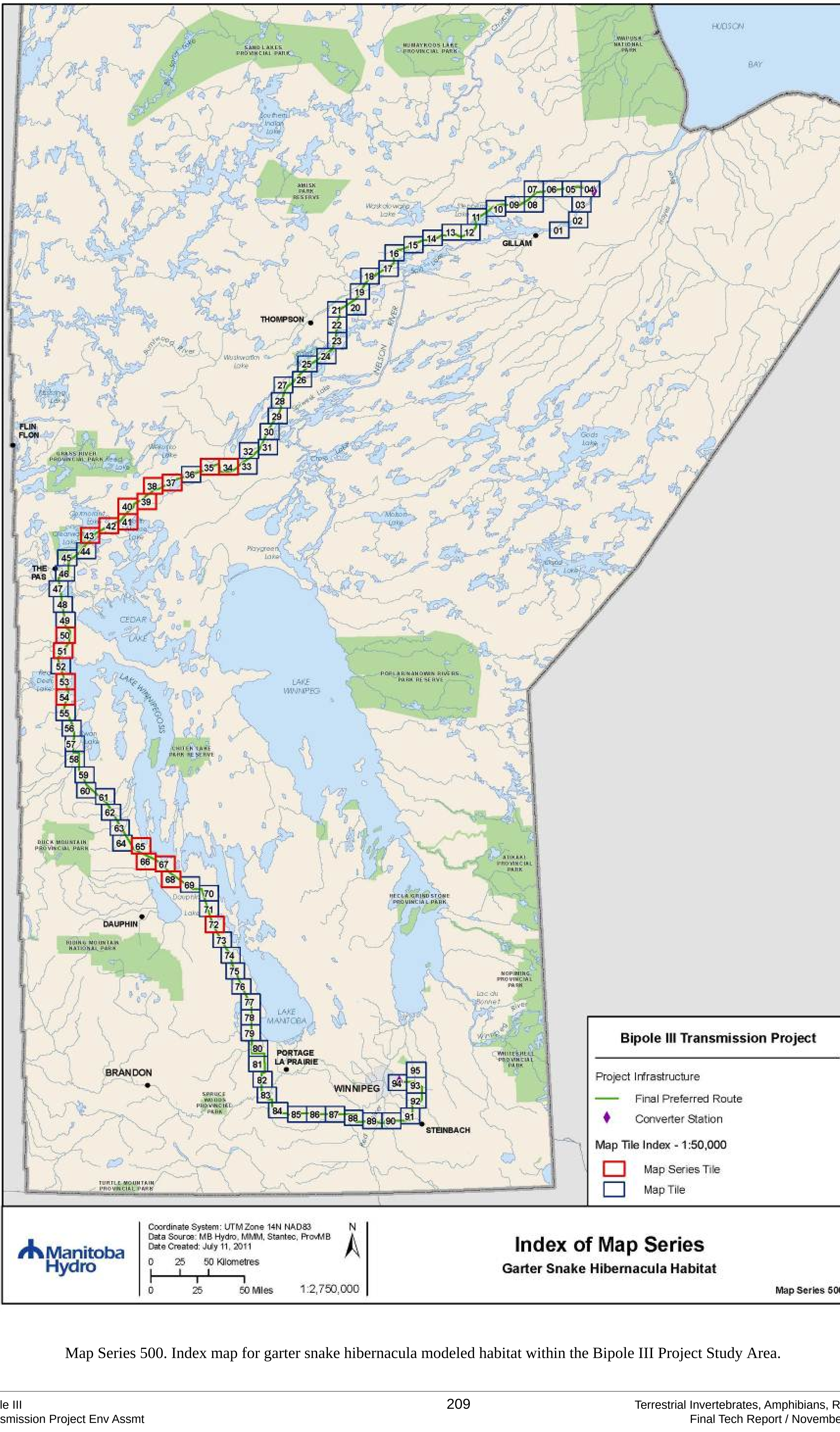
Map Series 400-5. Prairie skink modeled habitat and study sites within the Bipole III Project Study Area.



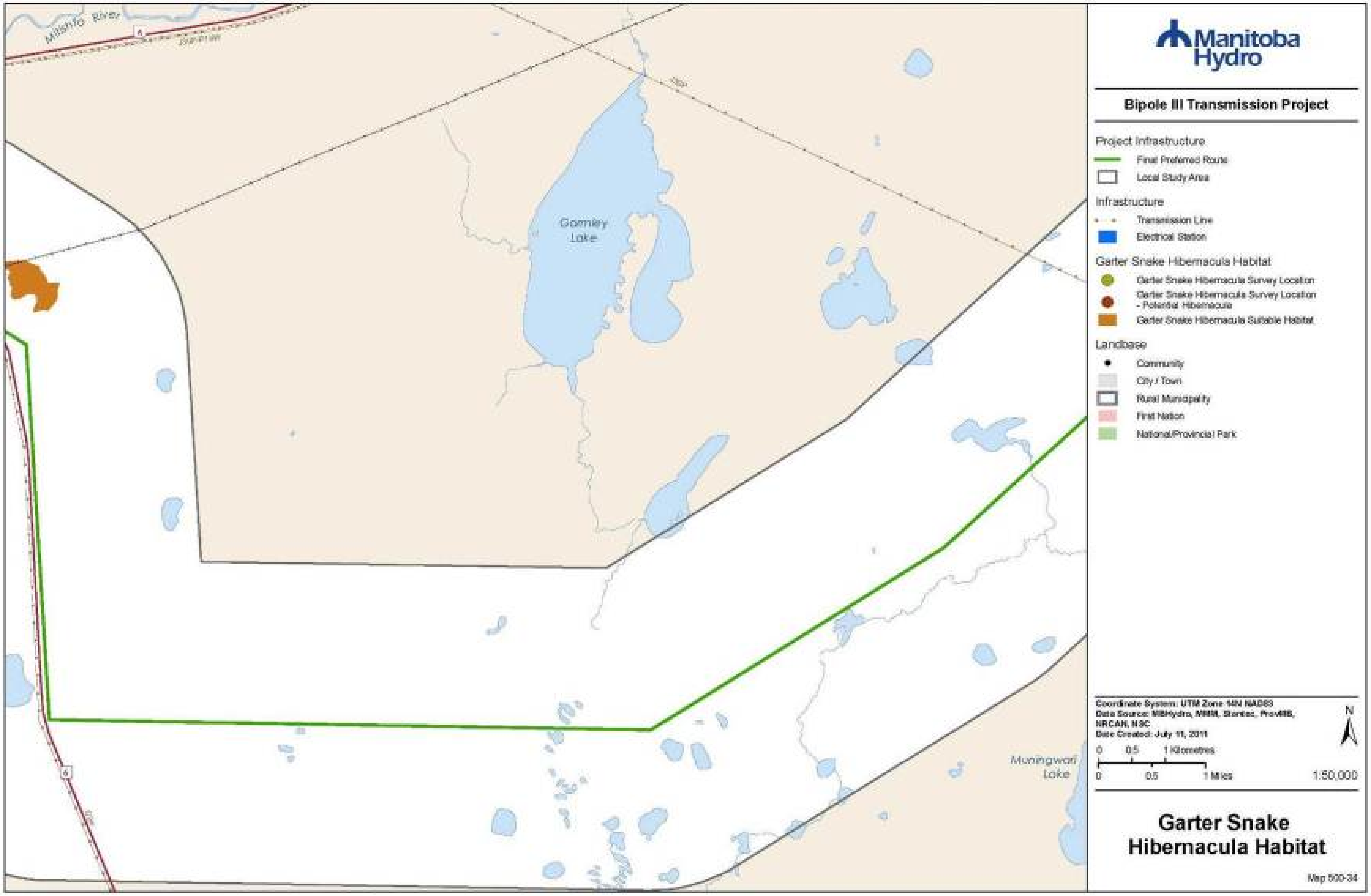
Map Series 400-6. Prairie skink modeled habitat and study sites within the Bipole III Project Study Area.



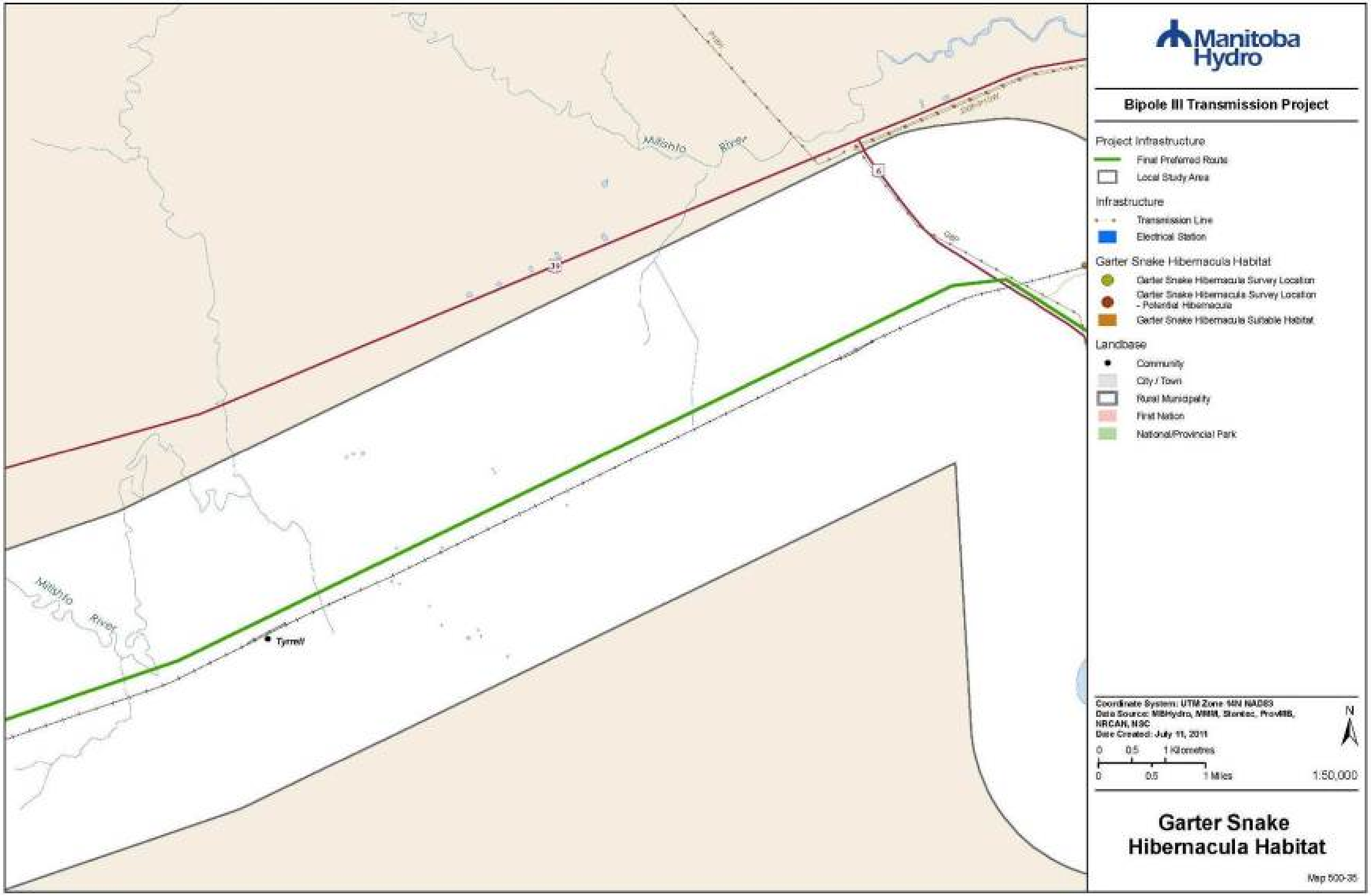
Map Series 400-7. Prairie skink modeled habitat and study sites within the Bipole III Project Study Area.



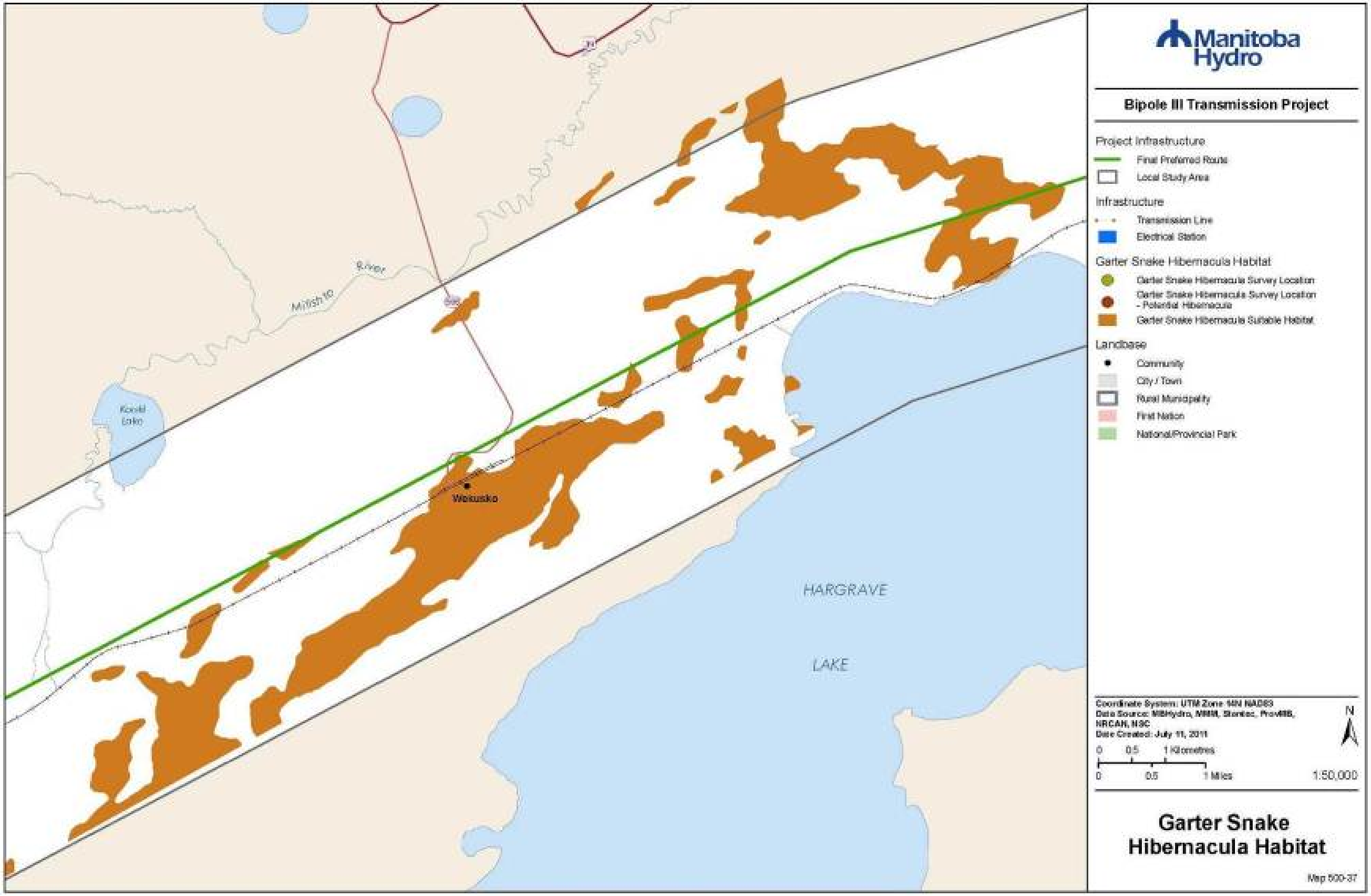
Map Series 500. Index map for garter snake hibernacula modeled habitat within the Bipole III Project Study Area.



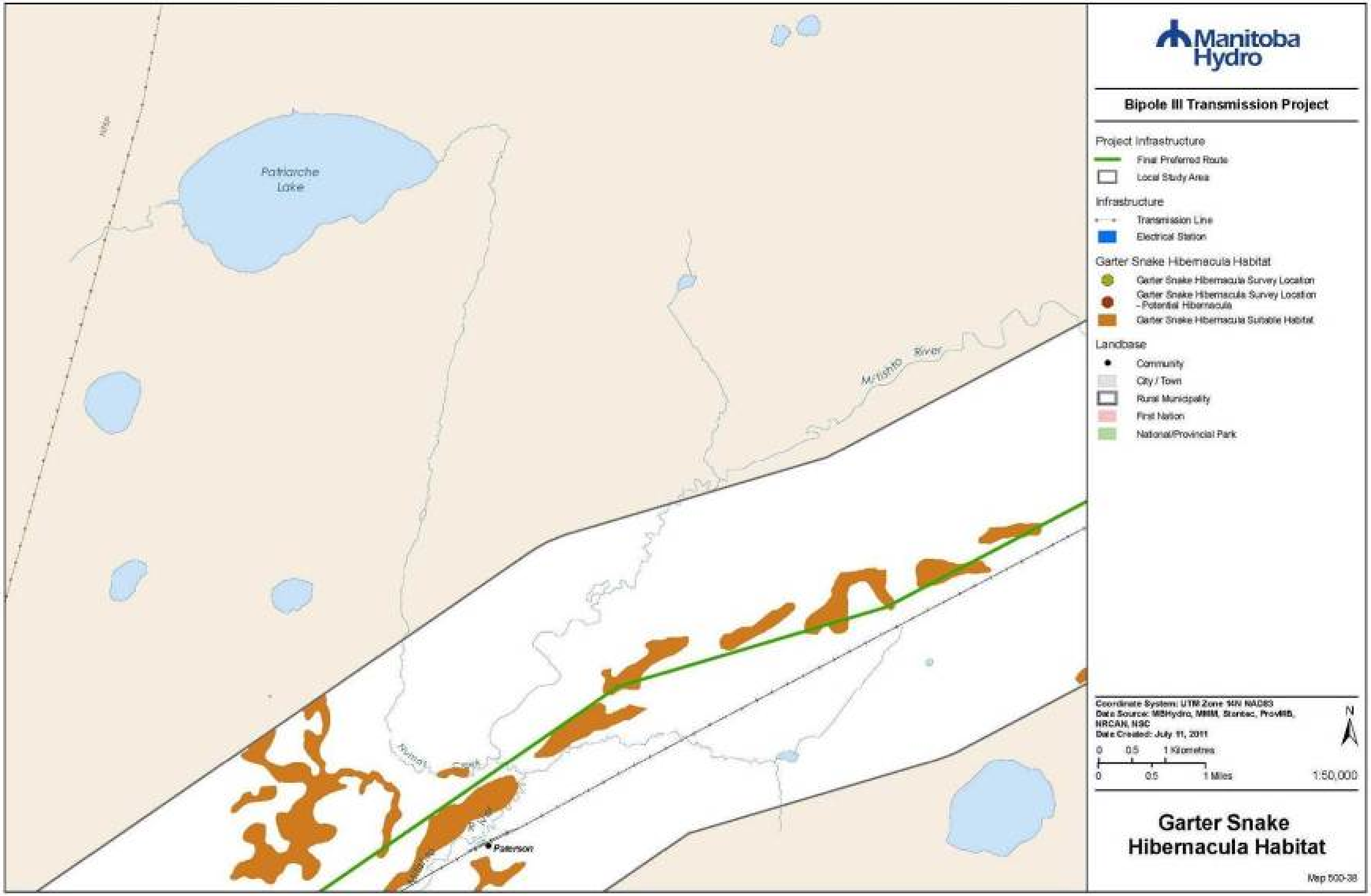
Map Series 500-1. Garter snake hibernacula modeled habitat and study sites within the Bipole III Project Study Area.



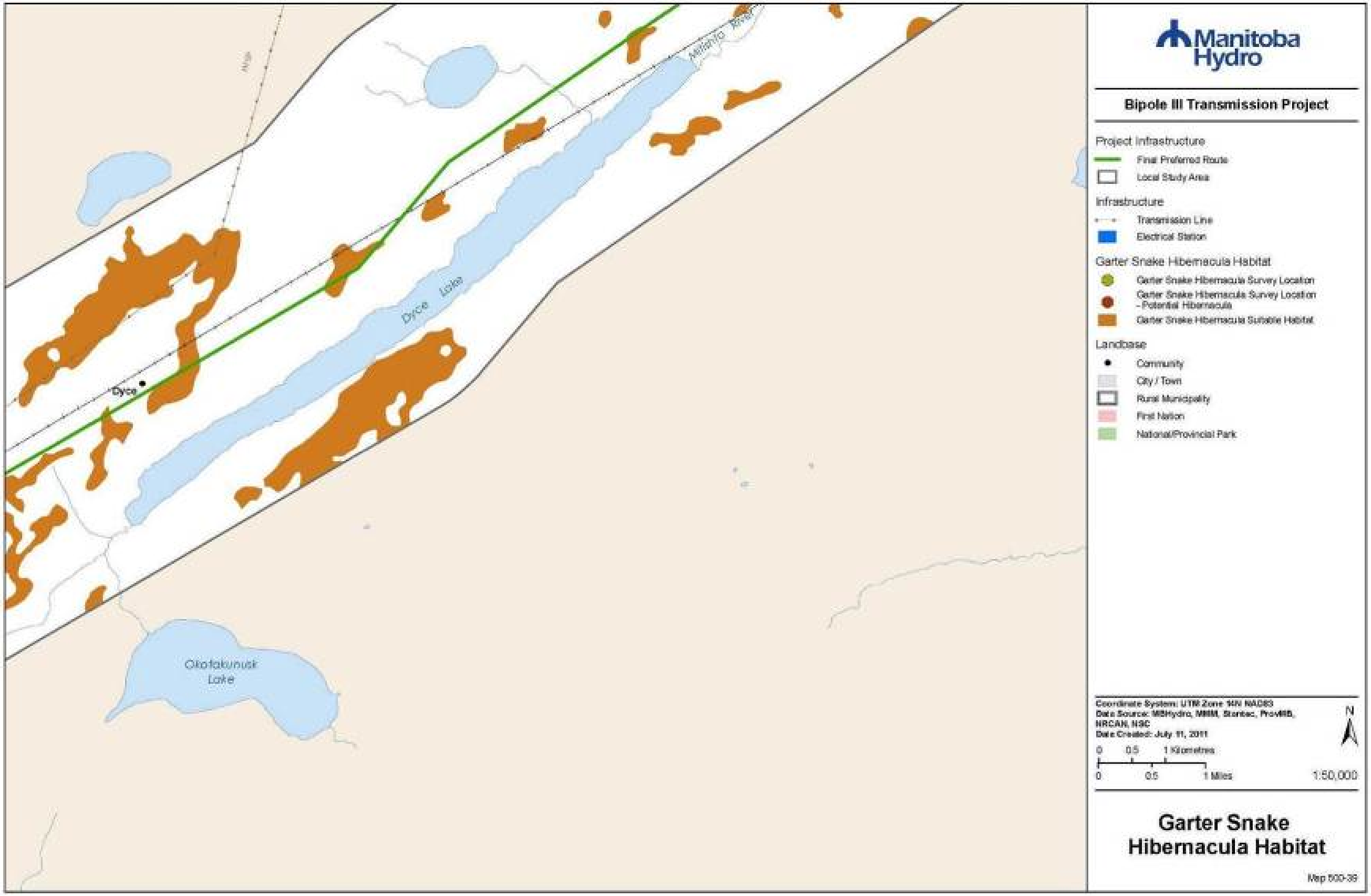
Map Series 500-2. Garter snake hibernacula modeled habitat and study sites within the Bipole III Project Study Area.



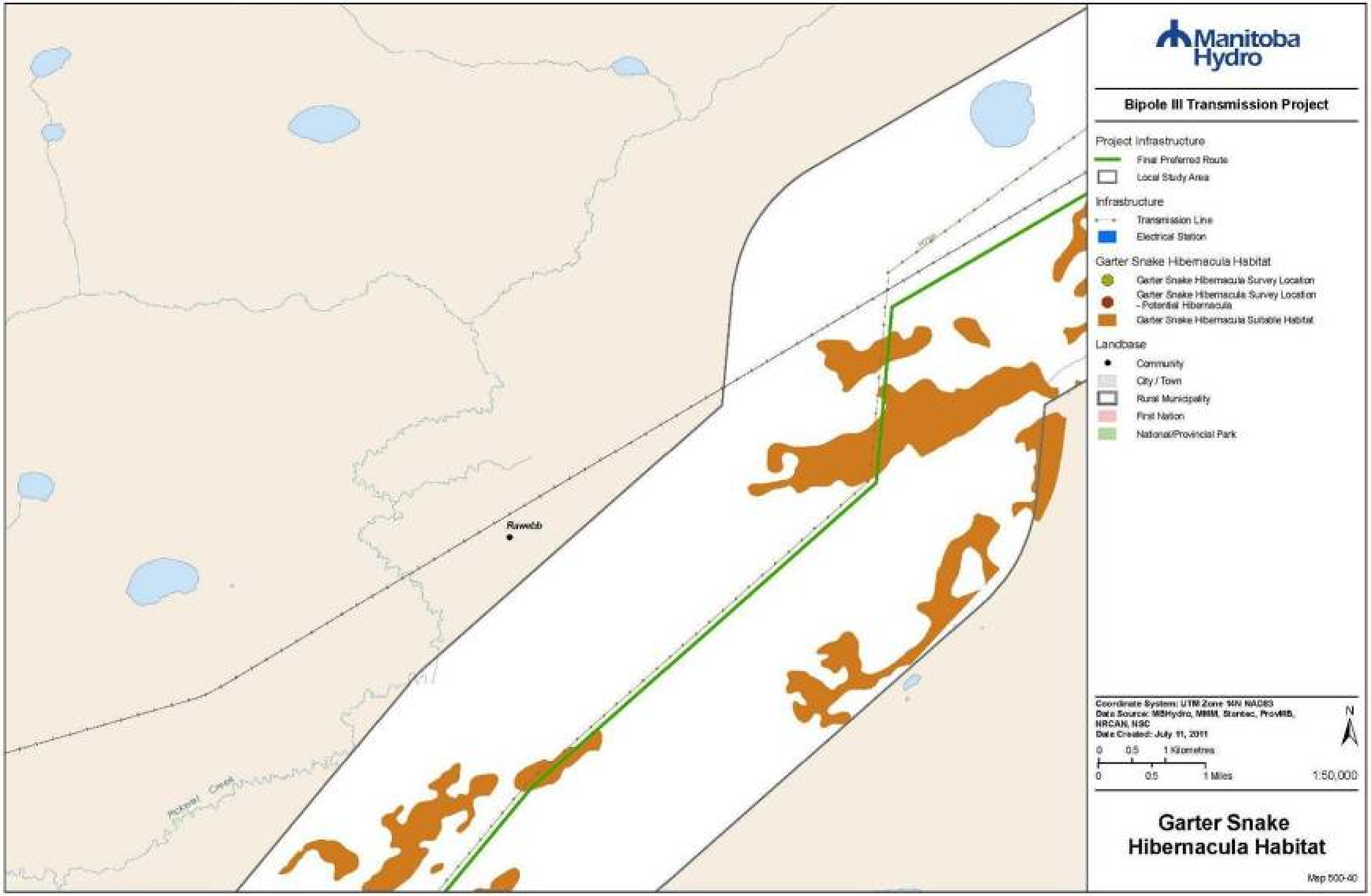
Map Series 500-3. Garter snake hibernacula modeled habitat and study sites within the Bipole III Project Study Area.



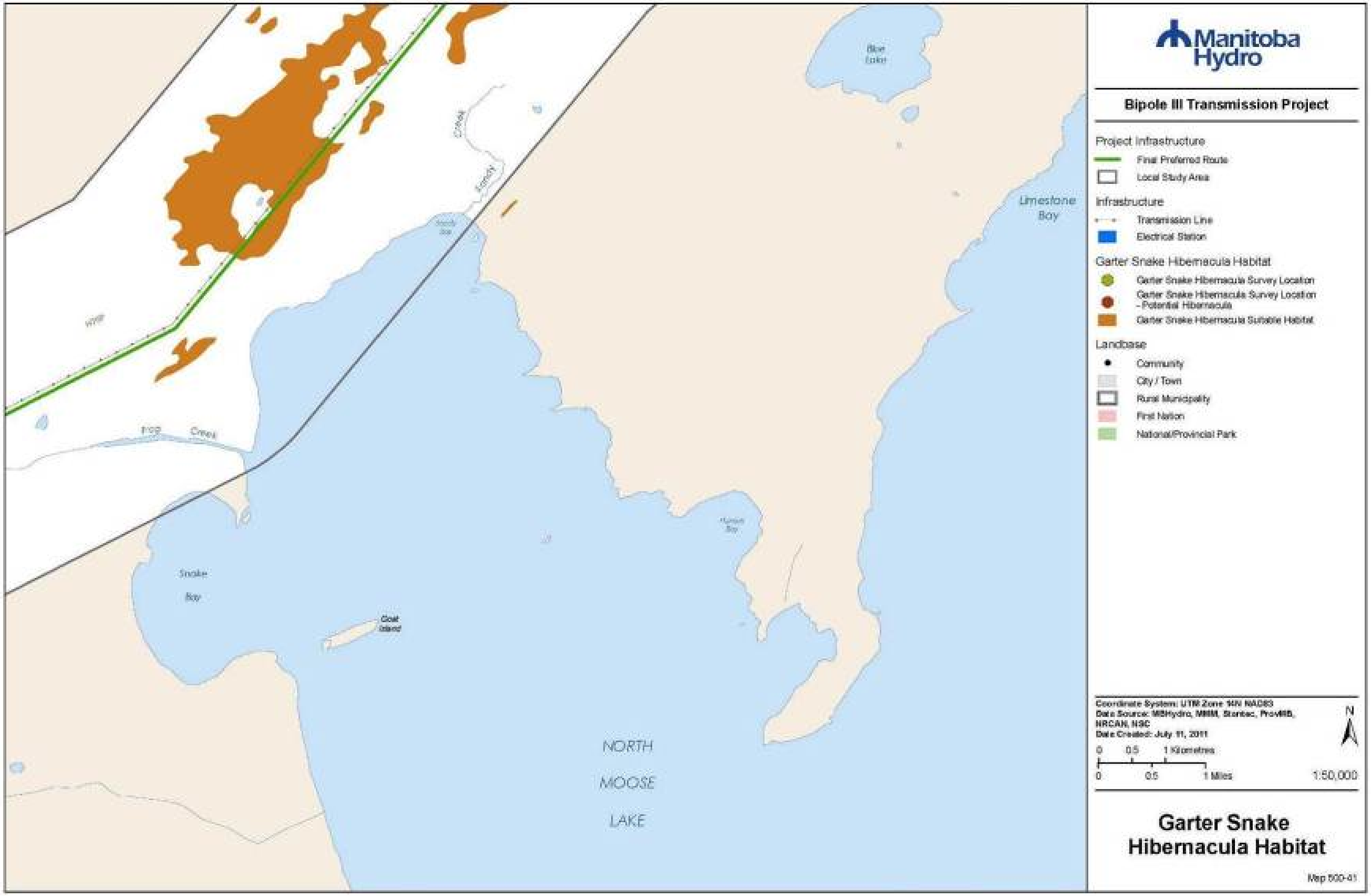
Map Series 500-4. Garter snake hibernacula modeled habitat and study sites within the Bipole III Project Study Area.



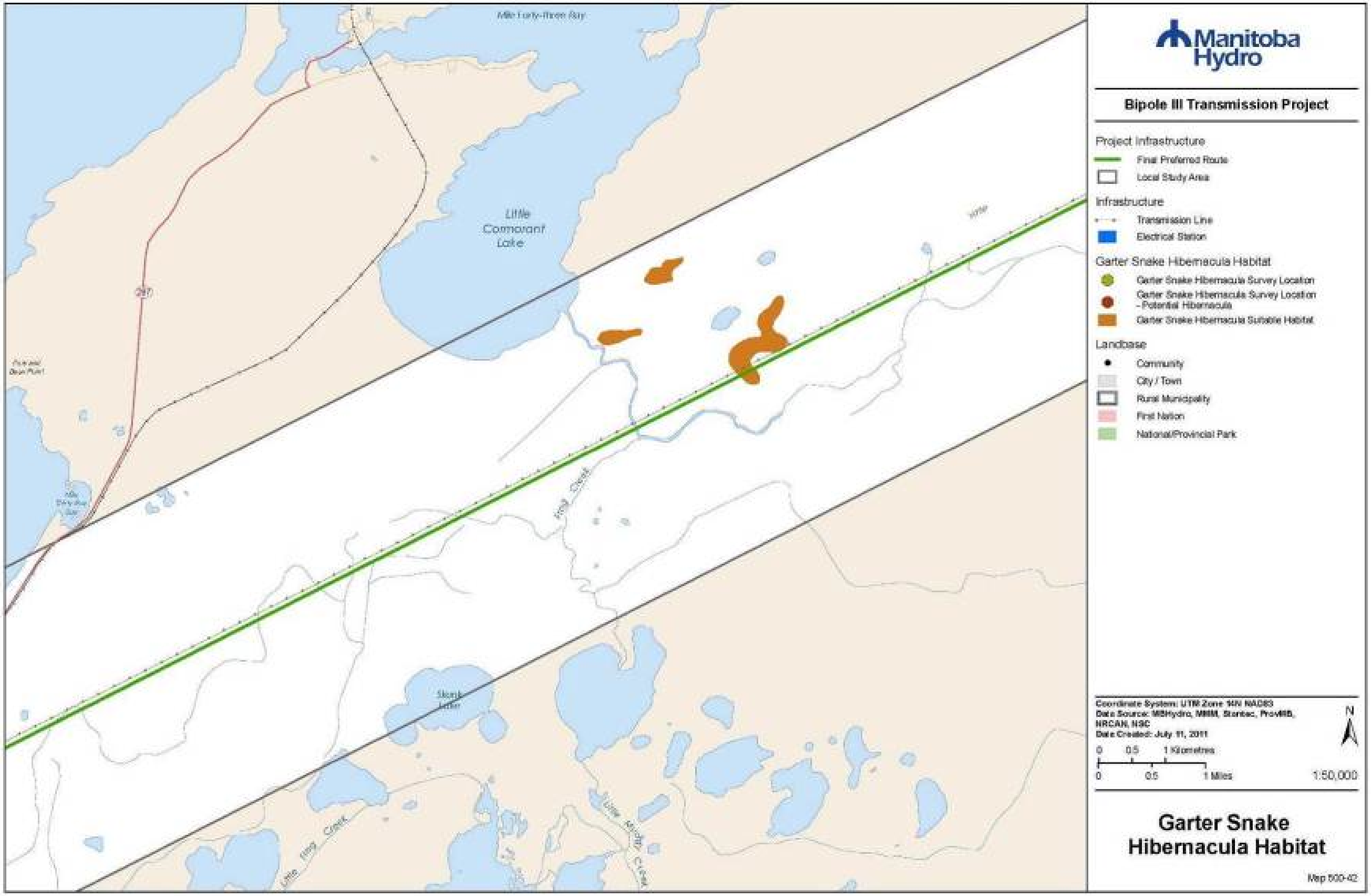
Map Series 500-5. Garter snake hibernacula modeled habitat and study sites within the Bipole III Project Study Area.



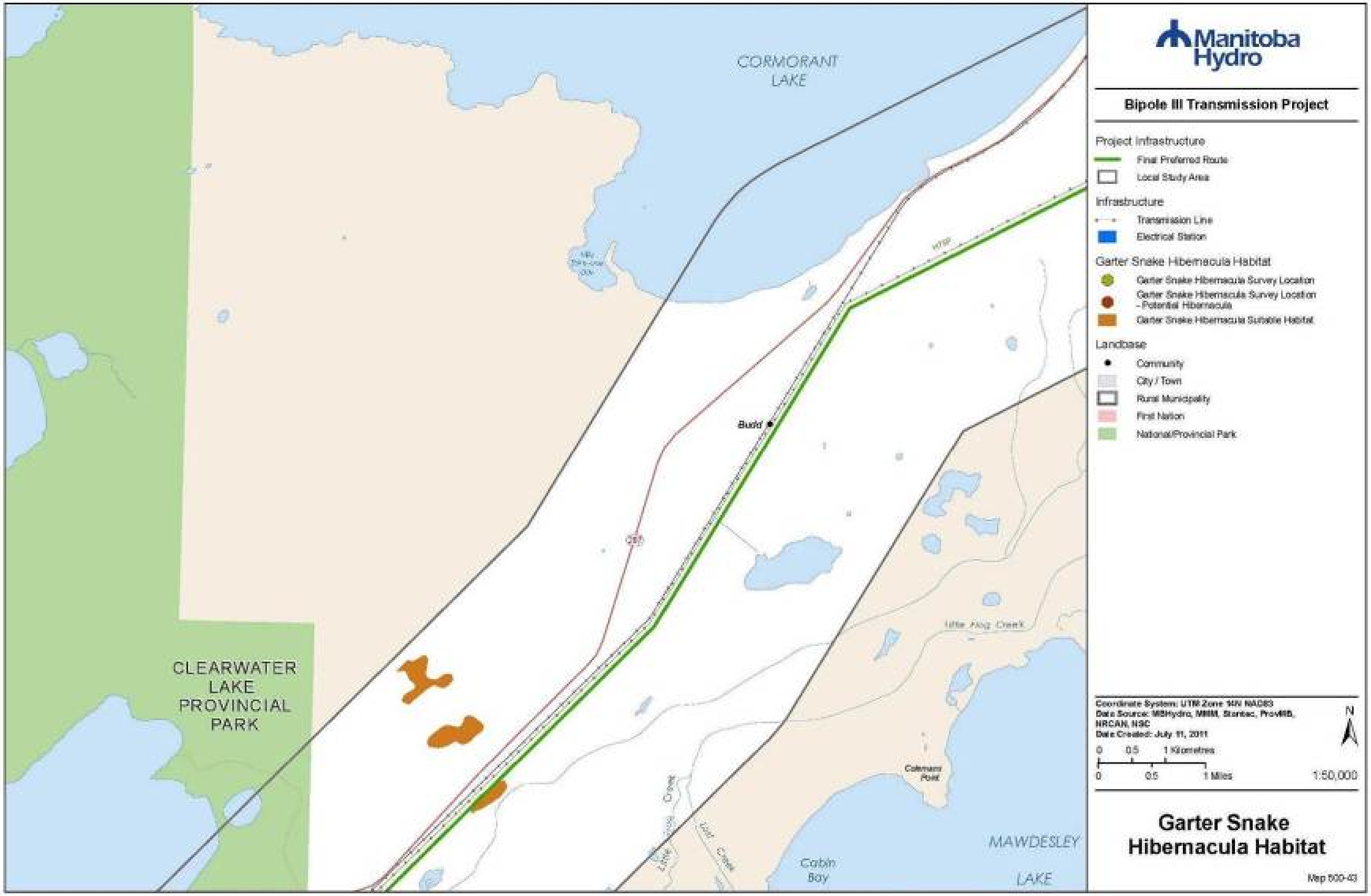
Map Series 500-6. Garter snake hibernacula modeled habitat and study sites within the Bipole III Project Study Area.



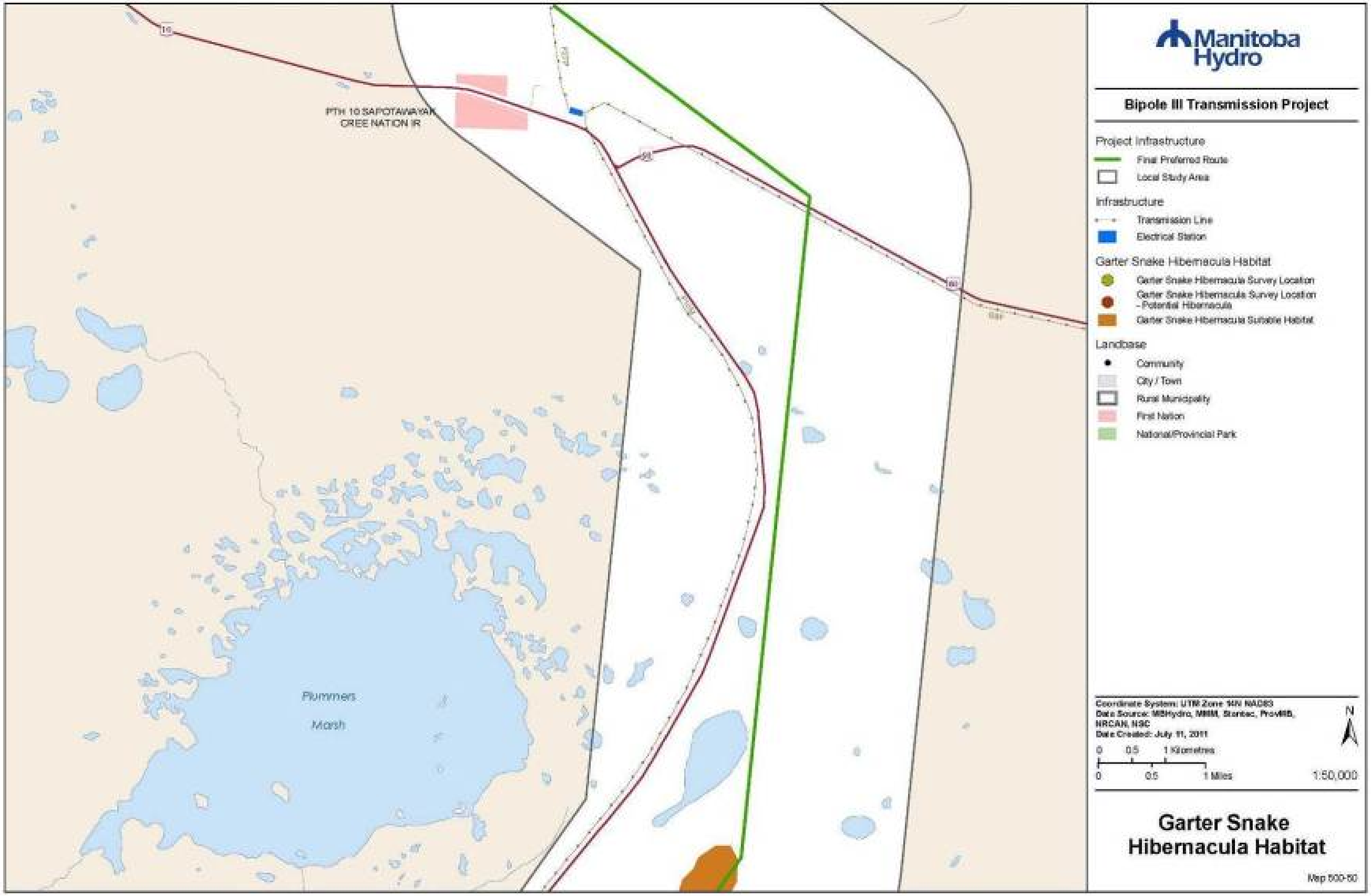
Map Series 500-7. Garter snake hibernacula modeled habitat and study sites within the Bipole III Project Study Area.



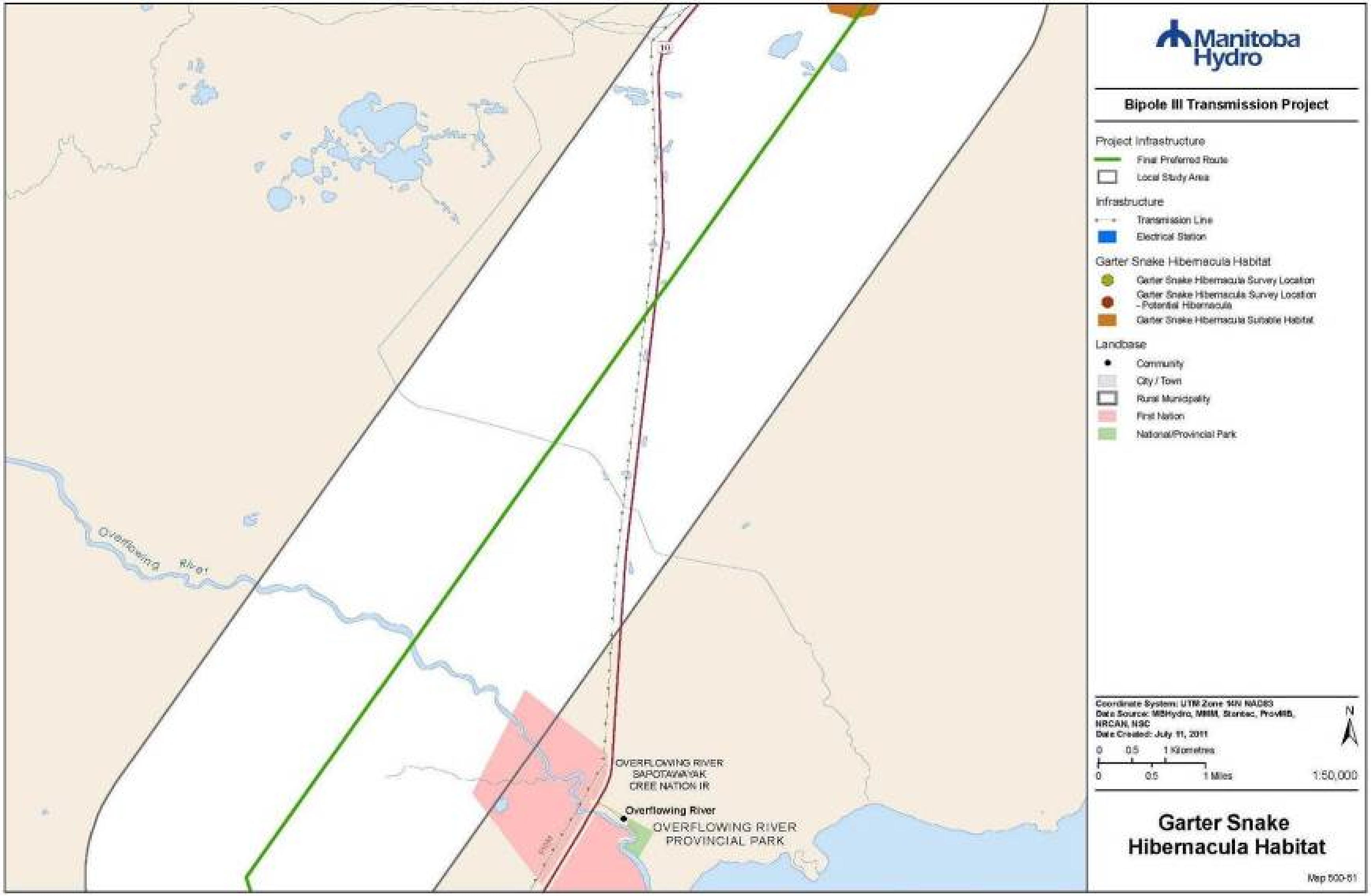
Map Series 500-8. Garter snake hibernacula modeled habitat and study sites within the Bipole III Project Study Area.



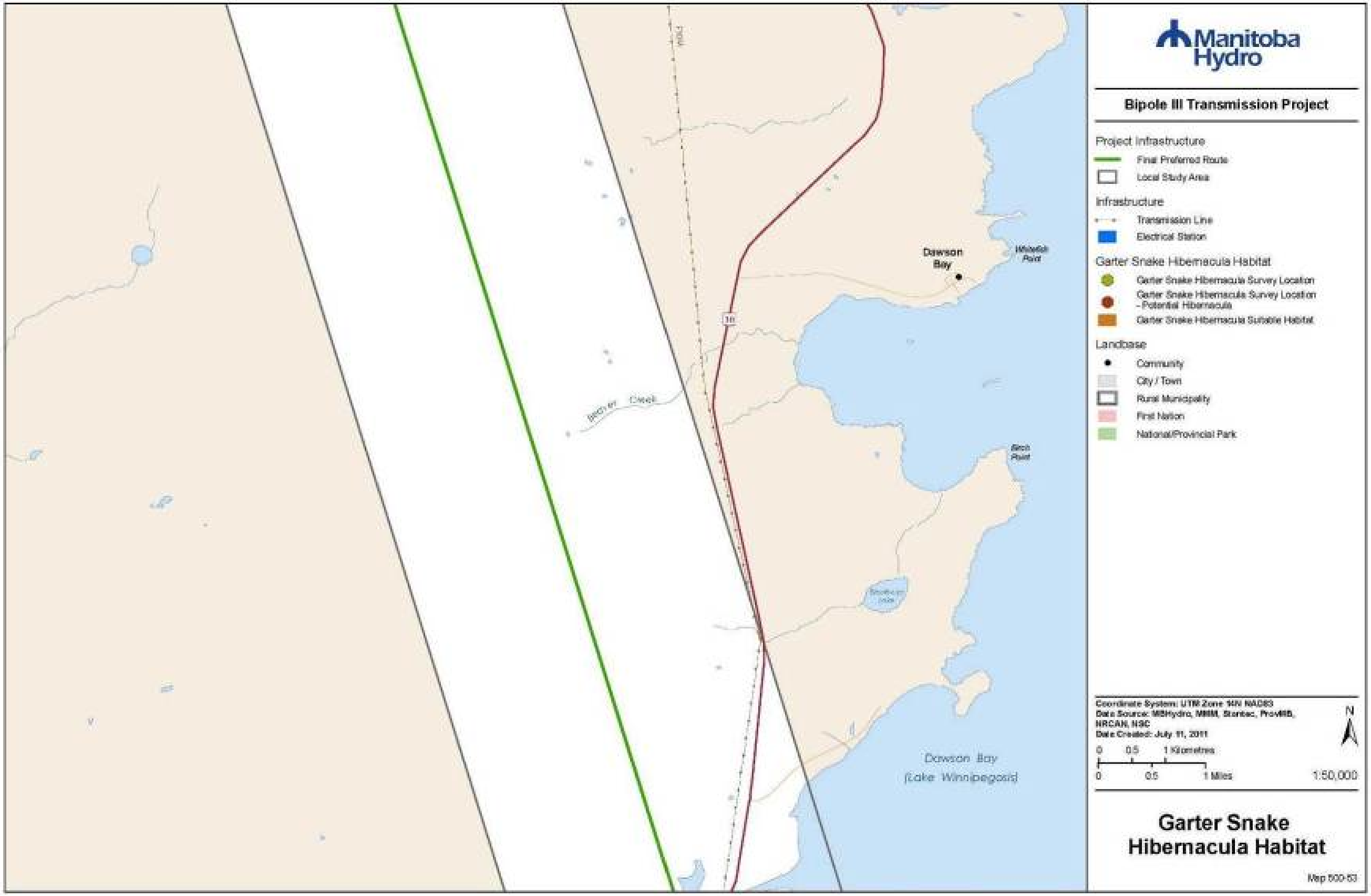
Map Series 500-9. Garter snake hibernacula modeled habitat and study sites within the Bipole III Project Study Area.



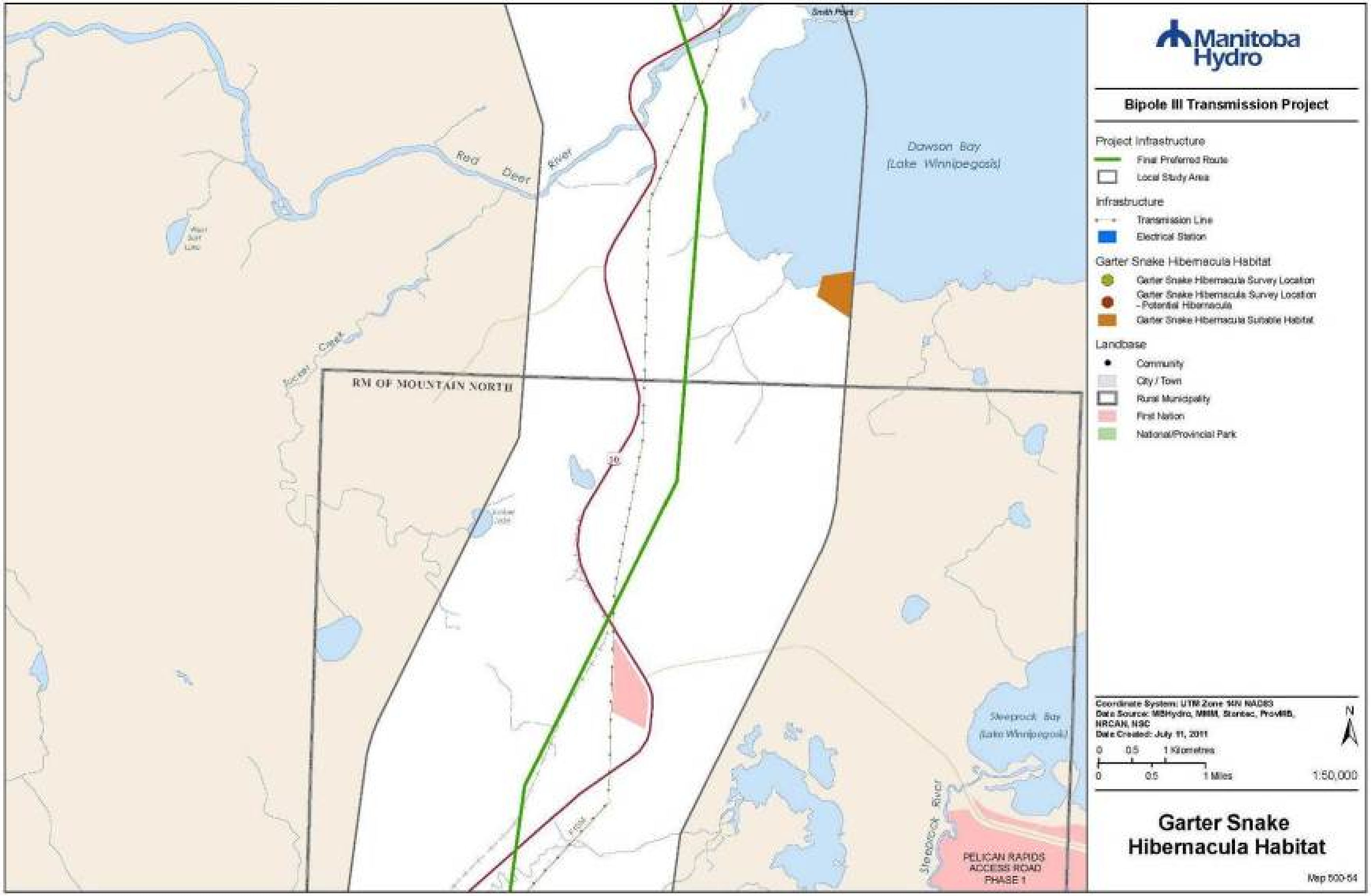
Map Series 500-10. Garter snake hibernacula modeled habitat and study sites within the Bipole III Project Study Area.



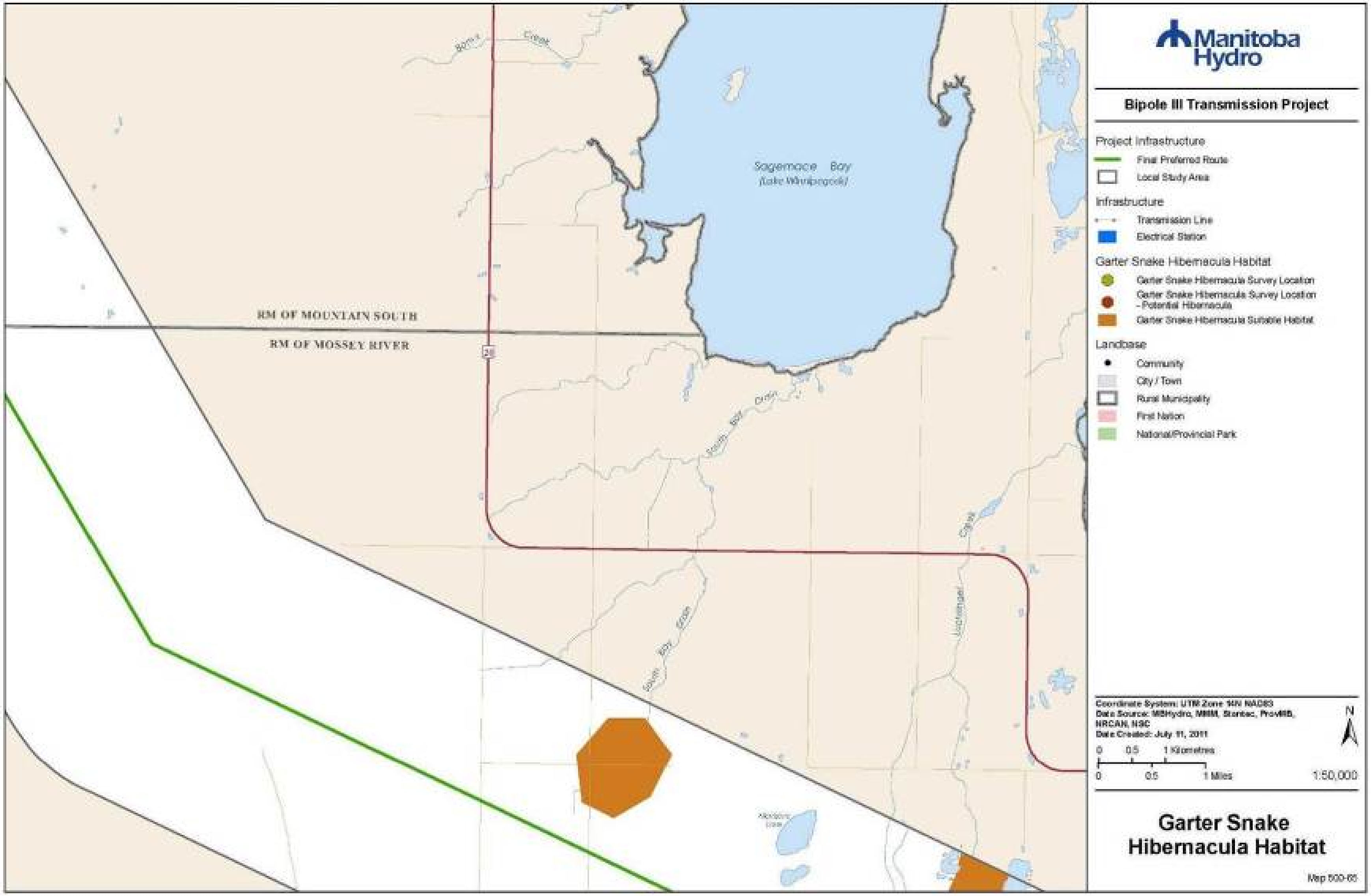
Map Series 500-11. Garter snake hibernacula modeled habitat and study sites within the Bipole III Project Study Area.



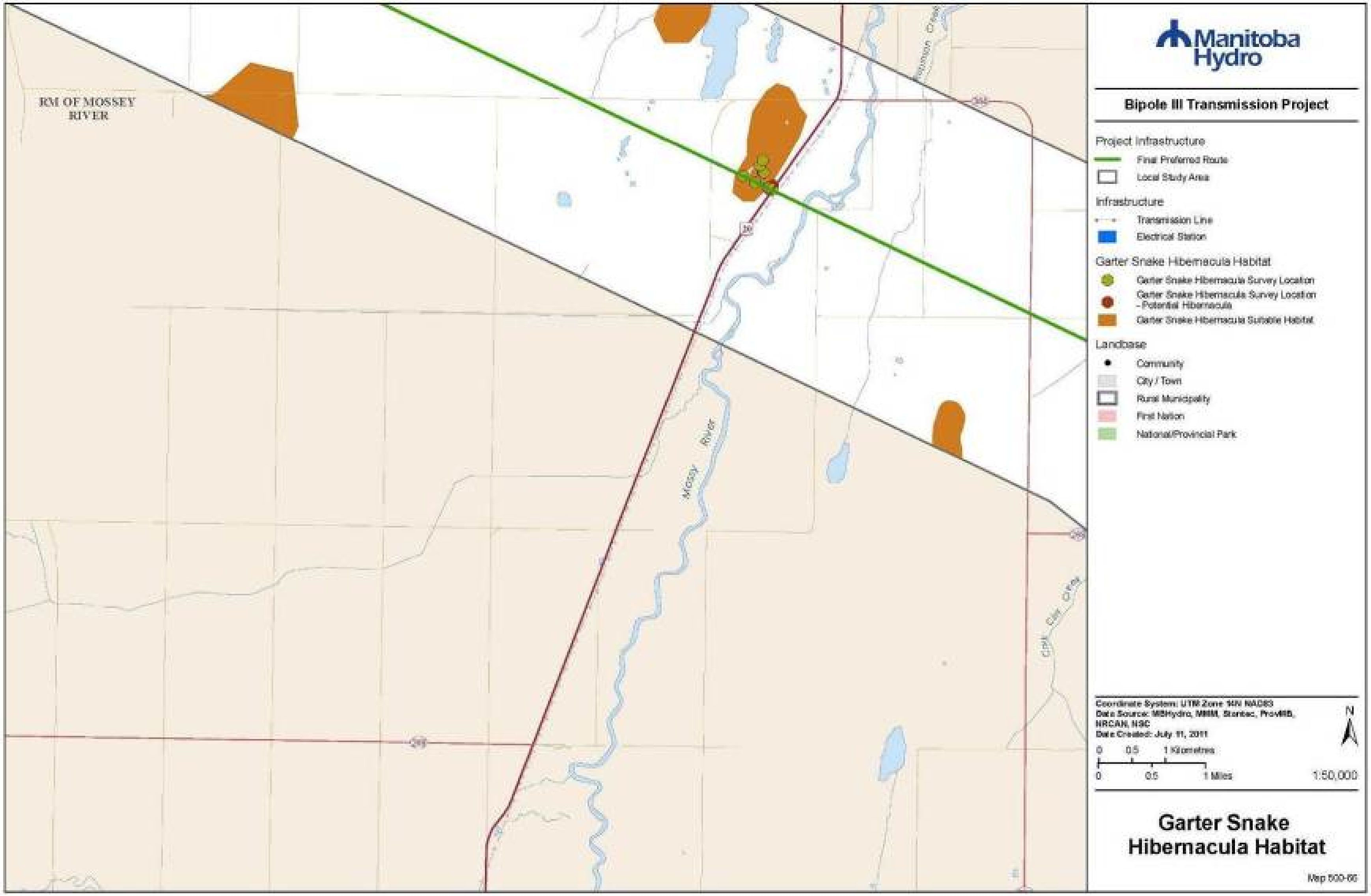
Map Series 500-12. Garter snake hibernacula modeled habitat and study sites within the Bipole III Project Study Area.



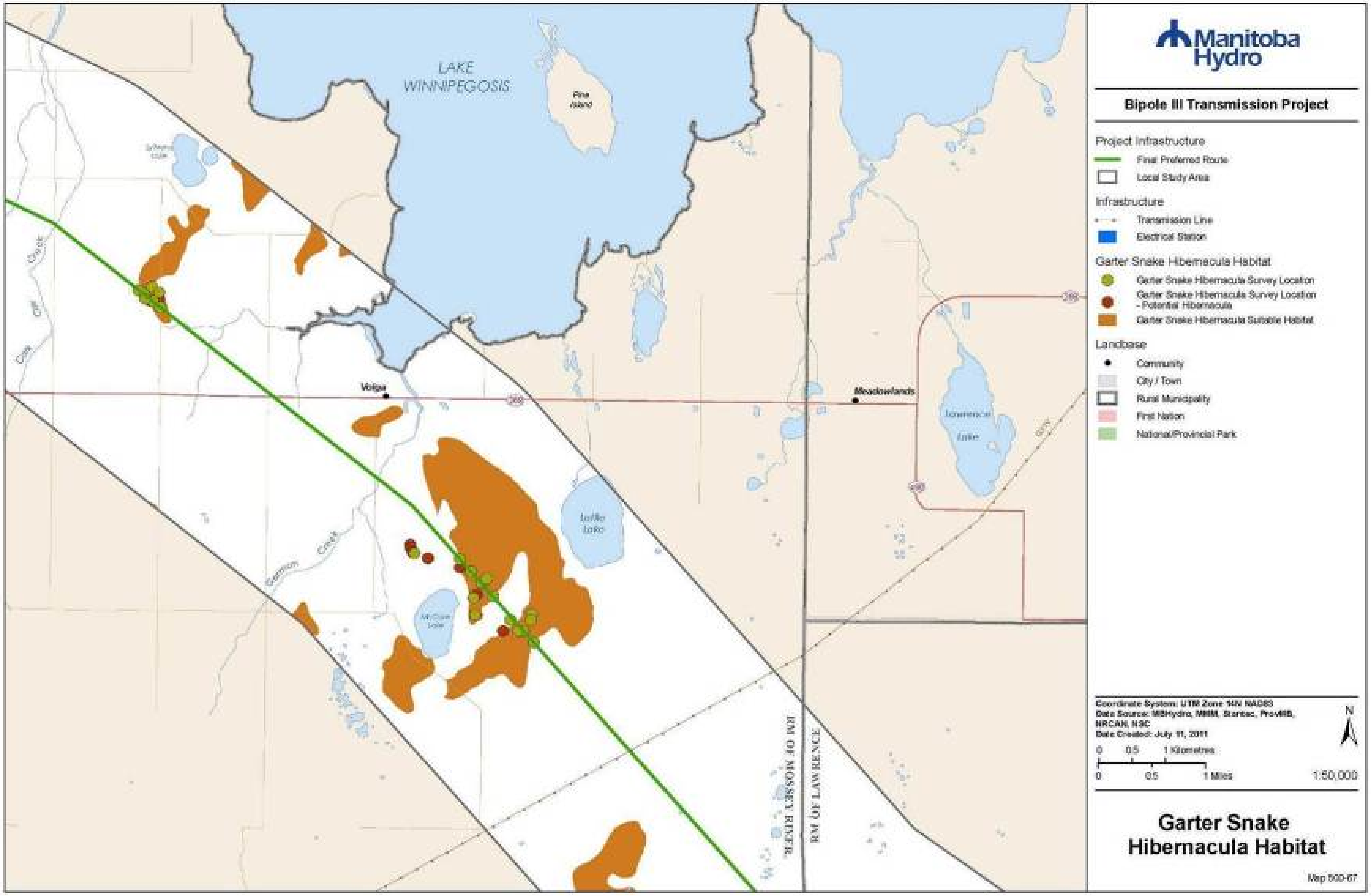
Map Series 500-13. Garter snake hibernacula modeled habitat and study sites within the Bipole III Project Study Area.



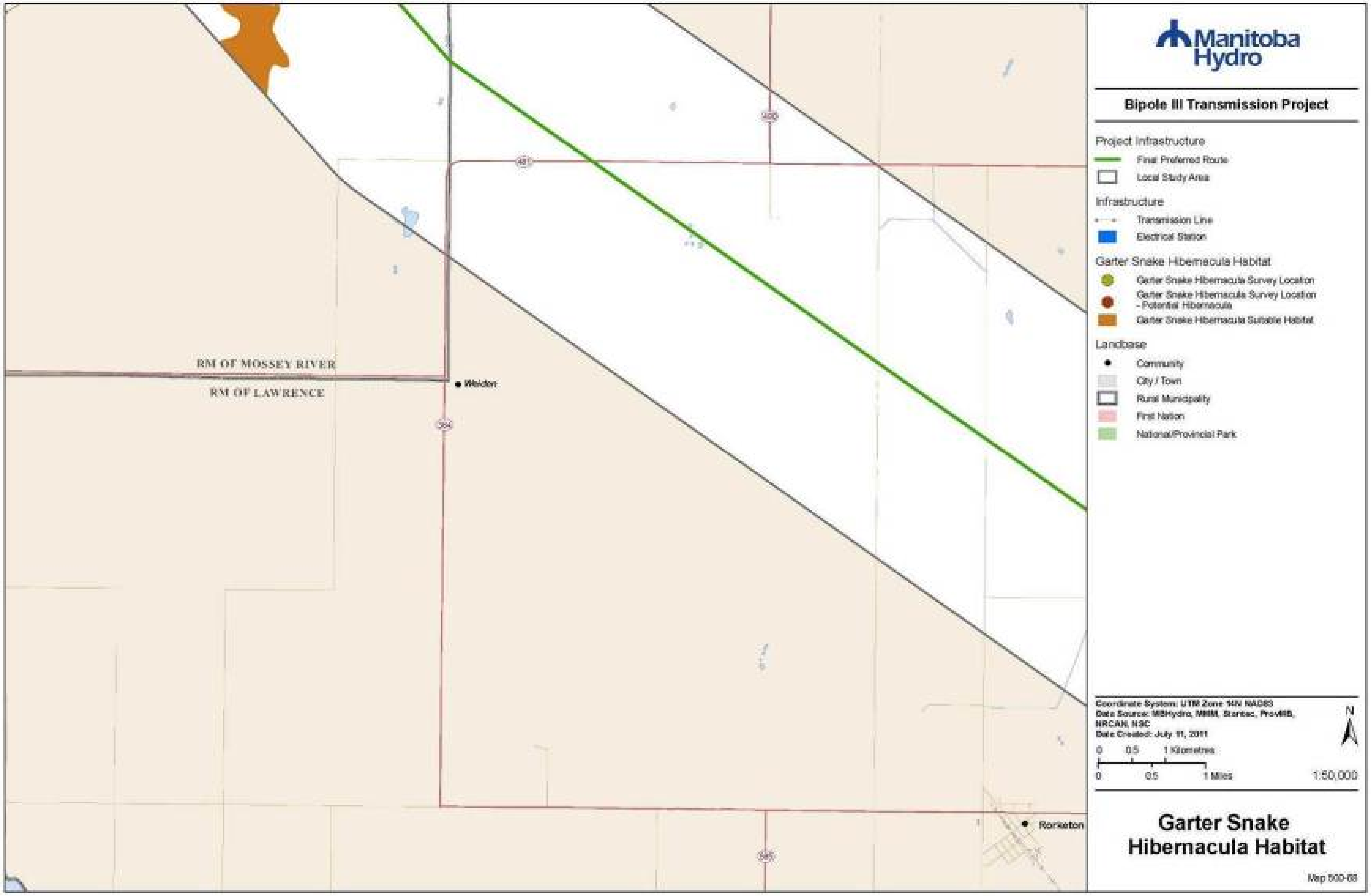
Map Series 500-14. Garter snake hibernacula modeled habitat and study sites within the Bipole III Project Study Area.



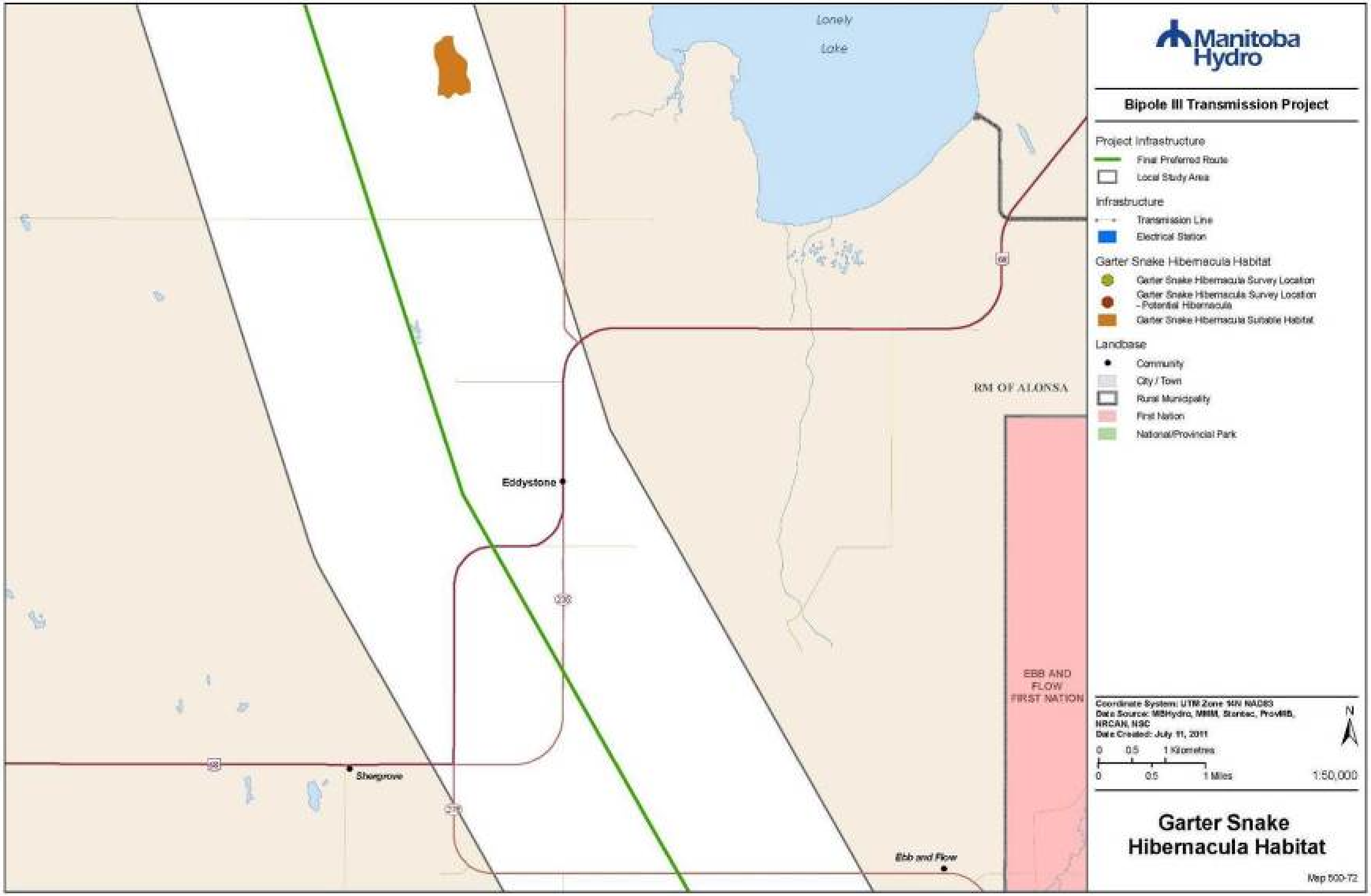
Map Series 500-15. Garter snake hibernacula modeled habitat and study sites within the Bipole III Project Study Area.



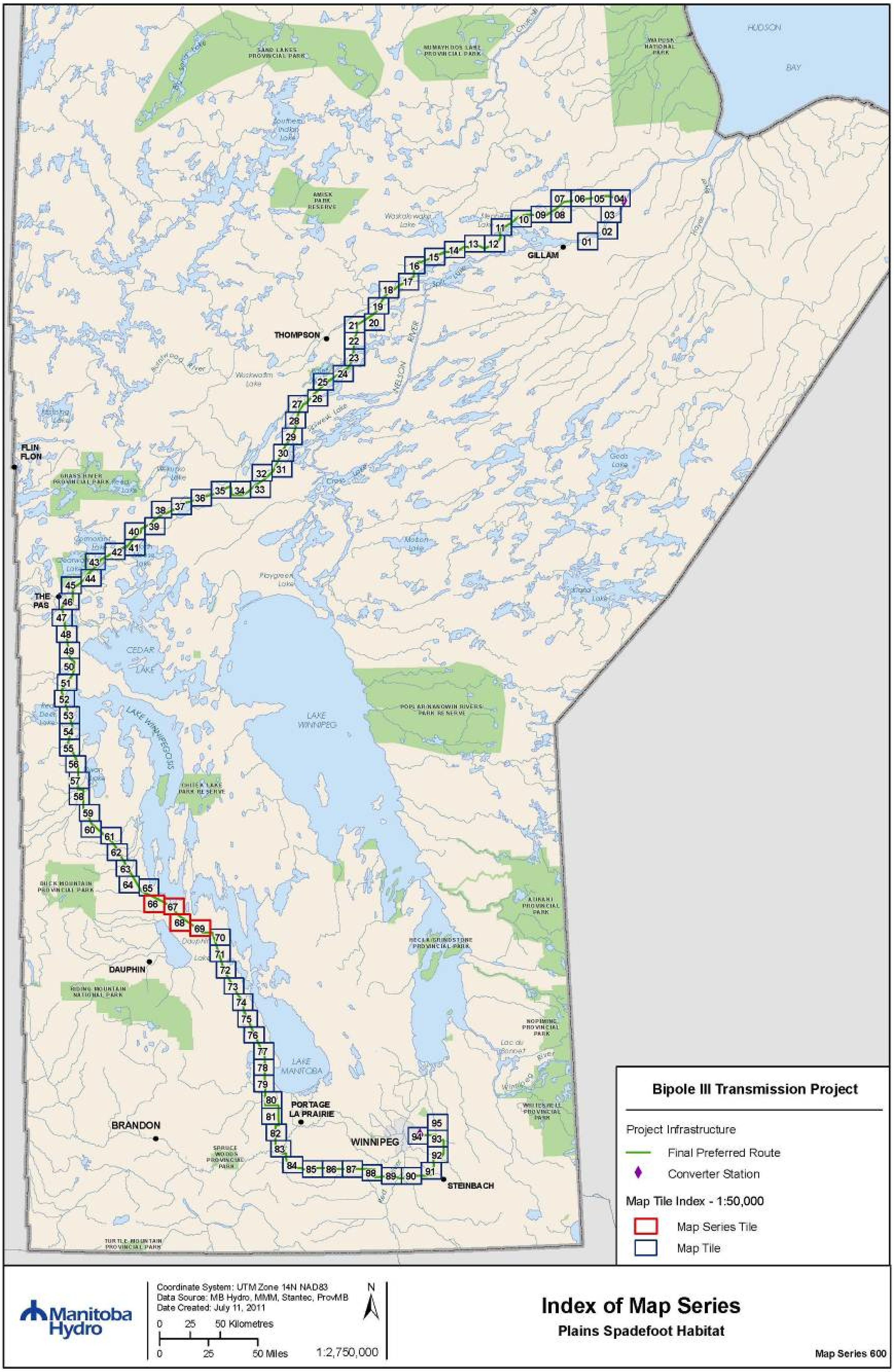
Map Series 500-16. Garter snake hibernacula modeled habitat and study sites within the Bipole III Project Study Area.



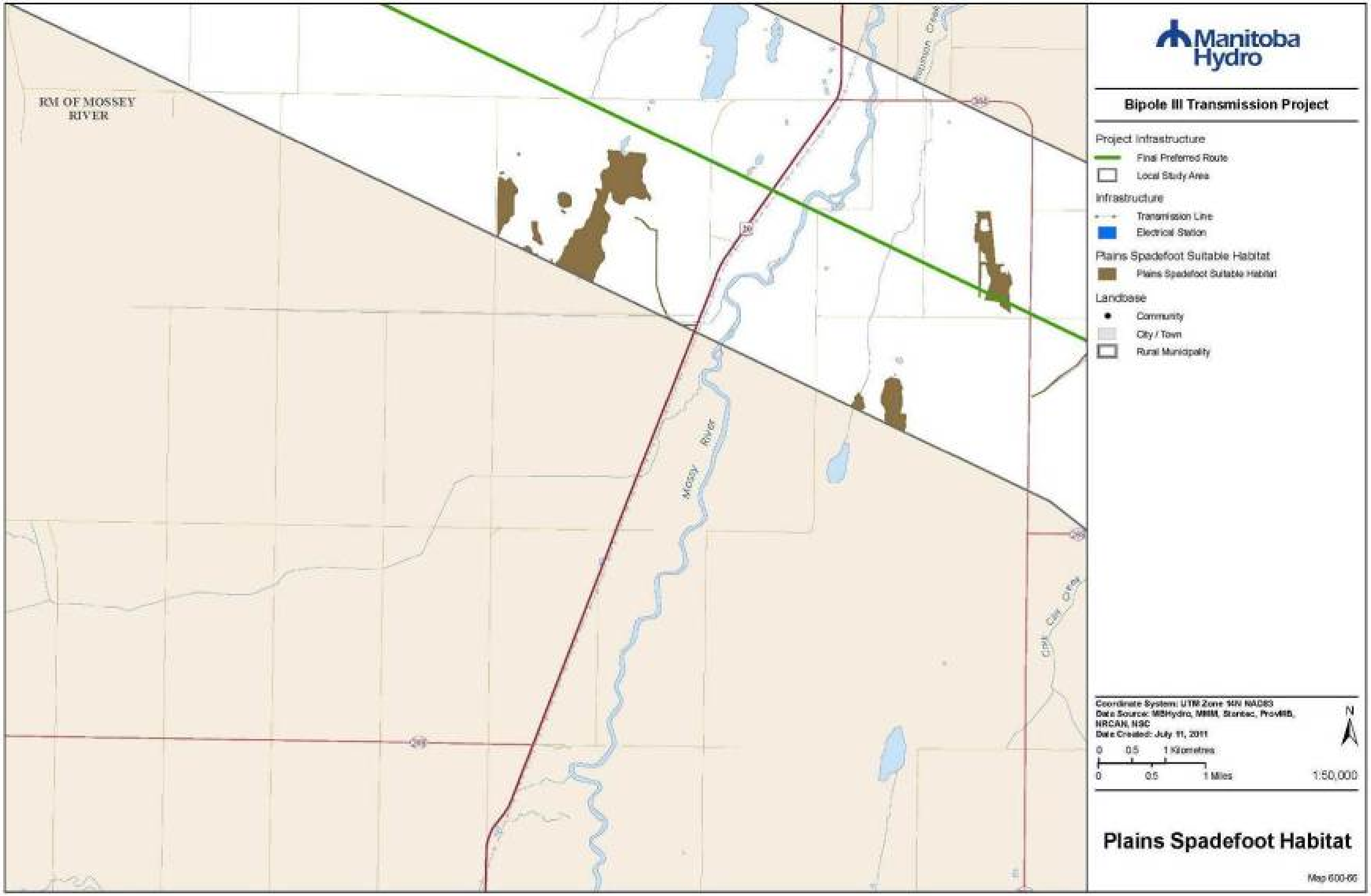
Map Series 500-17. Garter snake hibernacula modeled habitat and study sites within the Bipole III Project Study Area.



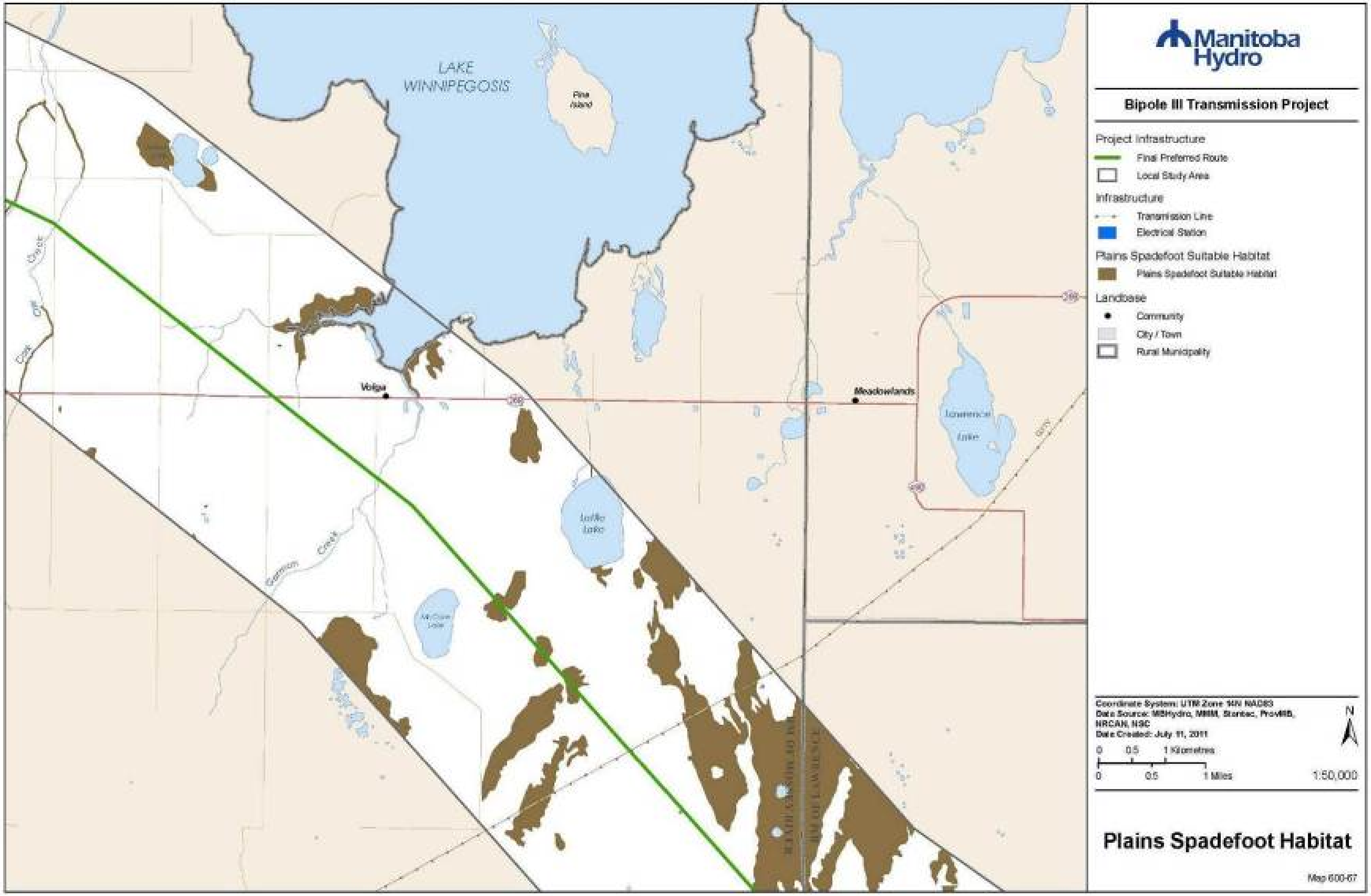
Map Series 500-18. Garter snake hibernacula modeled habitat and study sites within the Bipole III Project Study Area.



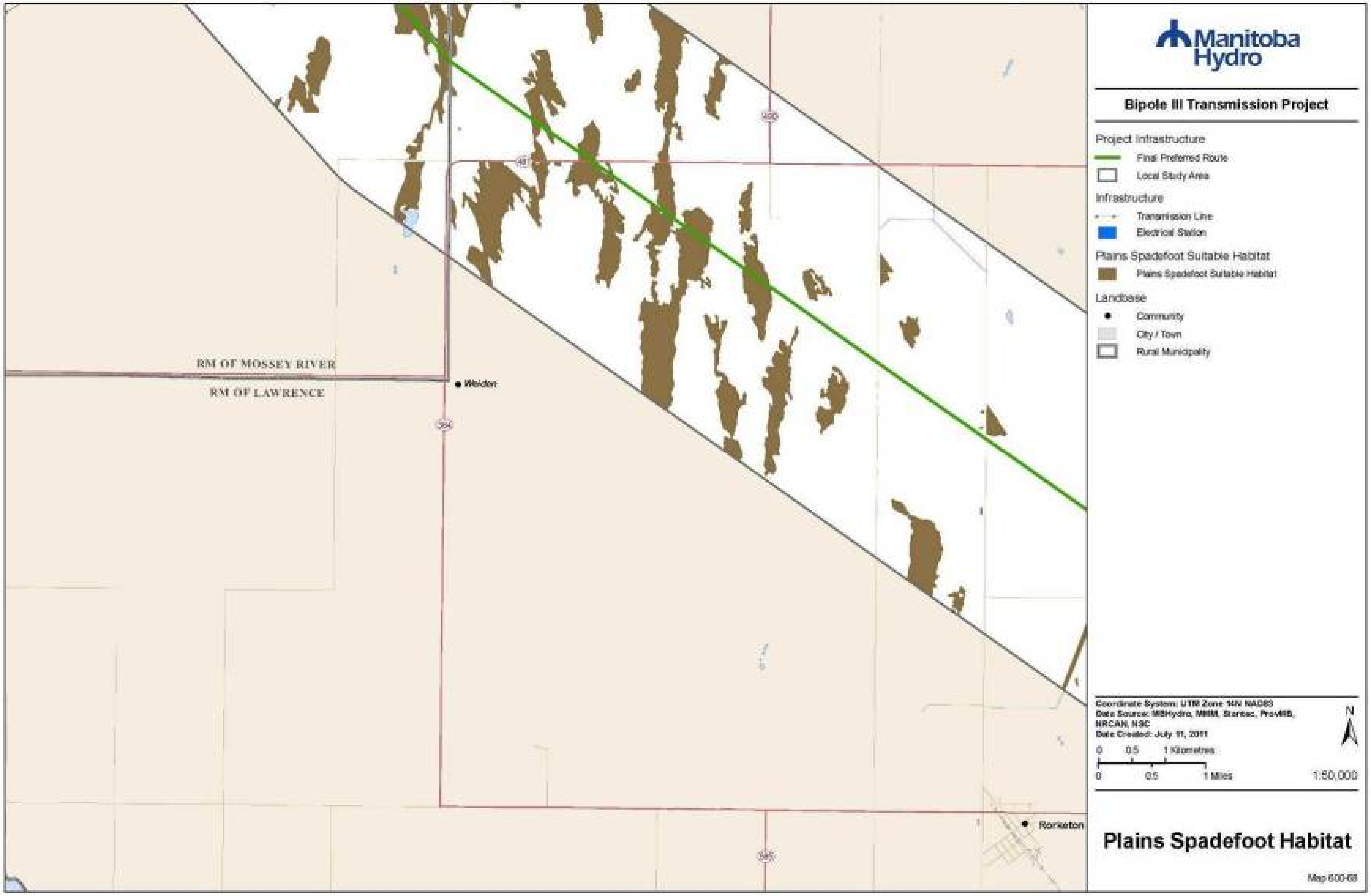
Map Series 600. Index map of plains spadefoot modeled habitat within the Bipole III Project Study Area.



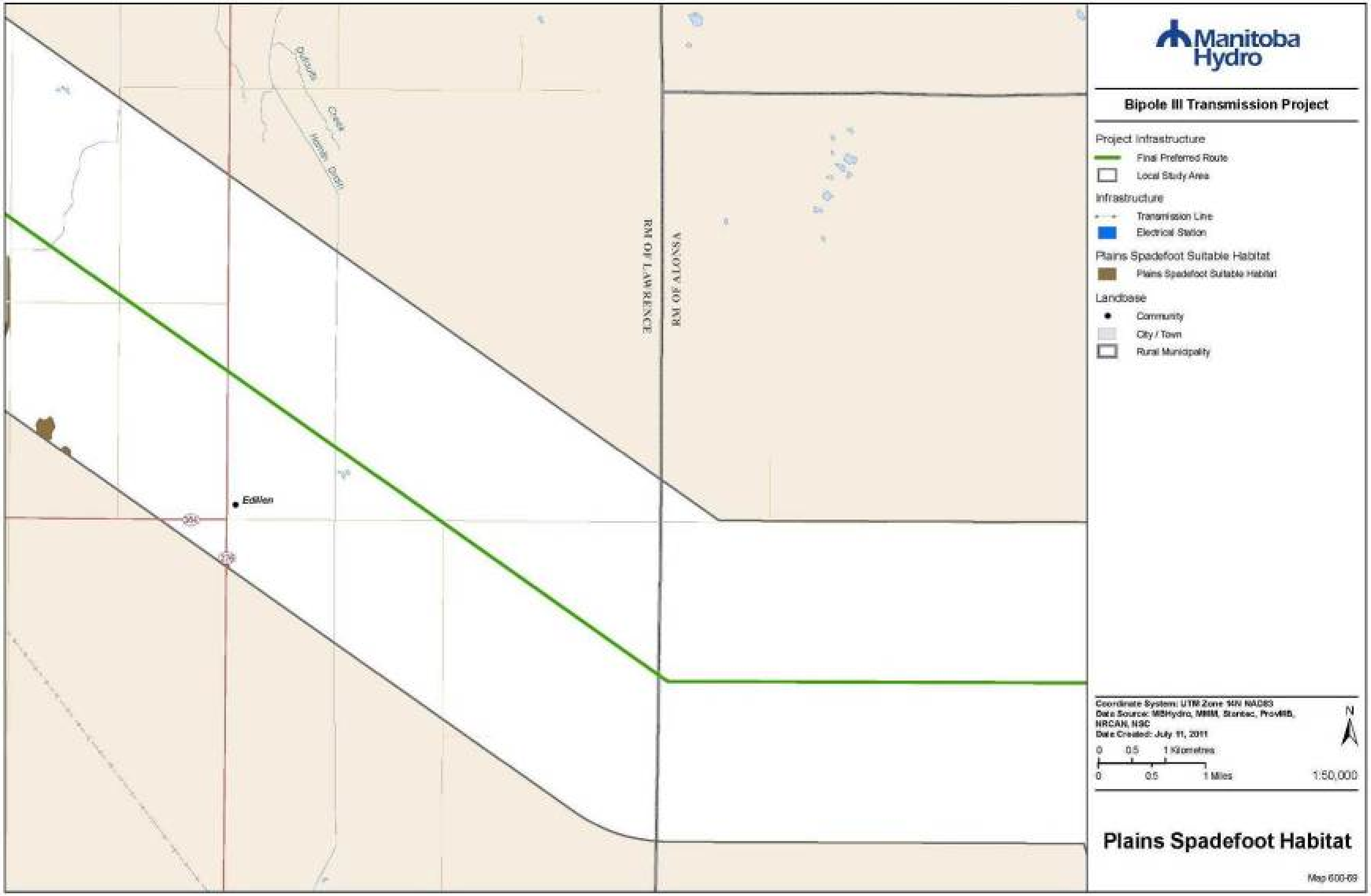
Map Series 600-1. Plains spadefoot modeled habitat within the Bipole III Project Study Area.



Map Series 600-2. Plains spadefoot modeled habitat within the Bipole III Project Study Area.

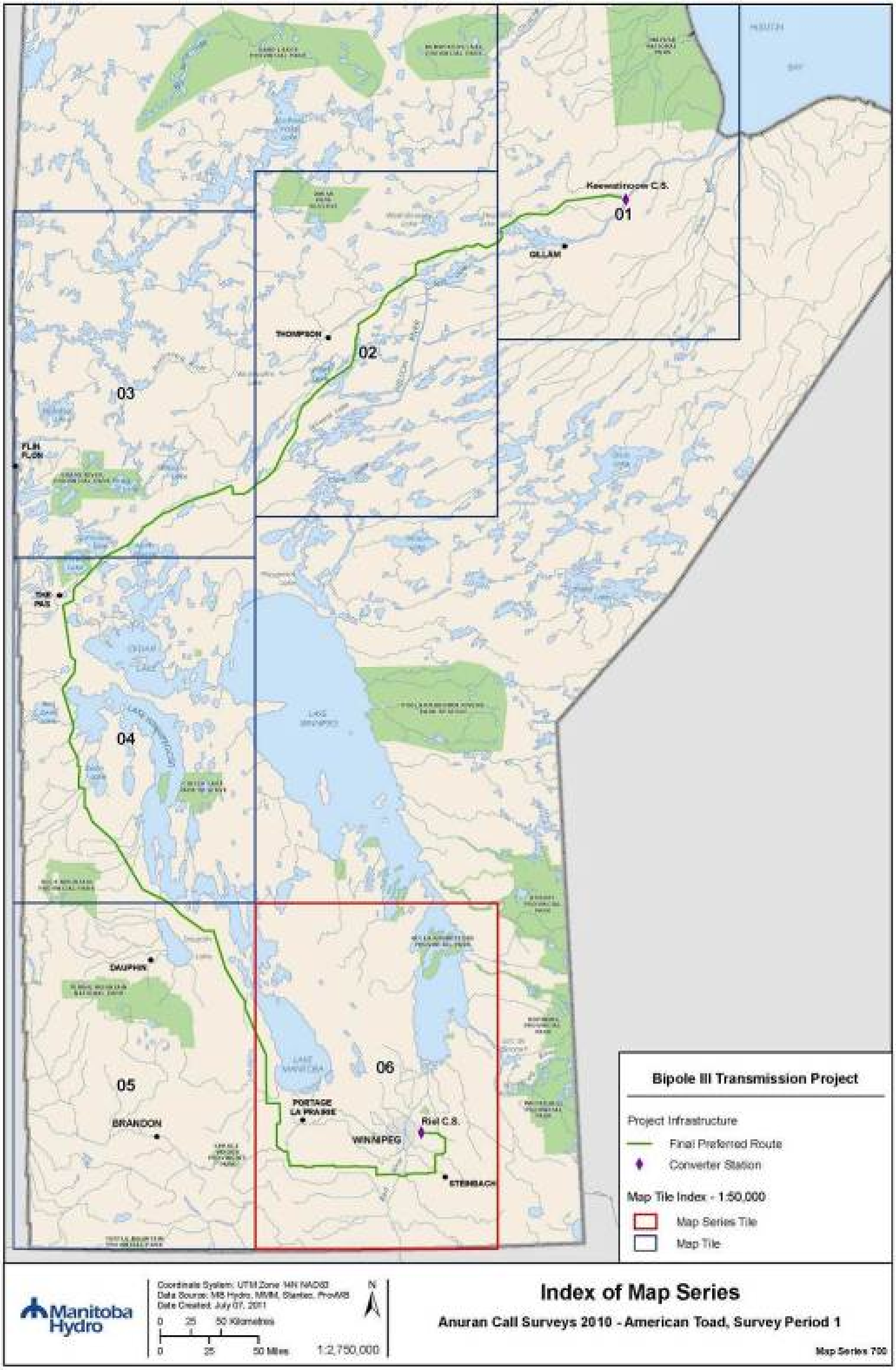


Map Series 600-3. Plains spadefoot modeled habitat within the Bipole III Project Study Area.

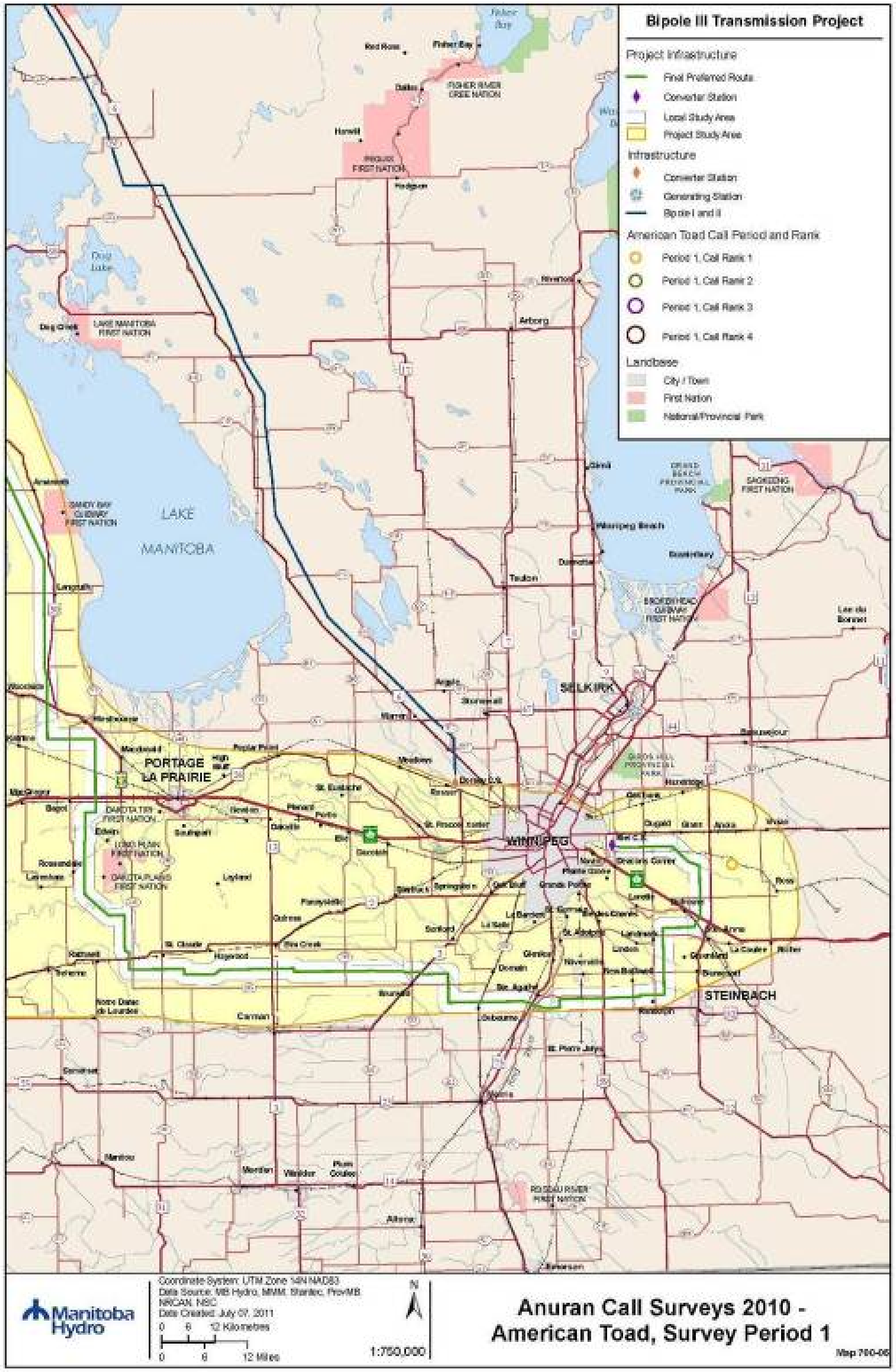


Map Series 600-4. Plains spadefoot modeled habitat within the Bipole III Project Study Area.

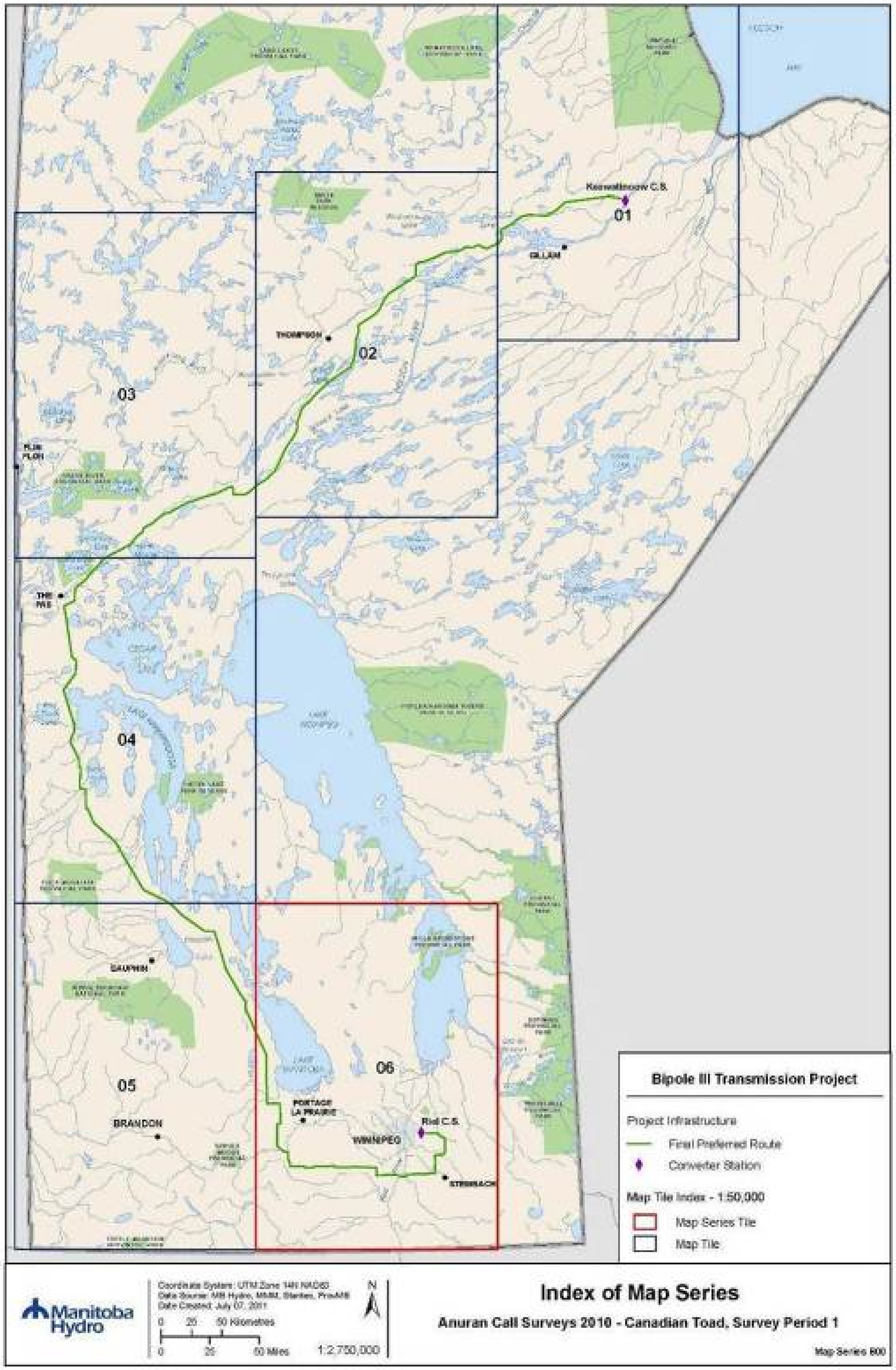
Map 3. Map of anuran call survey study sites within the Bipole III Project Study Area.



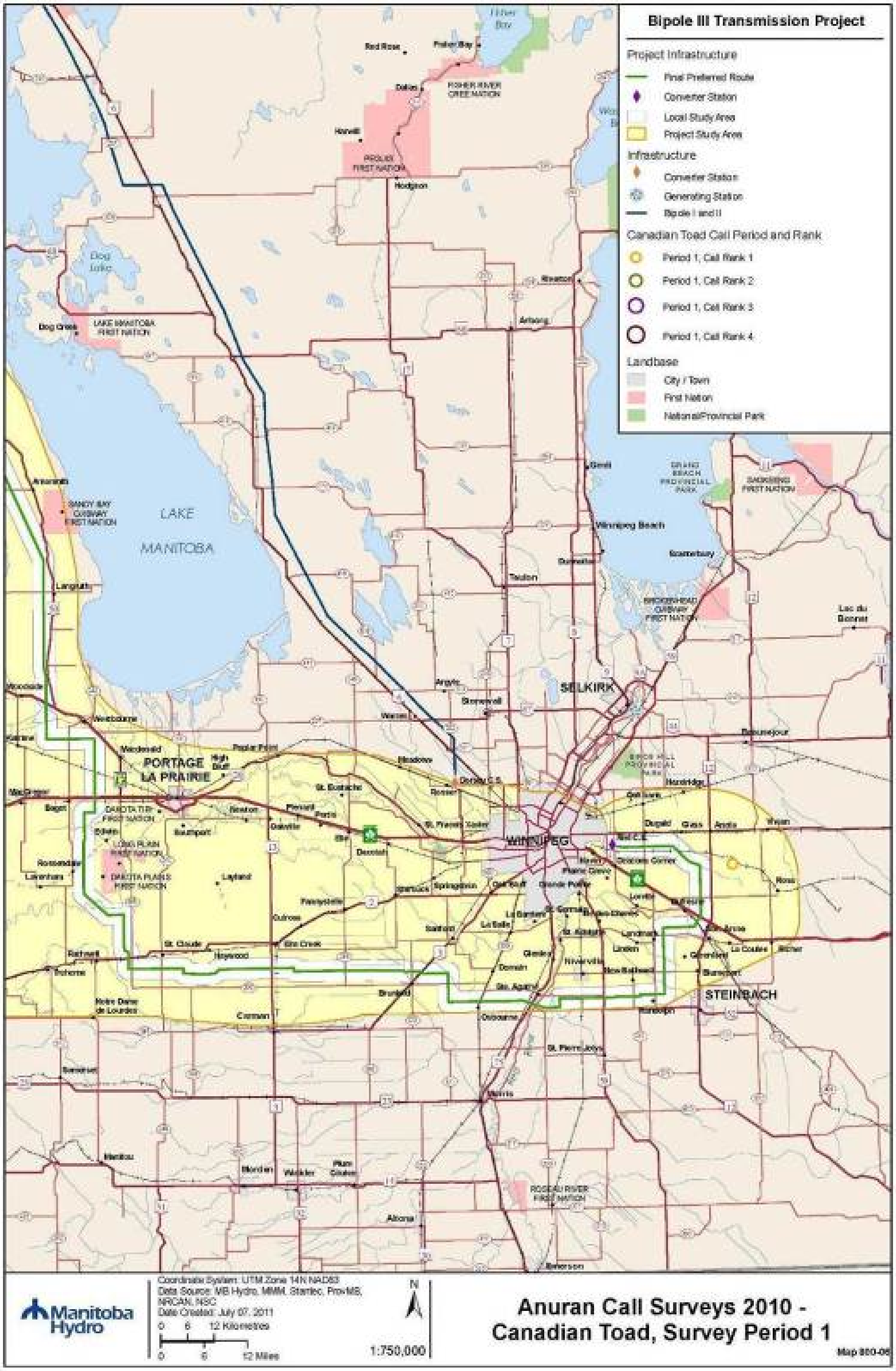
Map Series 700. Index map for Bipole III anuran call survey results for American toad, survey period 1.



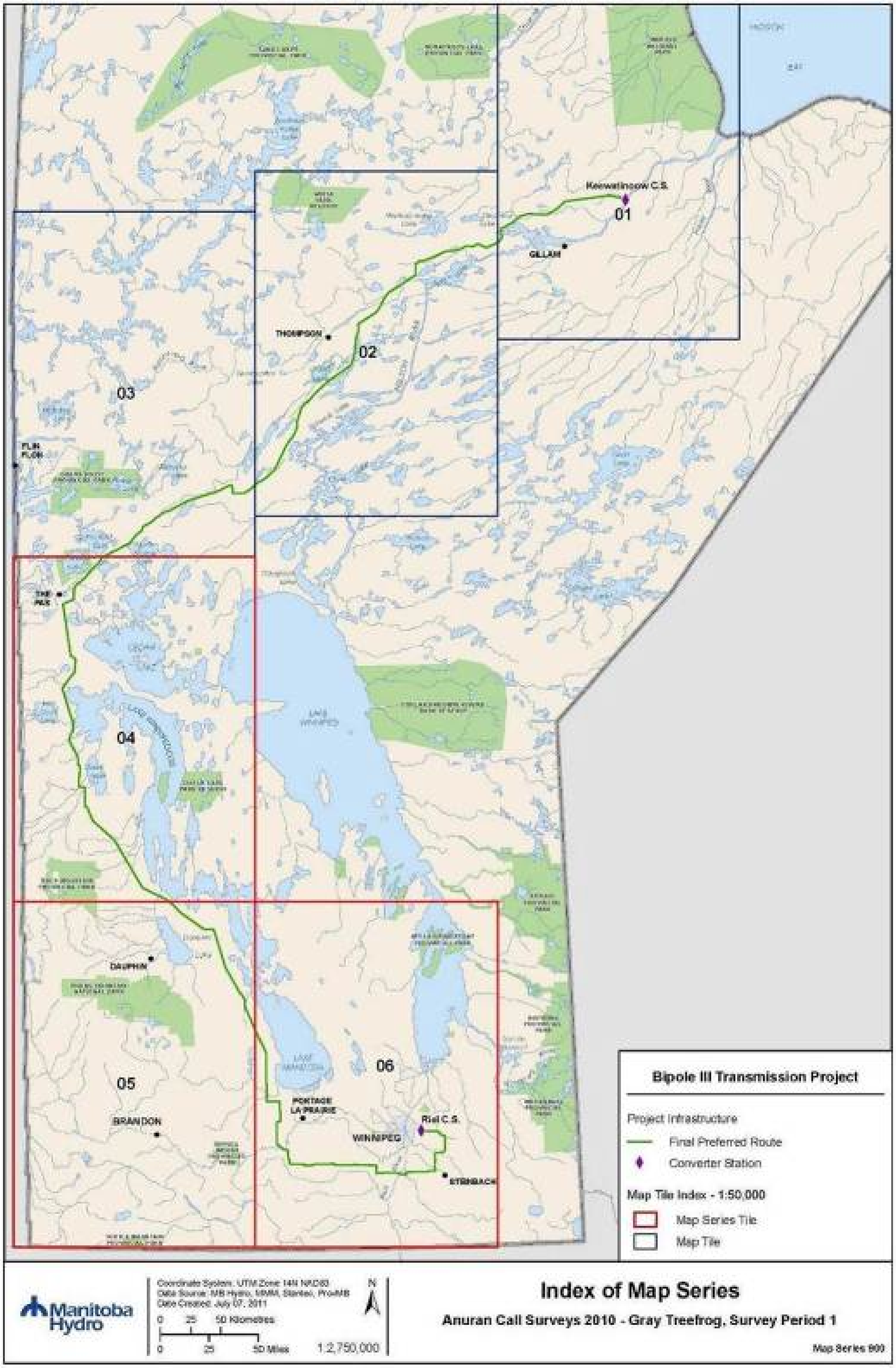
Map Series 700-1 Bipole III anuran call survey results for American toad, survey period 1.



Map Series 800. Index map for Bipole III anuran call survey results for Canadian toad, survey period 1.

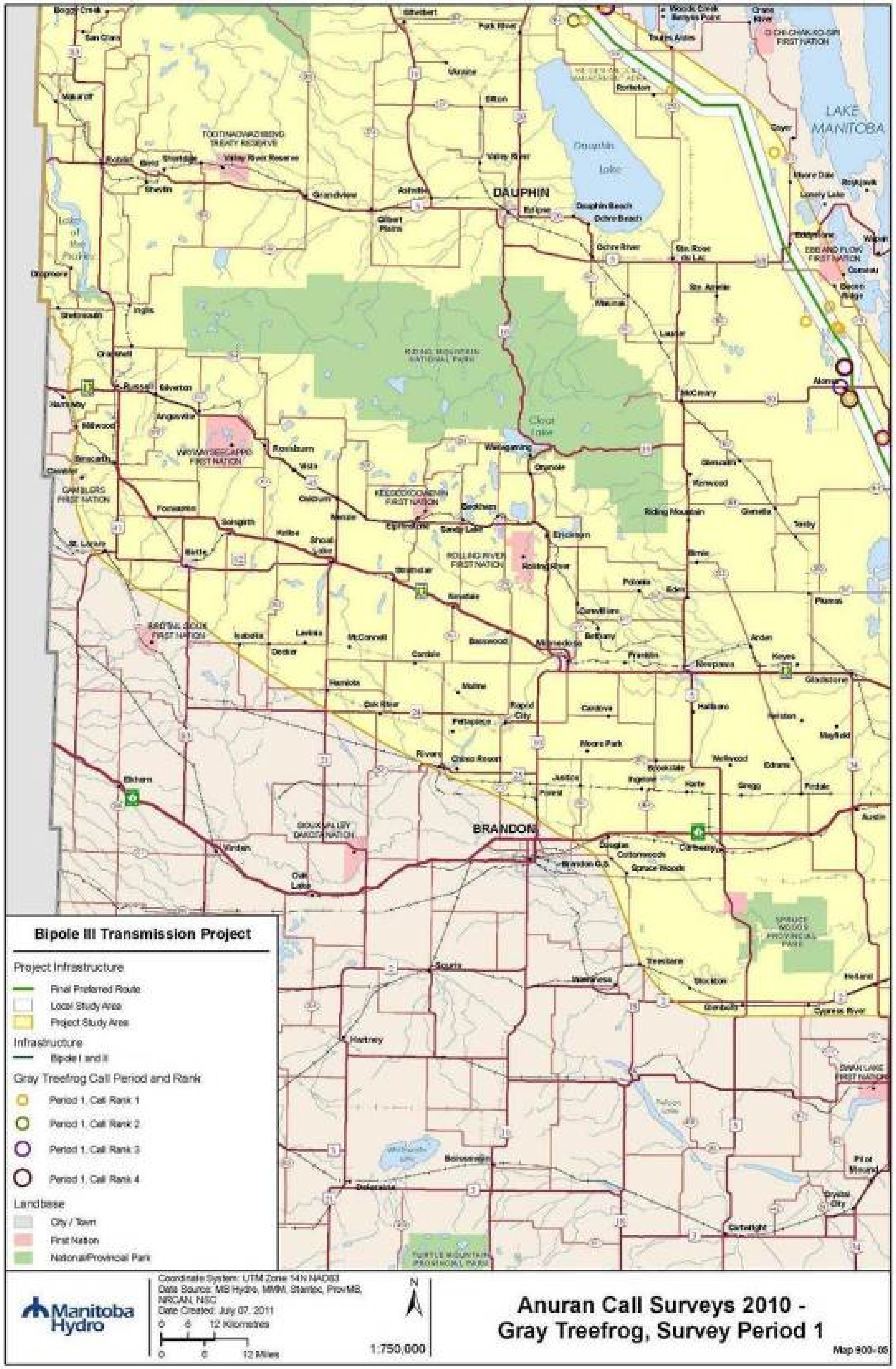


Map Series 800-1. Bipole III anuran call survey results for Canadian toad, survey period 1.

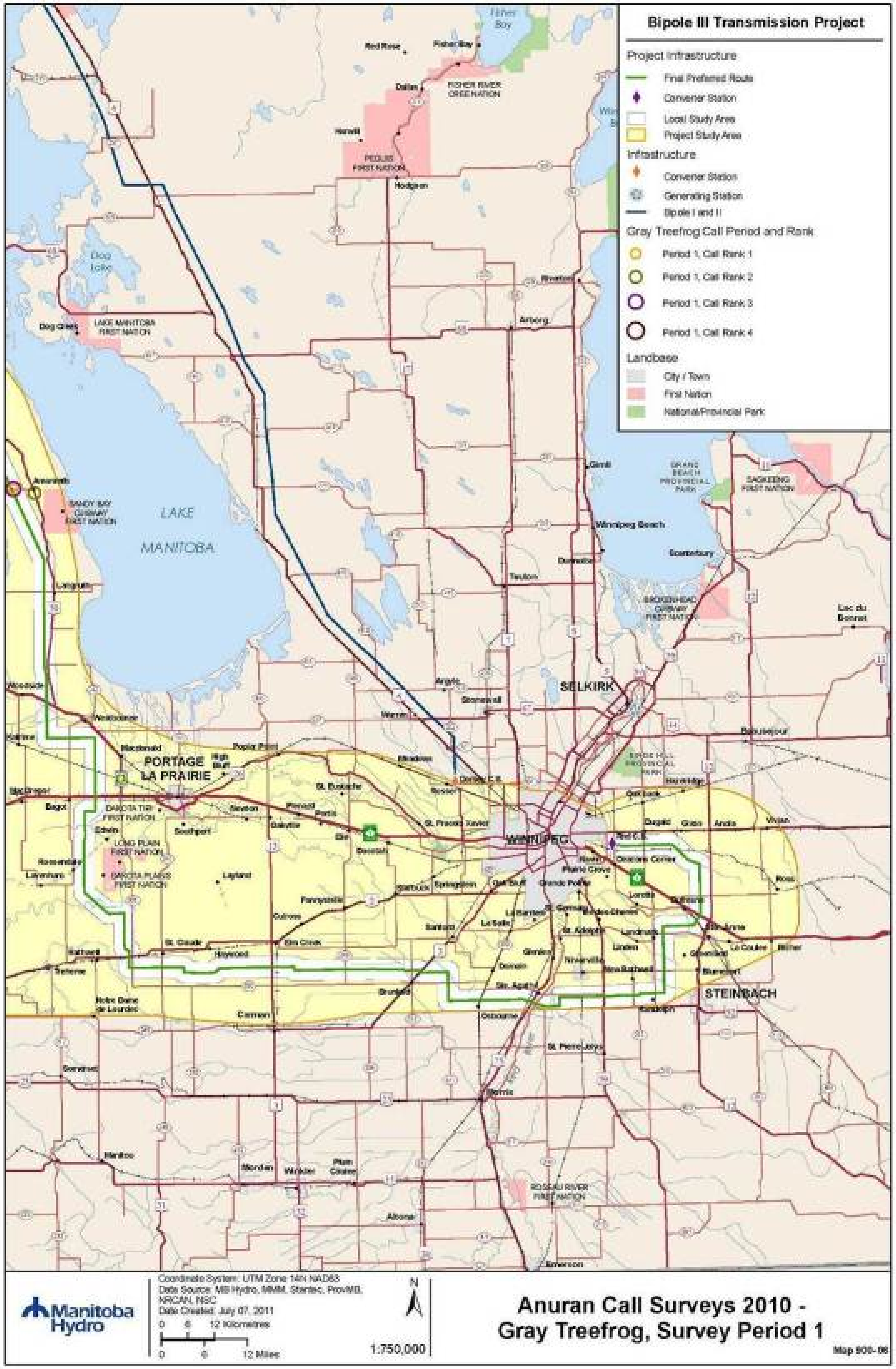


Map Series 900. Index map for Bipole III anuran call survey results for Gray treefrog, survey period 1.

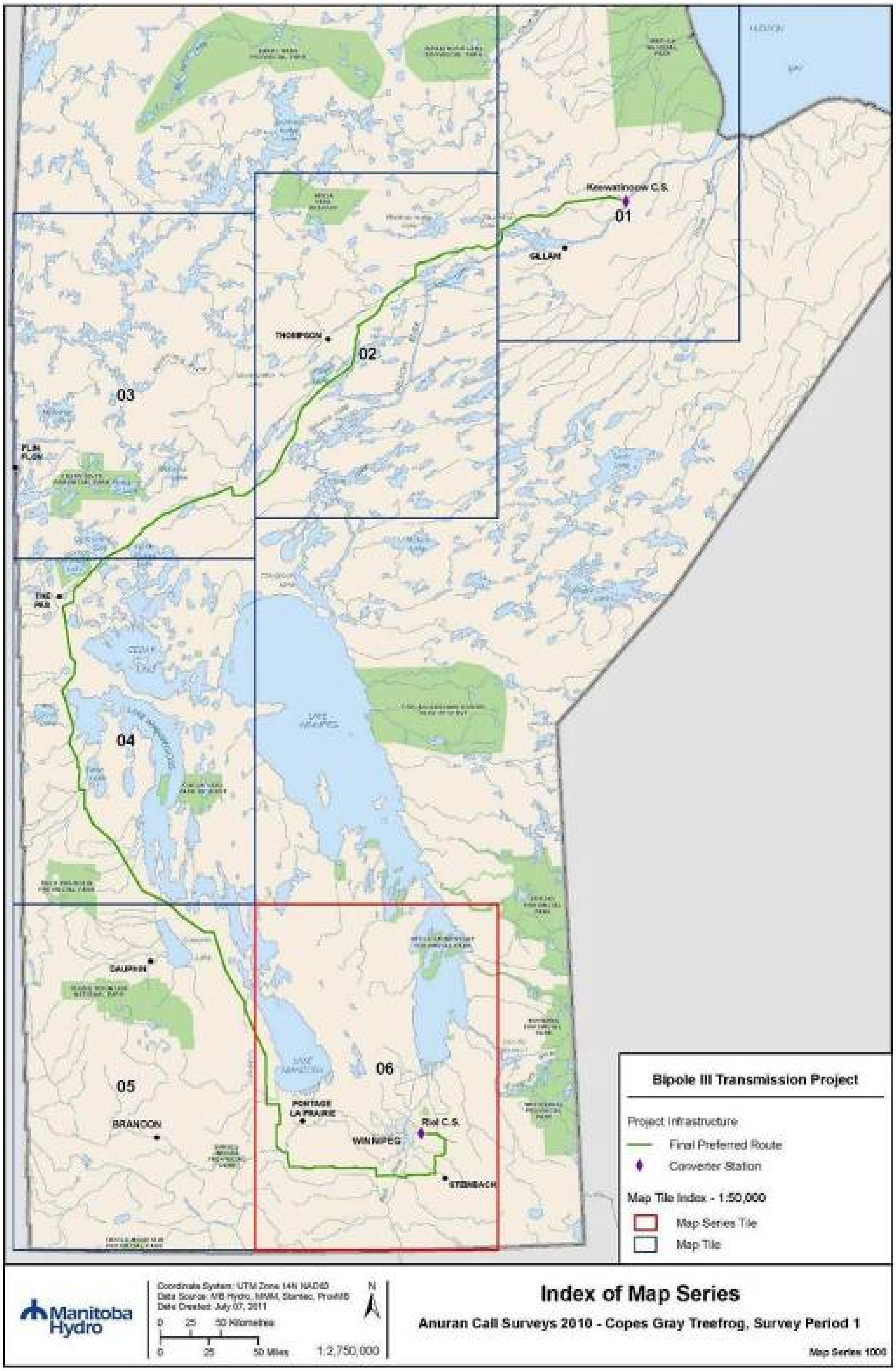
Map Series 900-1. Bipole III anuran call survey results for Gray treefrog, survey period 1



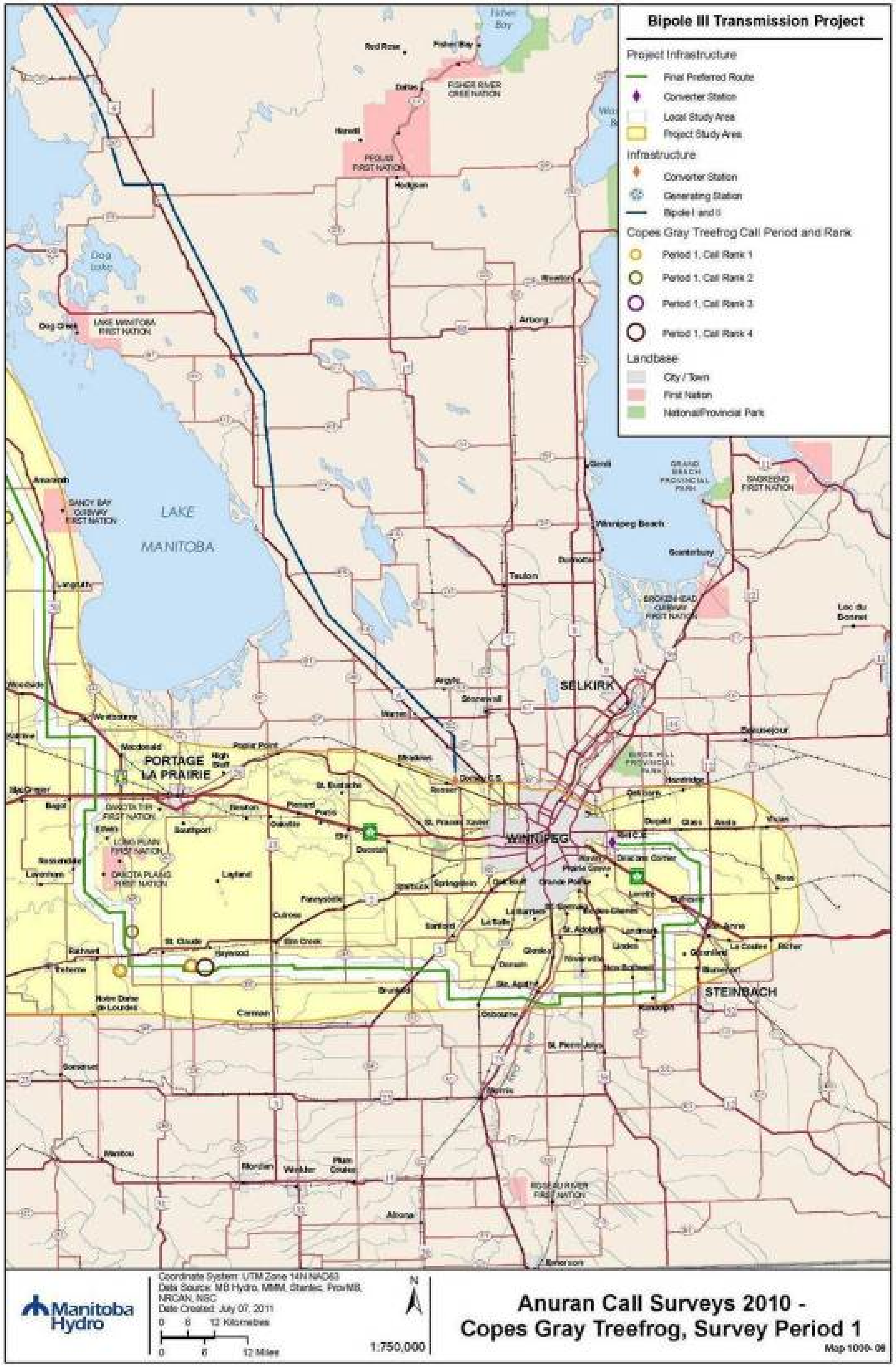
Map Series 900-2. Bipole III anuran call survey results for Gray treefrog, survey period 1



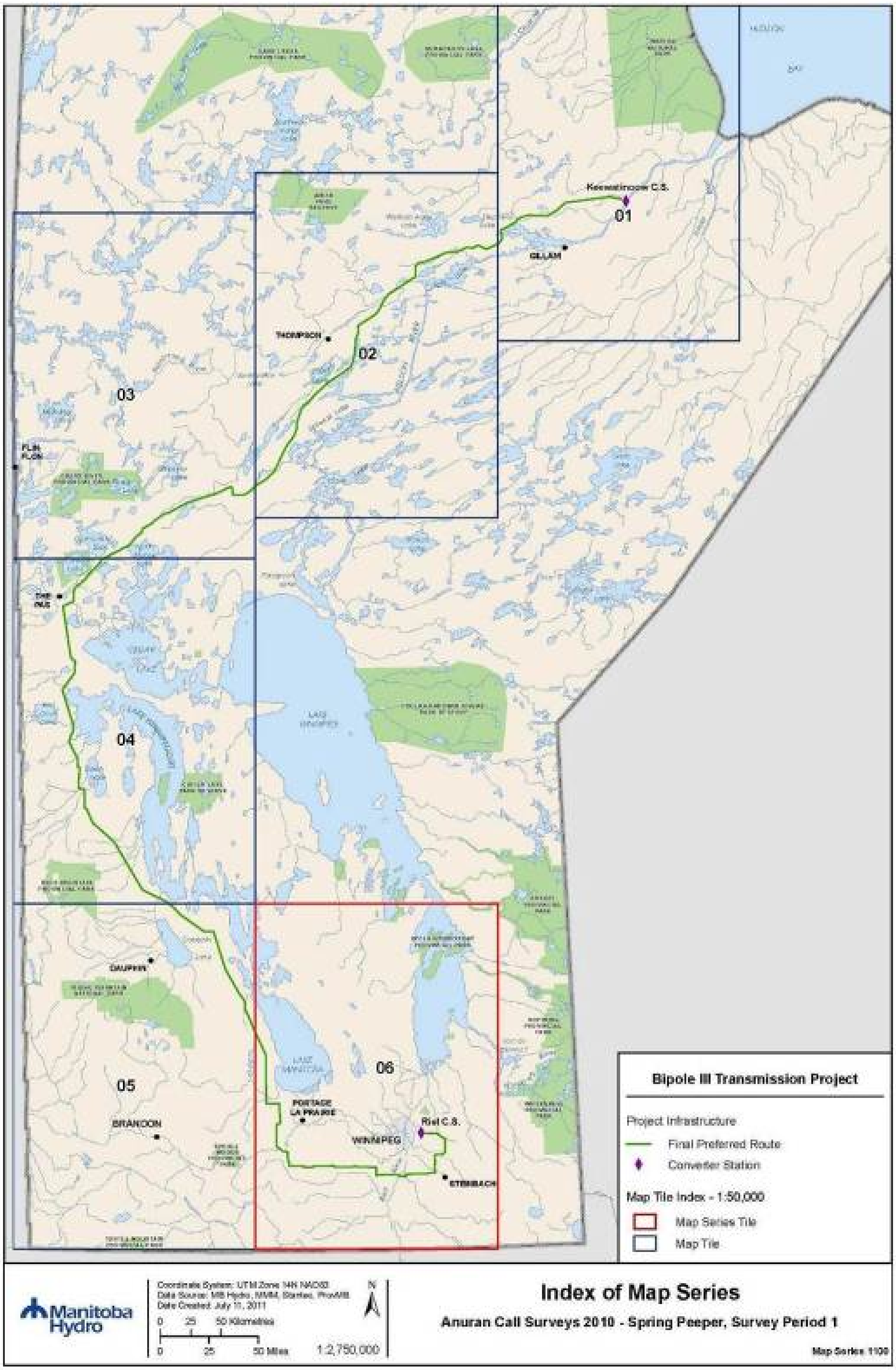
Map Series 900-3. Bipole III anuran call survey results for Gray treefrog, survey period 1



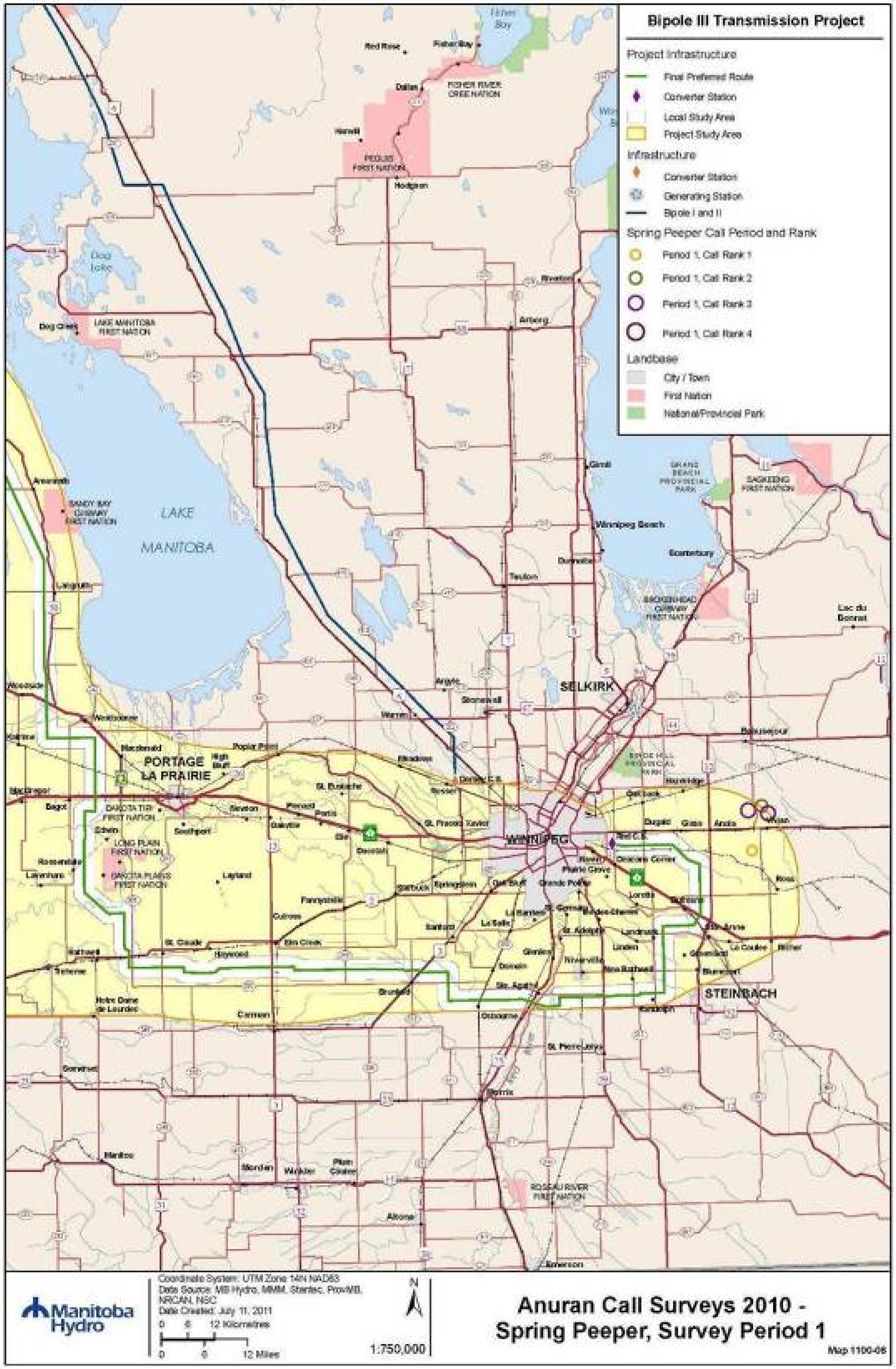
Map Series 1000. Index map for Bipole III anuran call survey results for Copes gray treefrog, survey period 1.



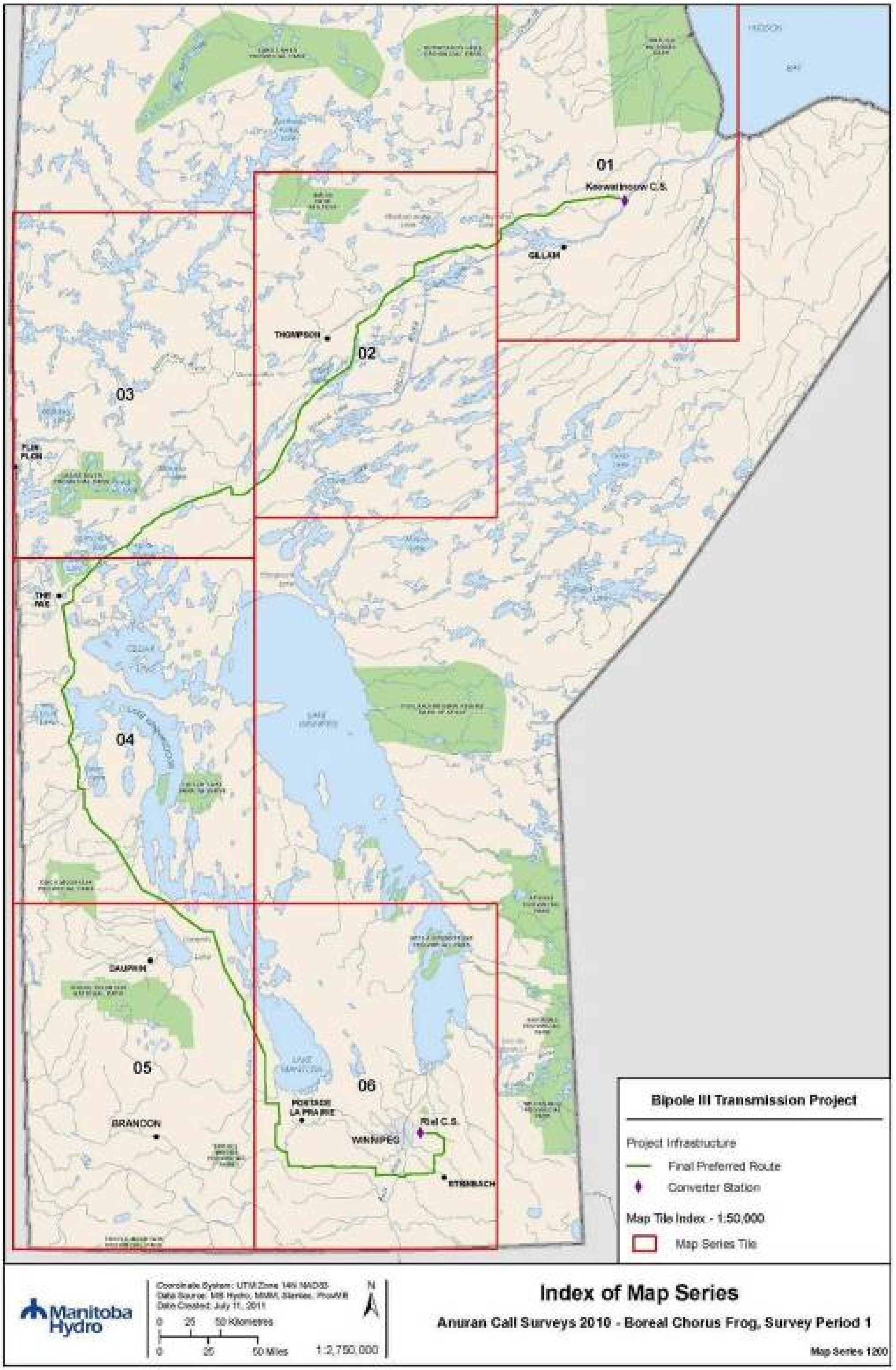
Map Series 1000-1. Bipole III anuran call survey results for Copes gray treefrog, survey period 1.



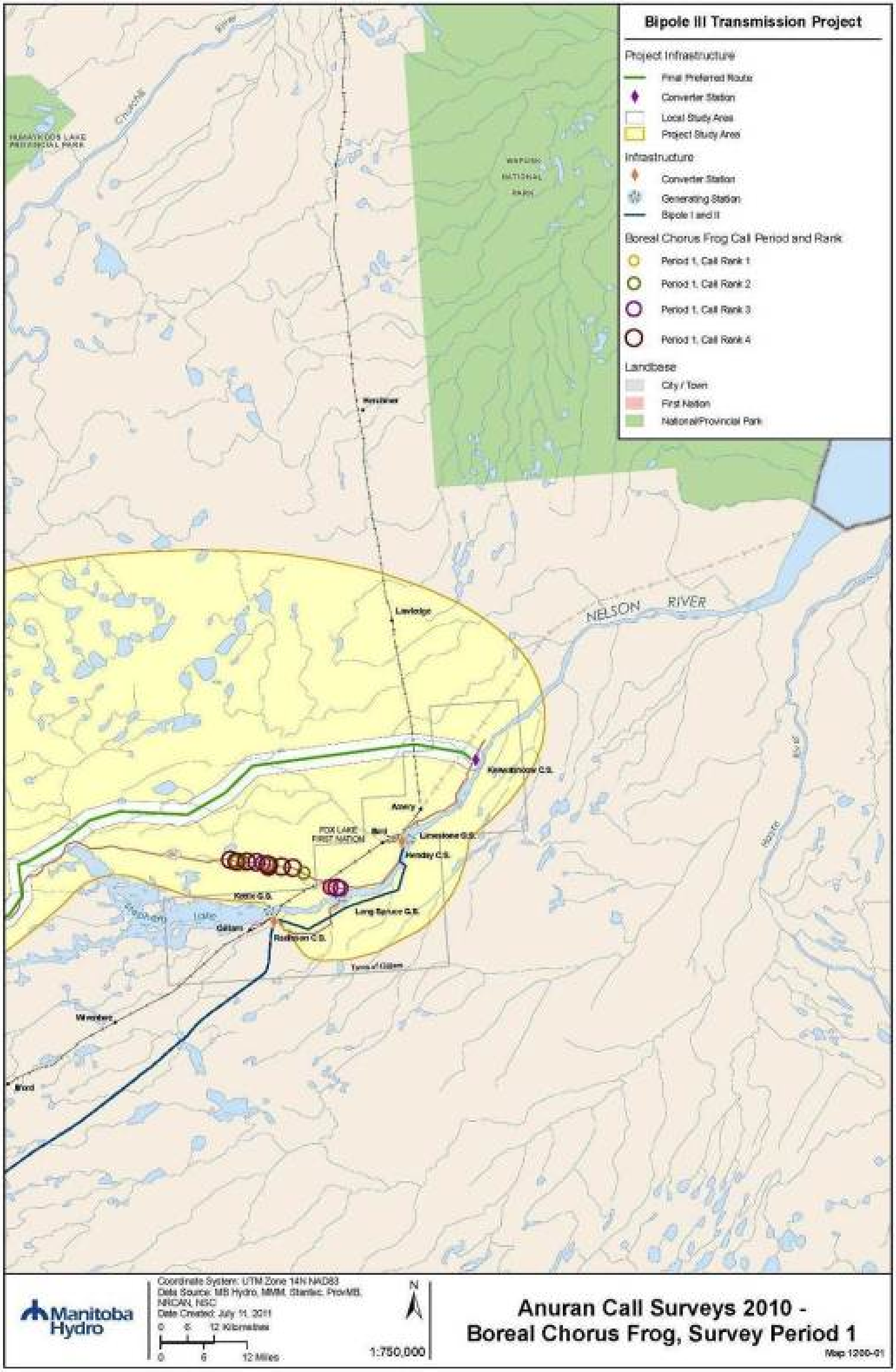
Map Series 1100. Index map for Bipole III anuran call survey results for spring peeper, survey period 1.



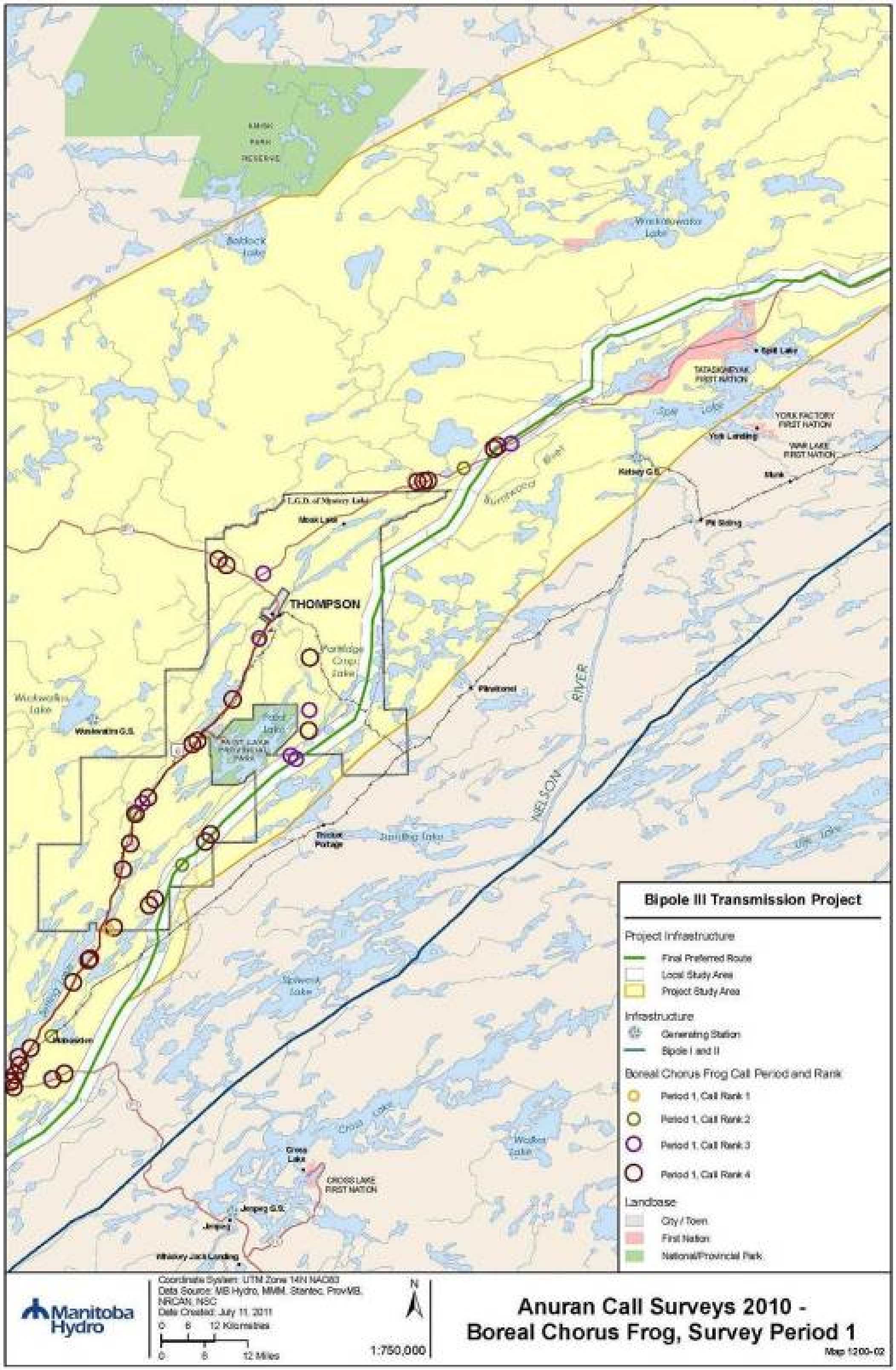
Map Series 1100-1. Bipole III anuran call survey results for spring peeper, survey period 1.



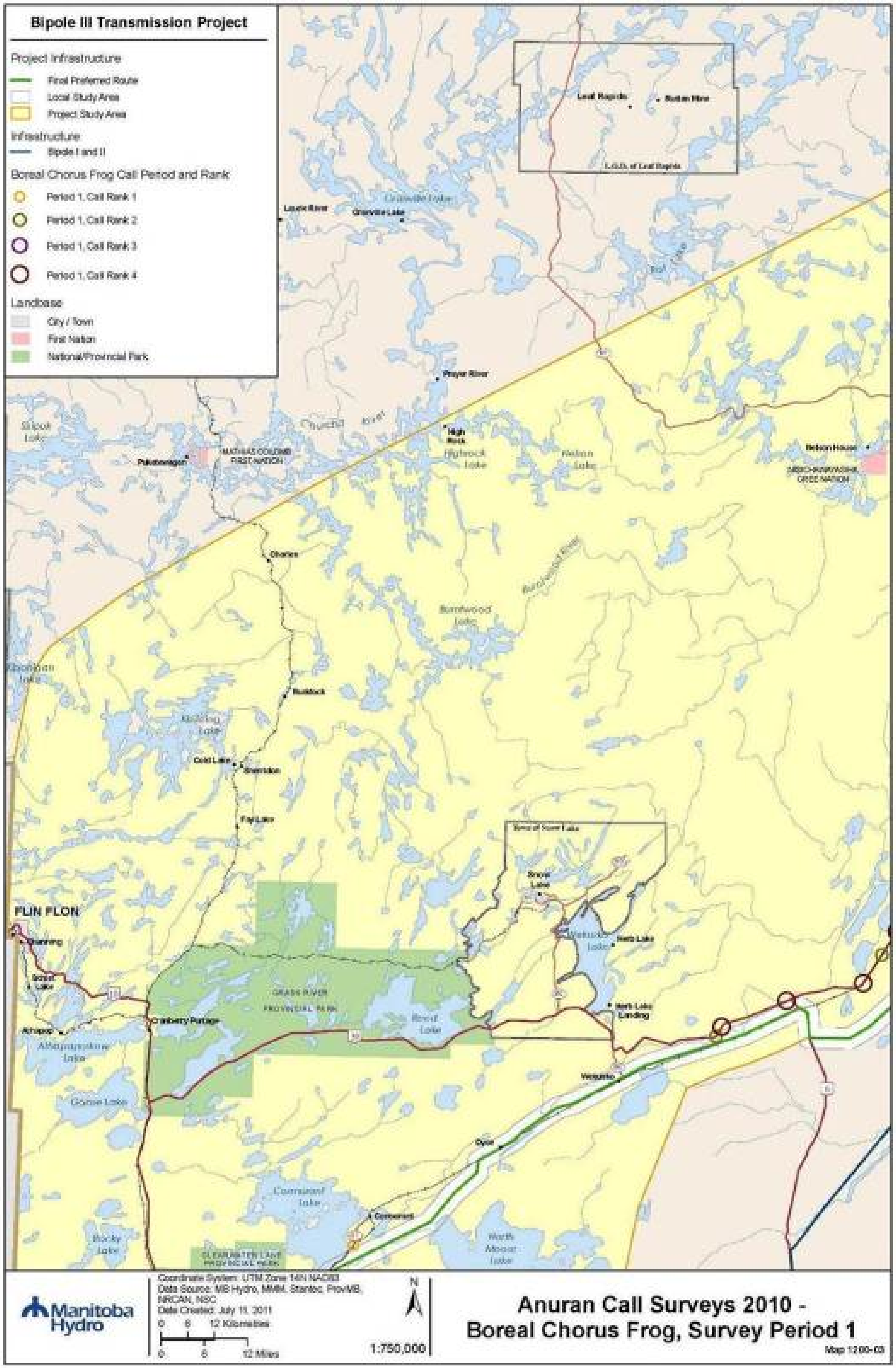
Map Series 1200. Index map for Bipole III anuran call survey results for boreal chorus frog, survey period 1.



Map Series 1200-1. Bipole III anuran call survey results for boreal chorus frog, survey period 1.

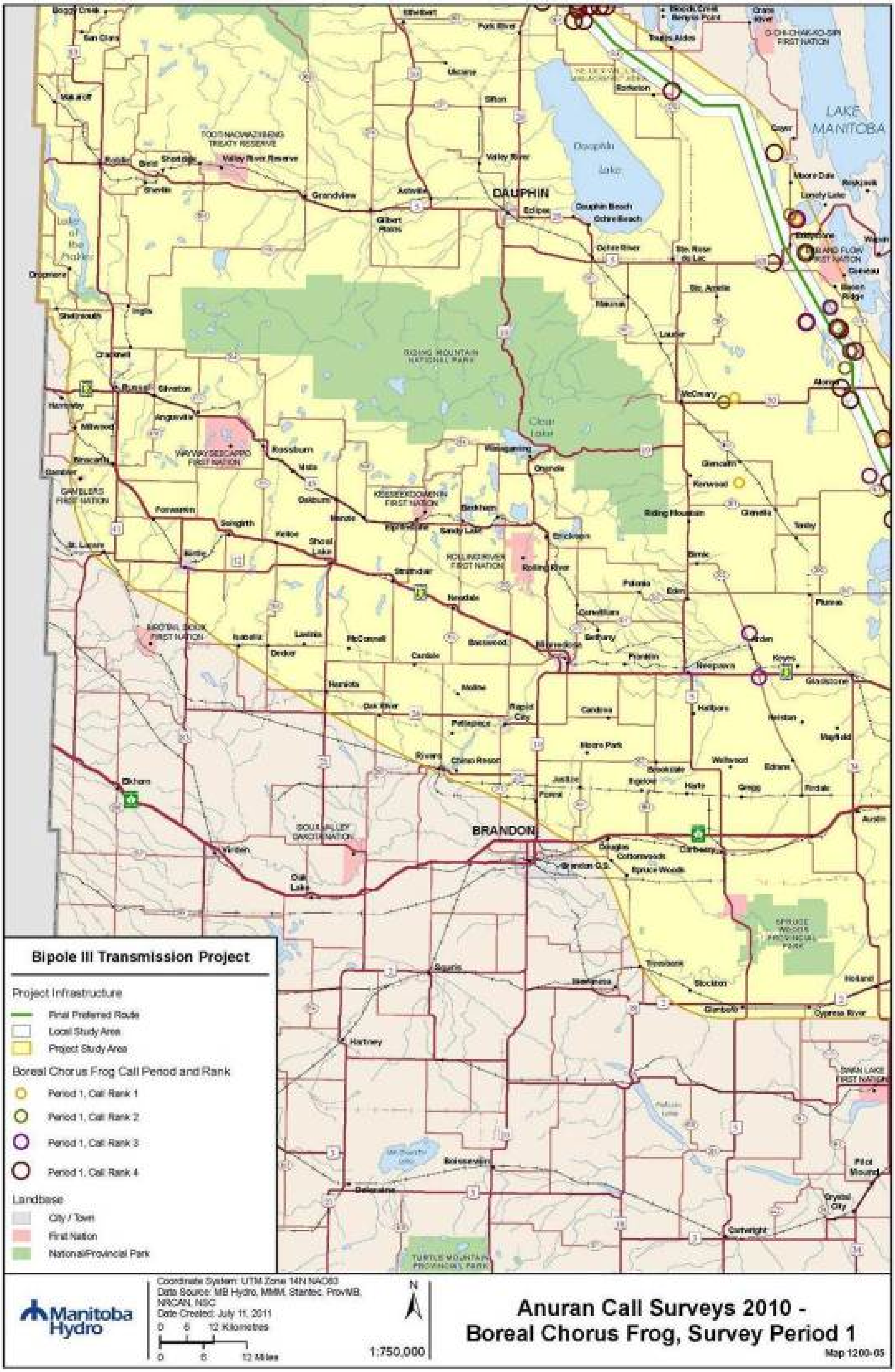


Map Series 1200-2. Bipole III anuran call survey results for boreal chorus frog, survey period 1.

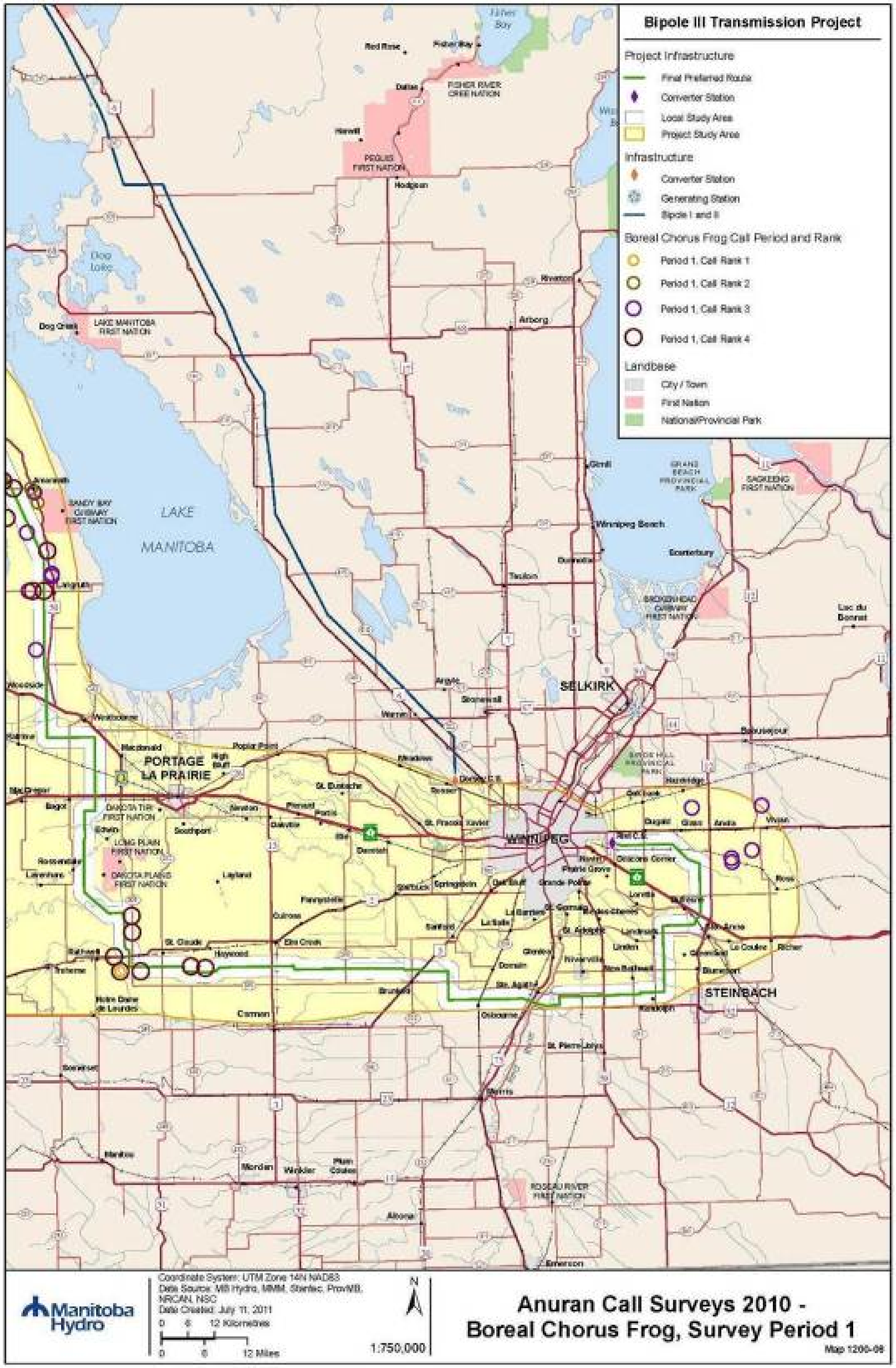


Map Series 1200-3. Bipole III anuran call survey results for boreal chorus frog, survey period 1.

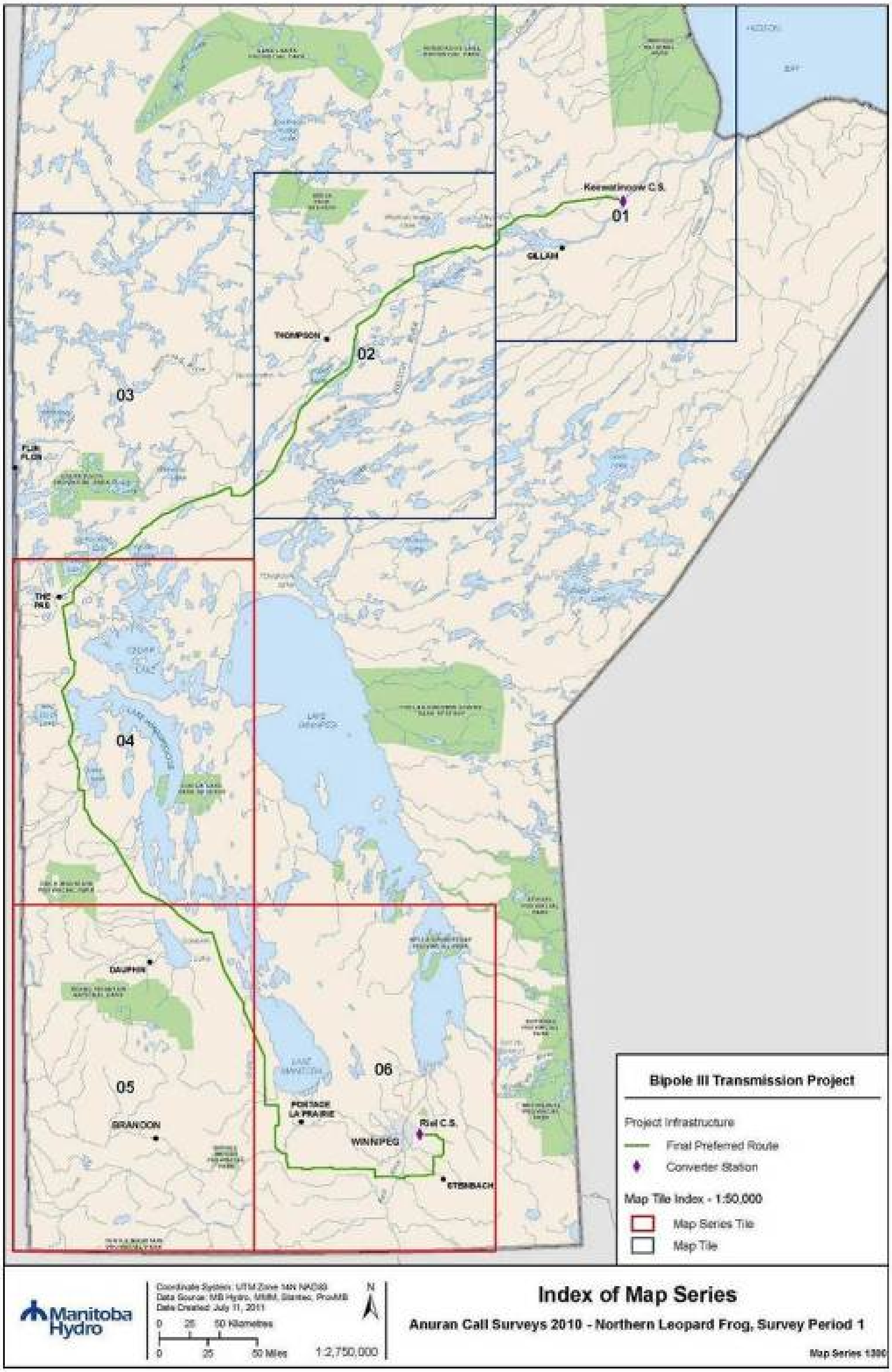
Map Series 1200-4. Bipole III anuran call survey results for boreal chorus frog, survey period 1.



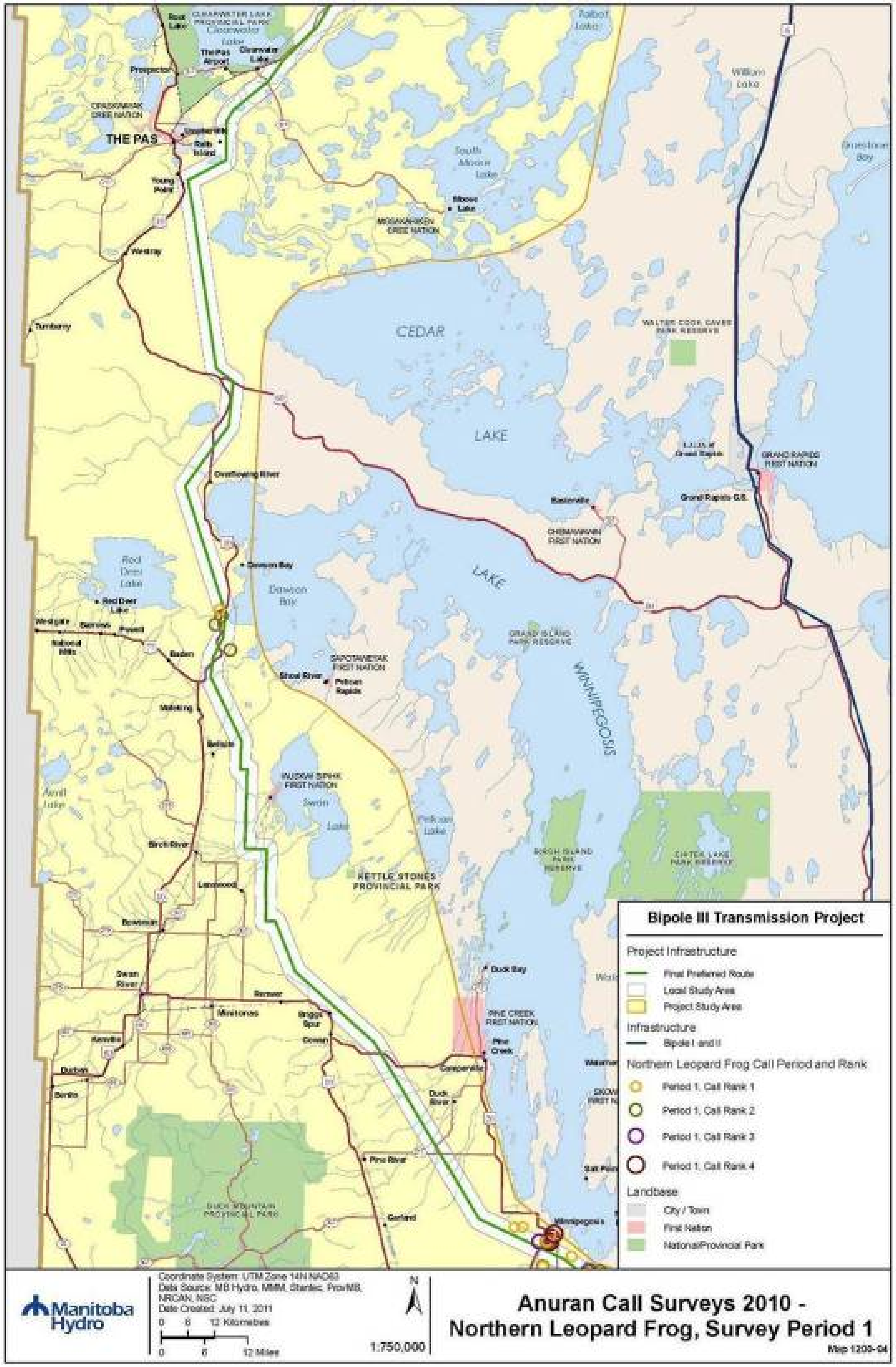
Map Series 1200-5. Bipole III anuran call survey results for boreal chorus frog, survey period 1.



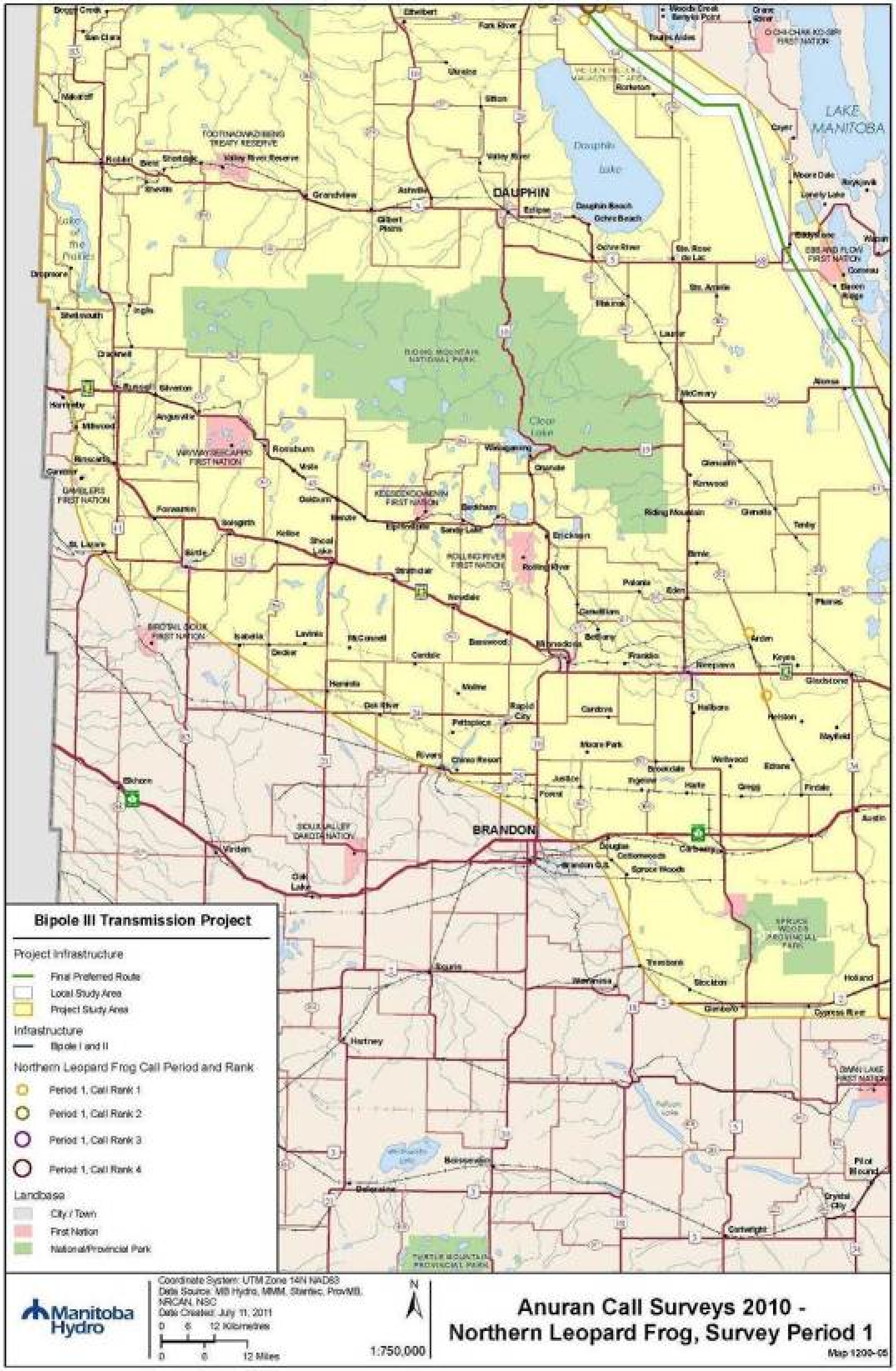
Map Series 1200-6. Bipole III anuran call survey results for boreal chorus frog, survey period 1.



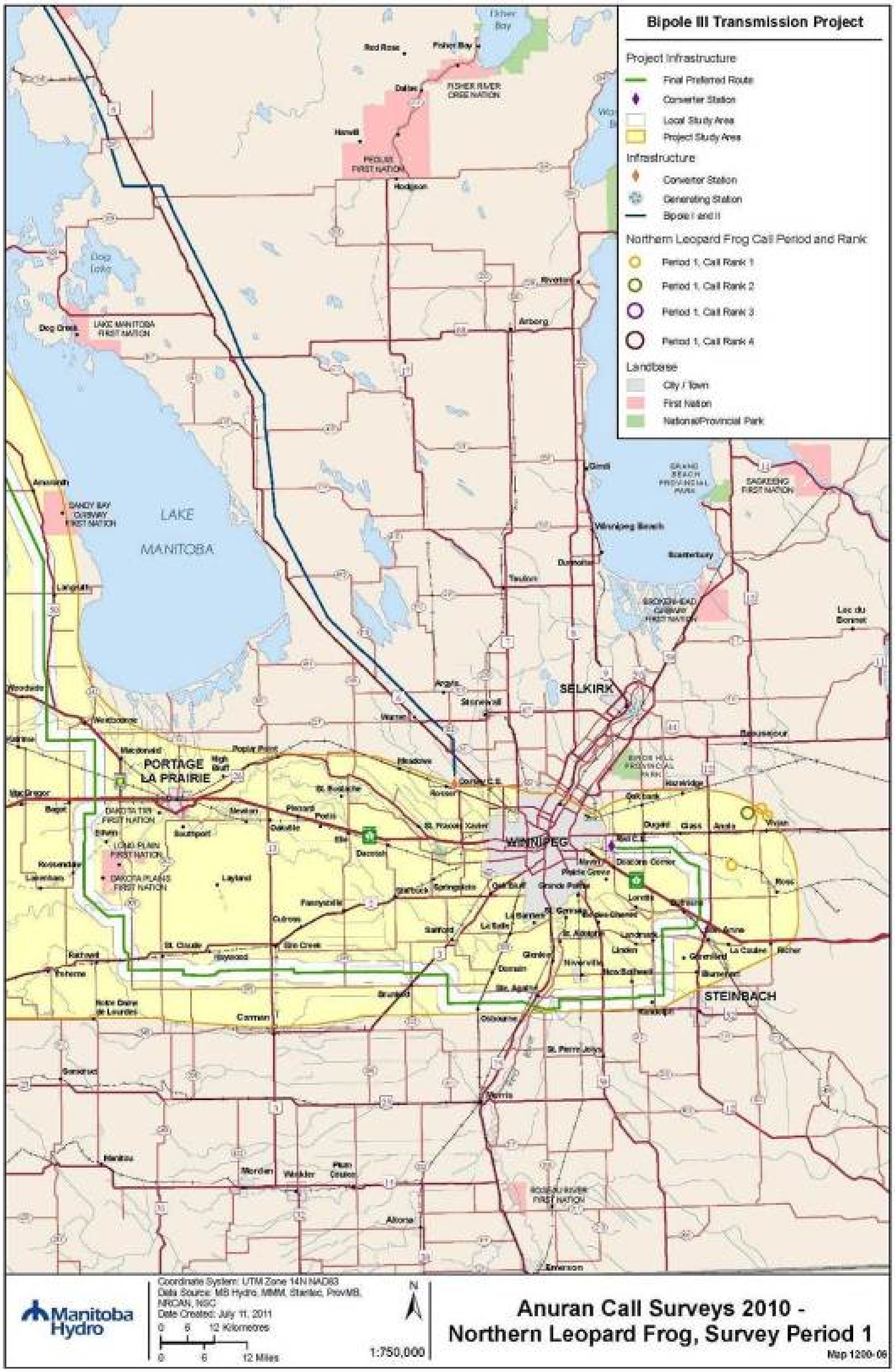
Map Series 1300. Index map for Bipole III anuran call survey results for northern leopard frog, survey period 1.



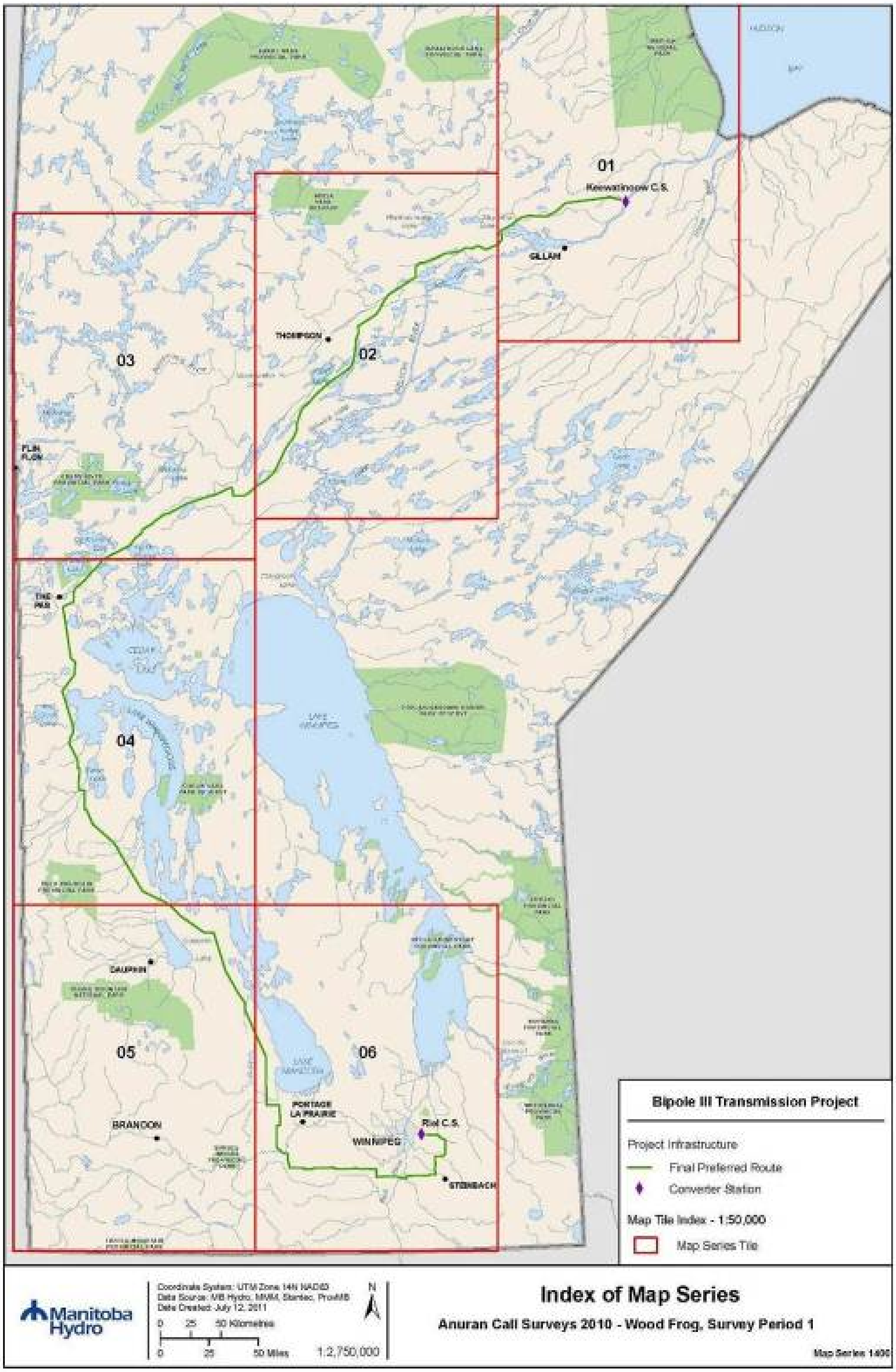
Map Series 1300-1. Bipole III anuran call survey results for northern leopard frog, survey period 1.



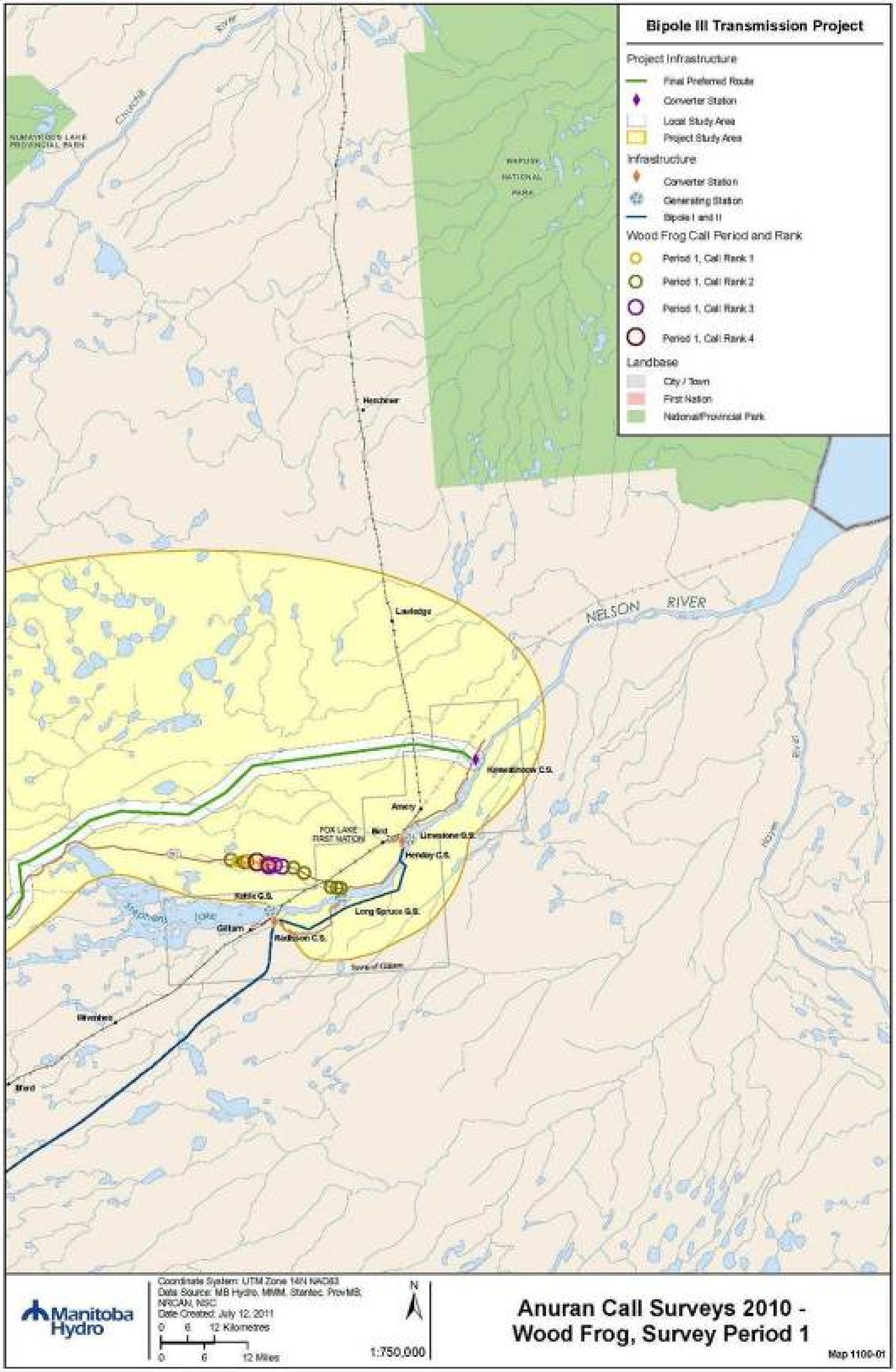
Map Series 1300-2. Bipole III anuran call survey results for northern leopard frog, survey period 1.



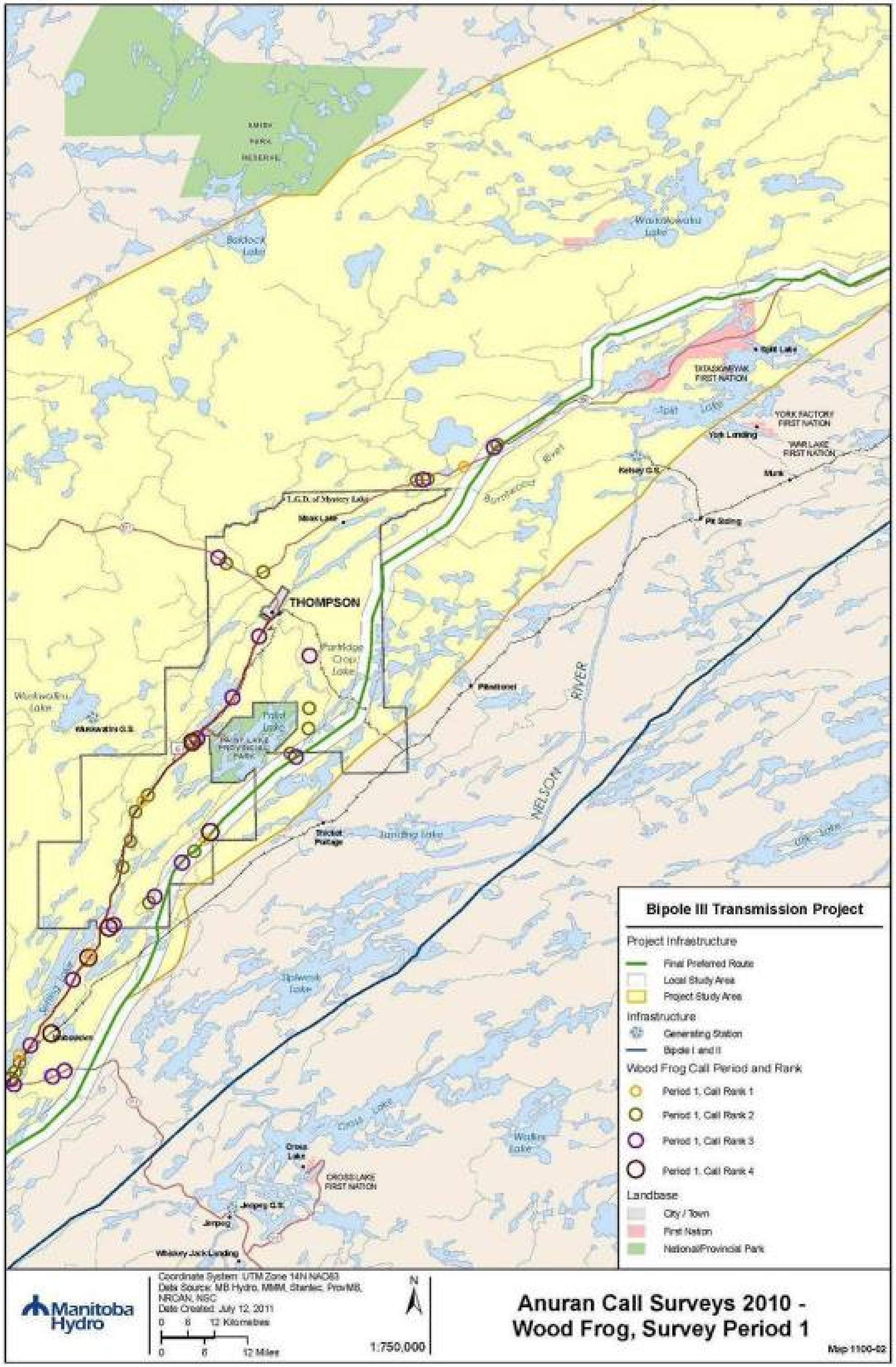
Map Series 1300-3. Bipole III anuran call survey results for northern leopard frog, survey period 1.



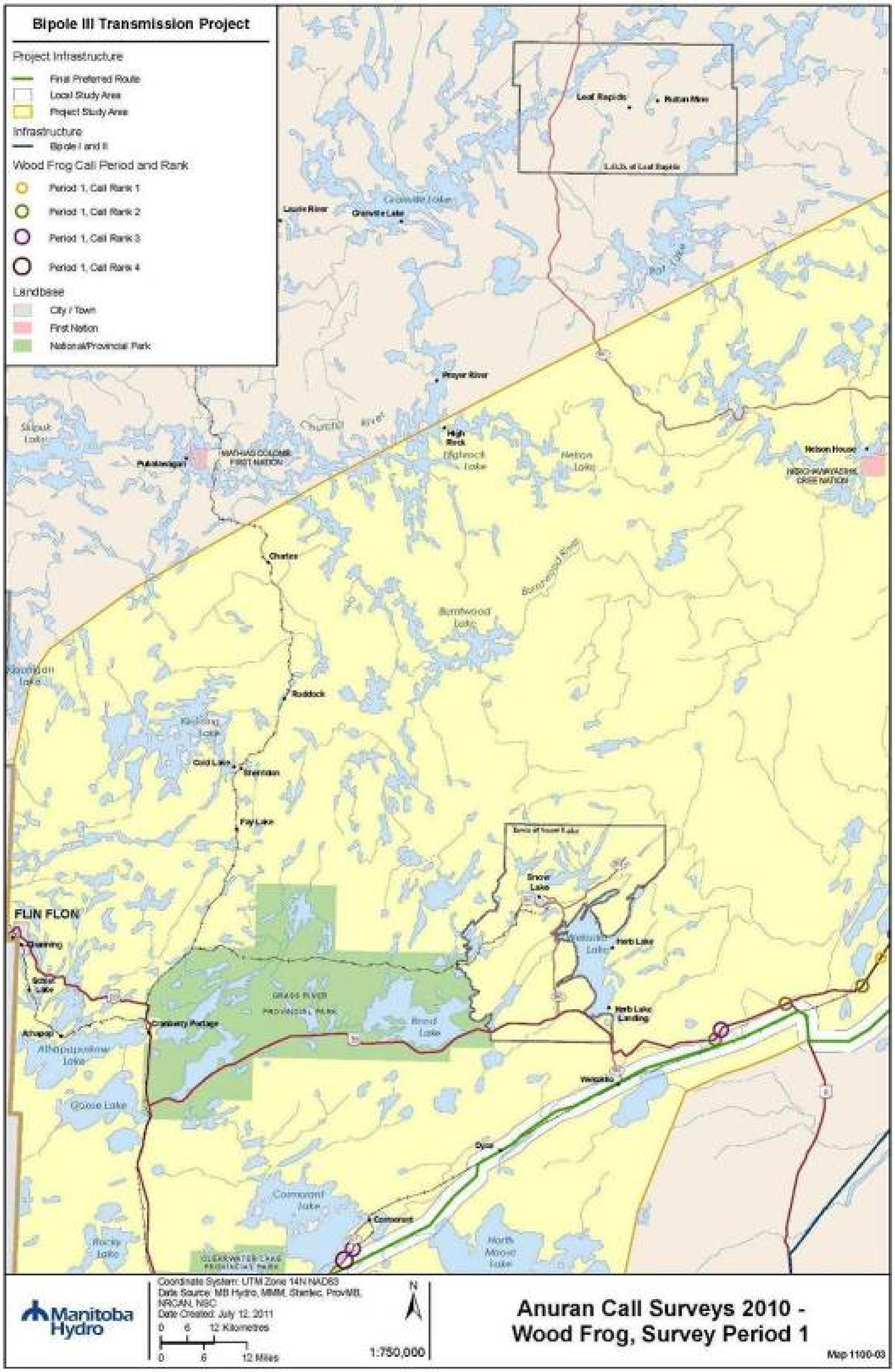
Map Series 1400. Index map for Bipole III anuran call survey results for wood frog, survey period 1.



Map Series 1400-1. Bipole III anuran call survey results for wood frog, survey period 1.

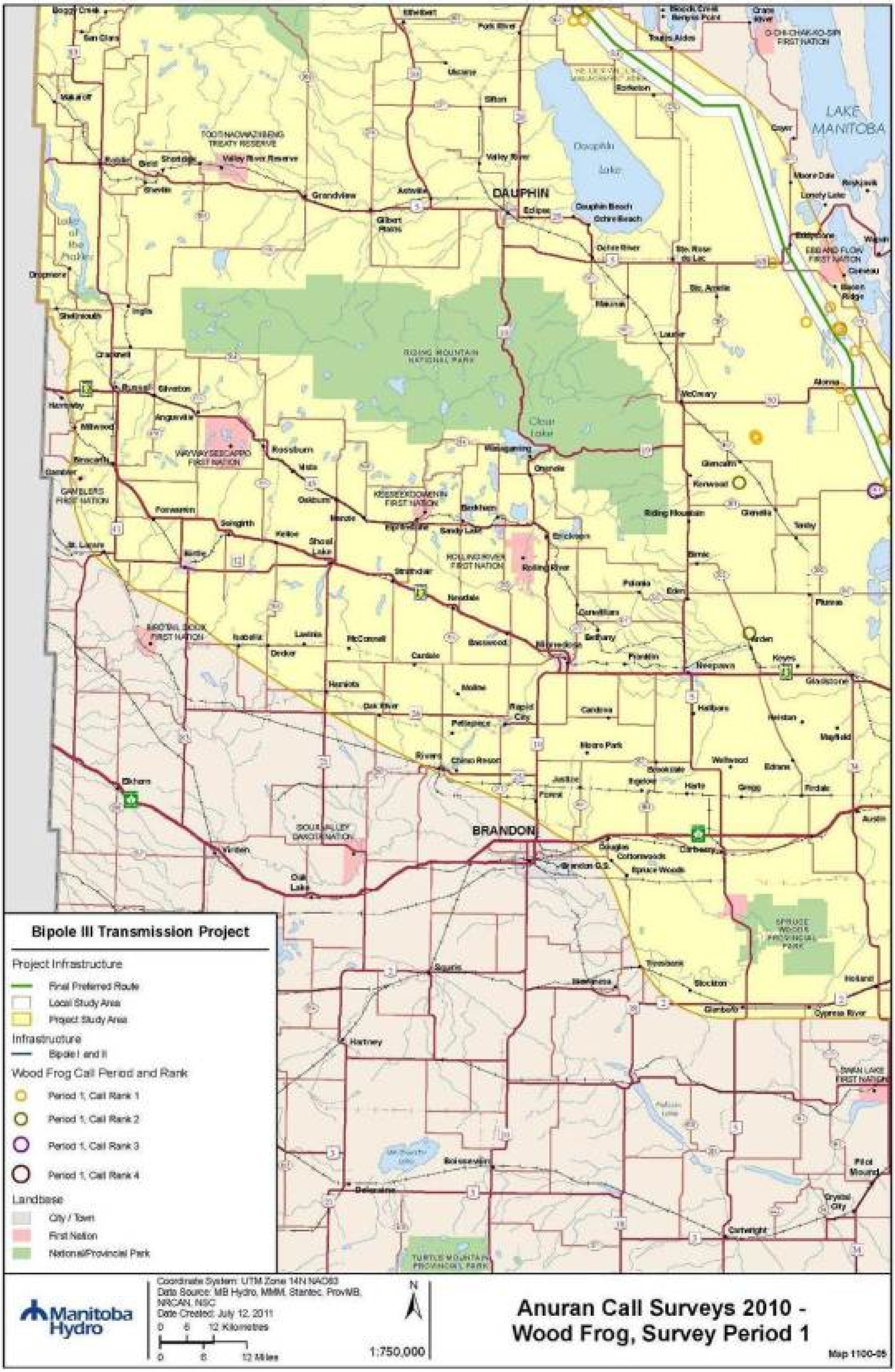


Map Series 1400-2. Bipole III anuran call survey results for wood frog, survey period 1.

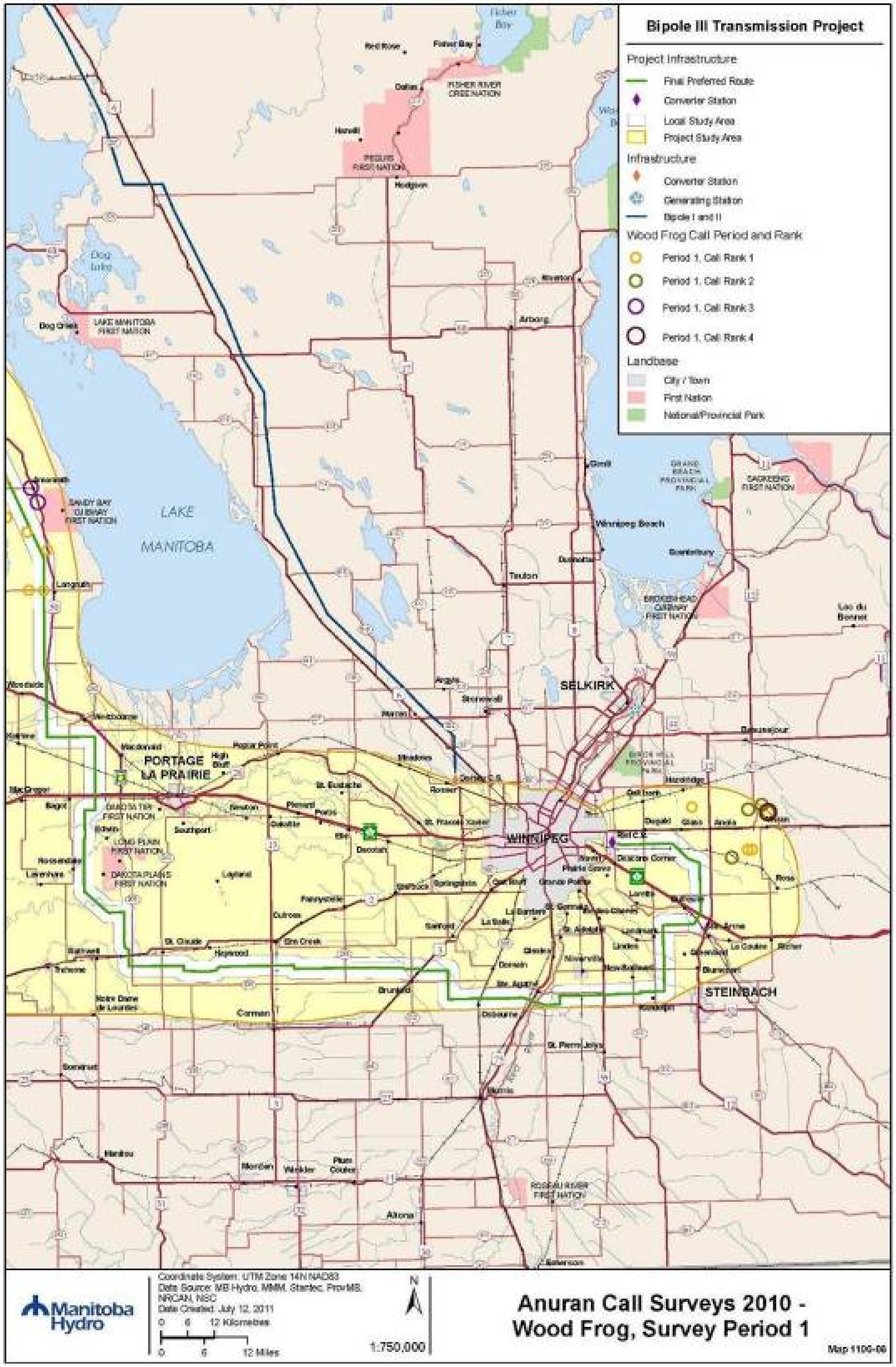


Map Series 1400-3. Bipole III anuran call survey results for wood frog, survey period 1.

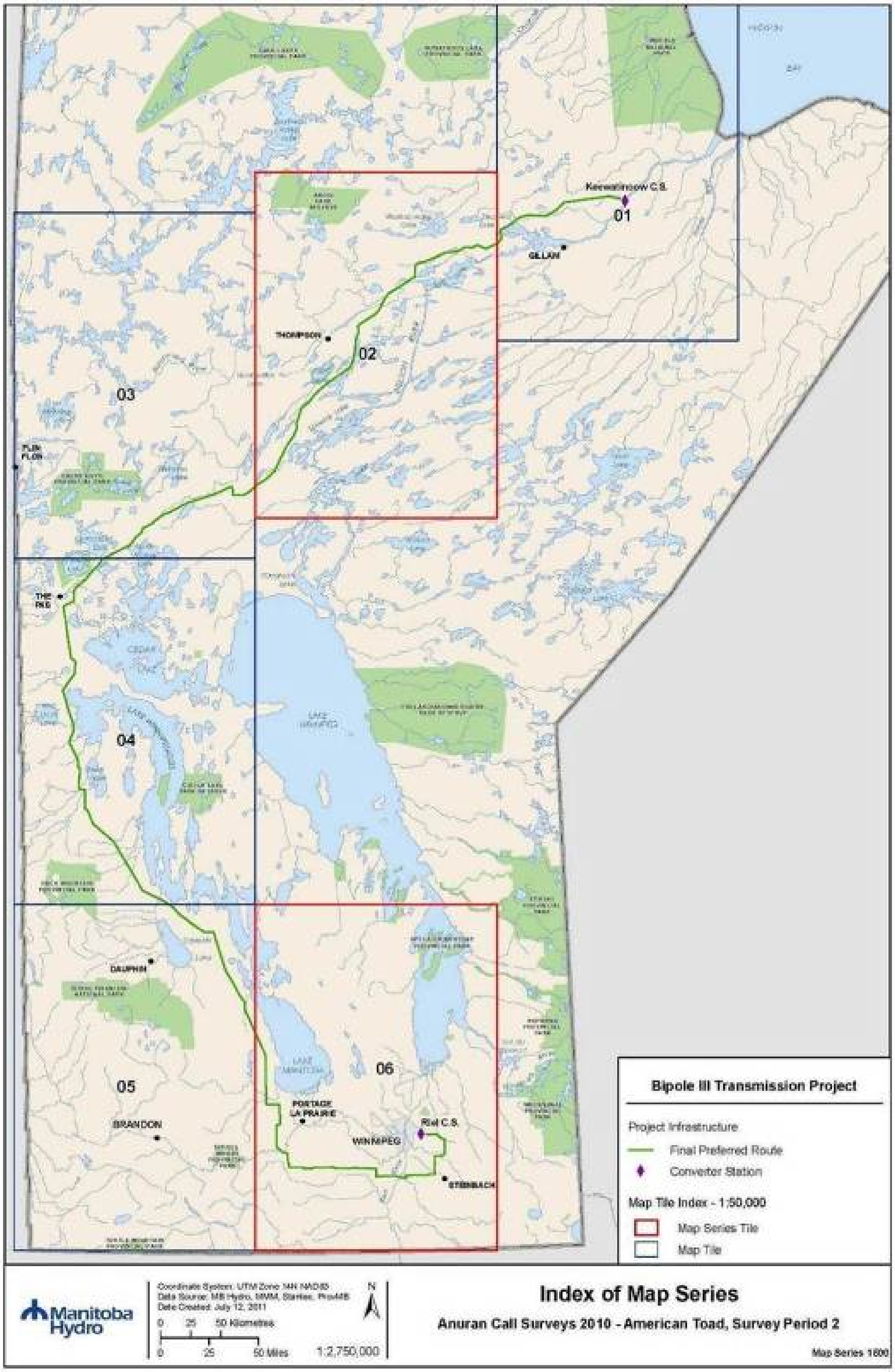
Map Series 1400-4. Bipole III anuran call survey results for wood frog, survey period 1.



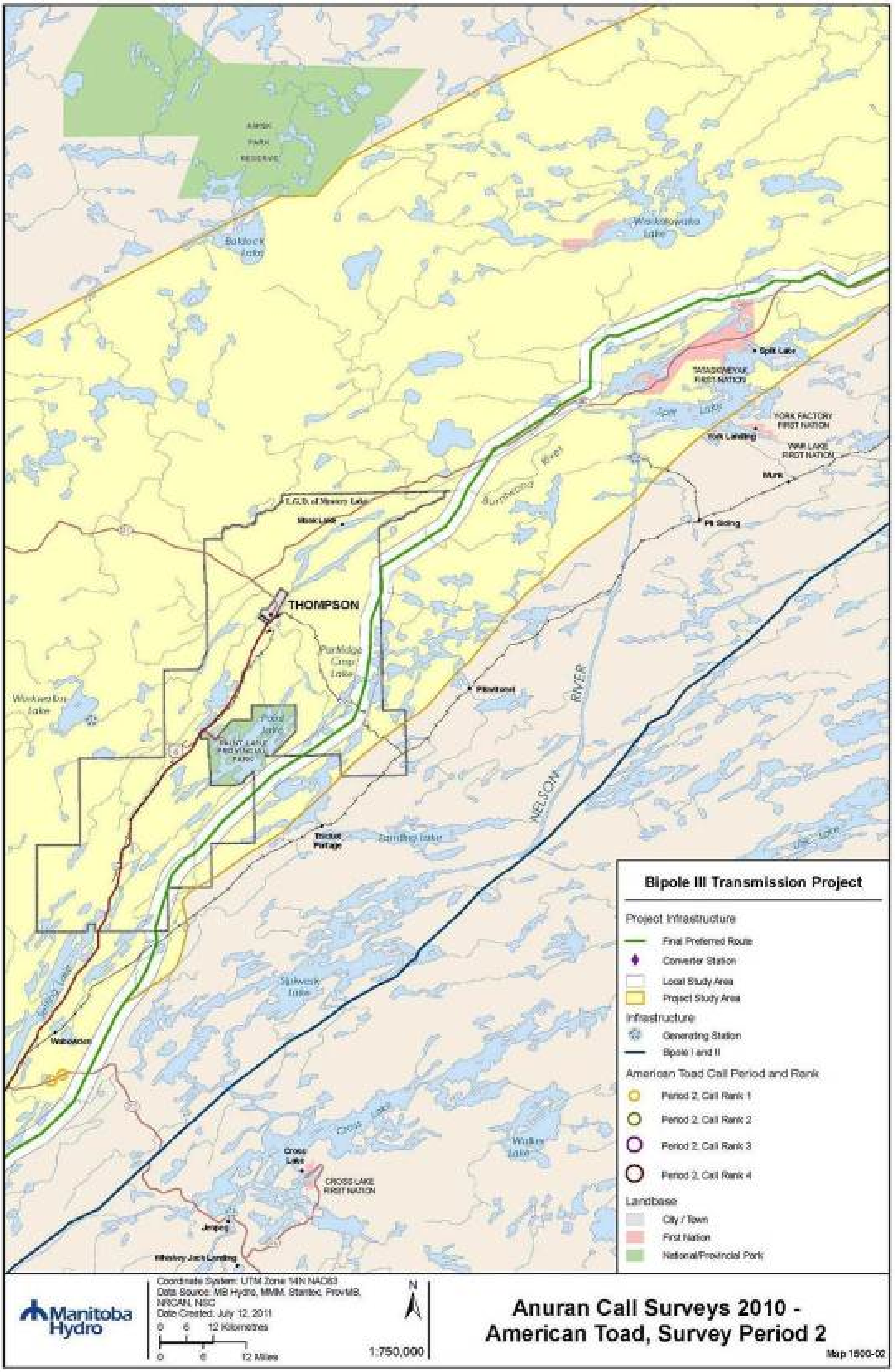
Map Series 1400-5. Bipole III anuran call survey results for wood frog, survey period 1.



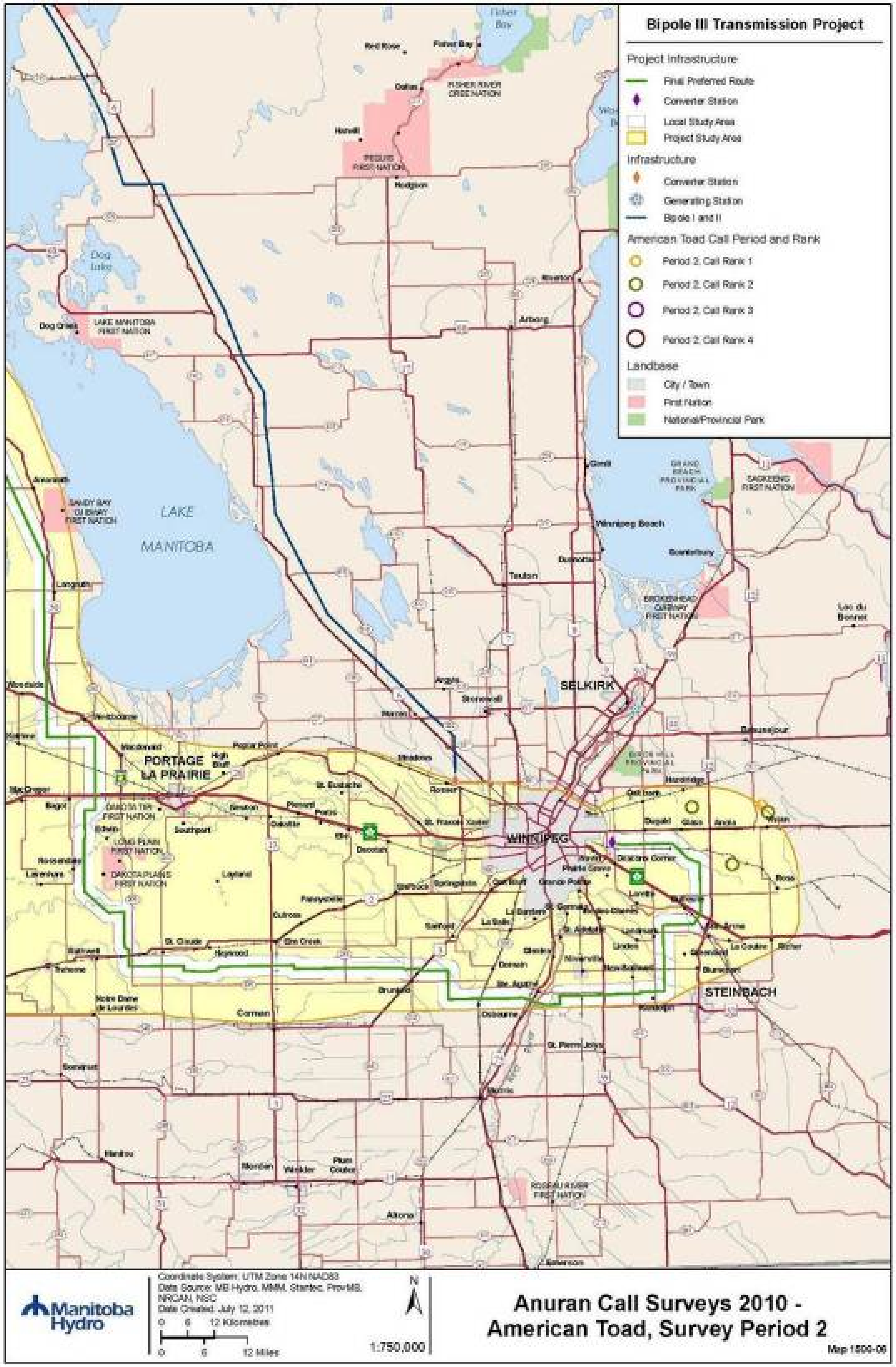
Map Series 1400-6. Bipole III anuran call survey results for wood frog, survey period 1.



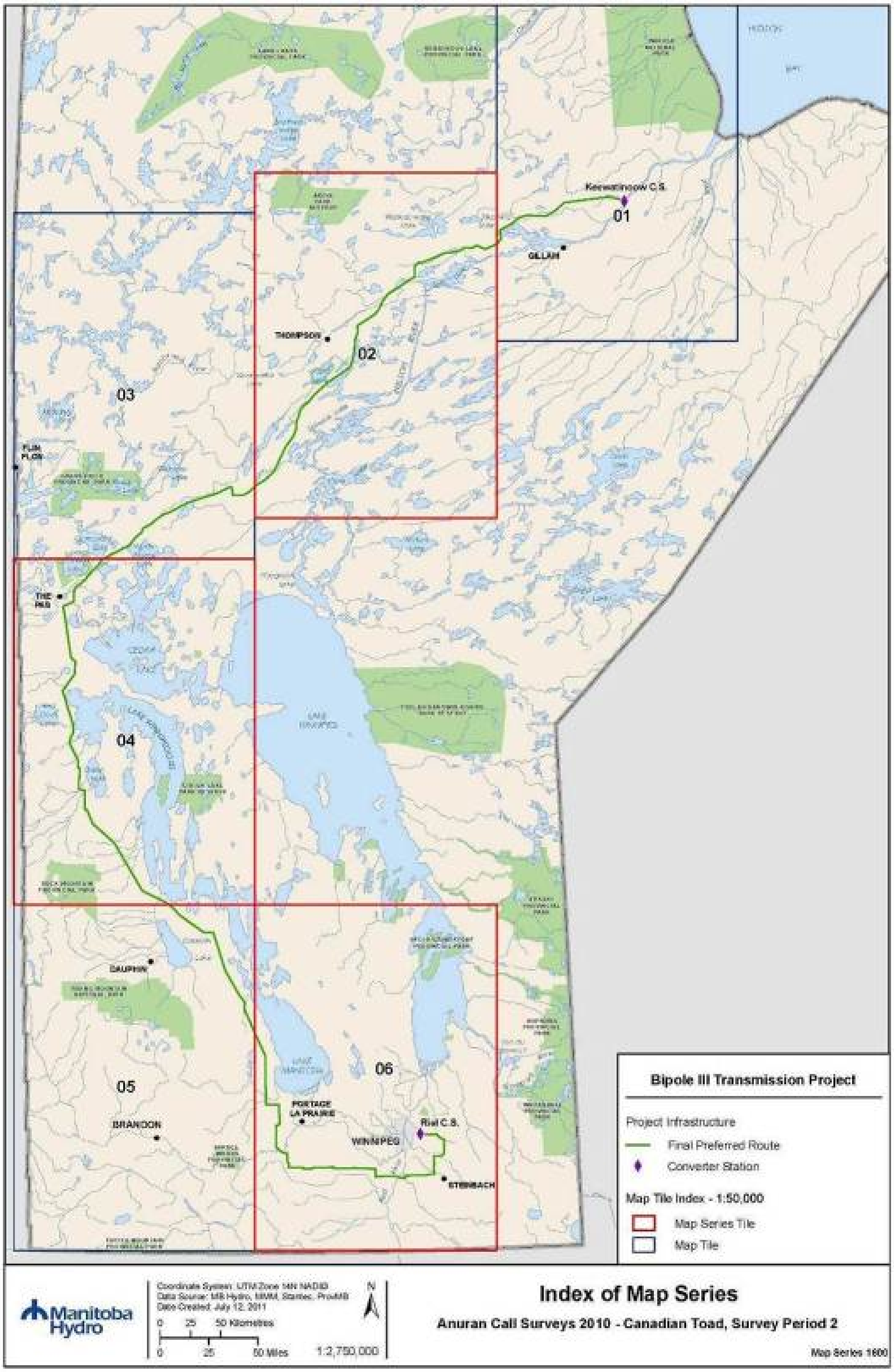
Map Series 1500. Index map for Bipole III anuran call survey results for American toad, survey period 2.



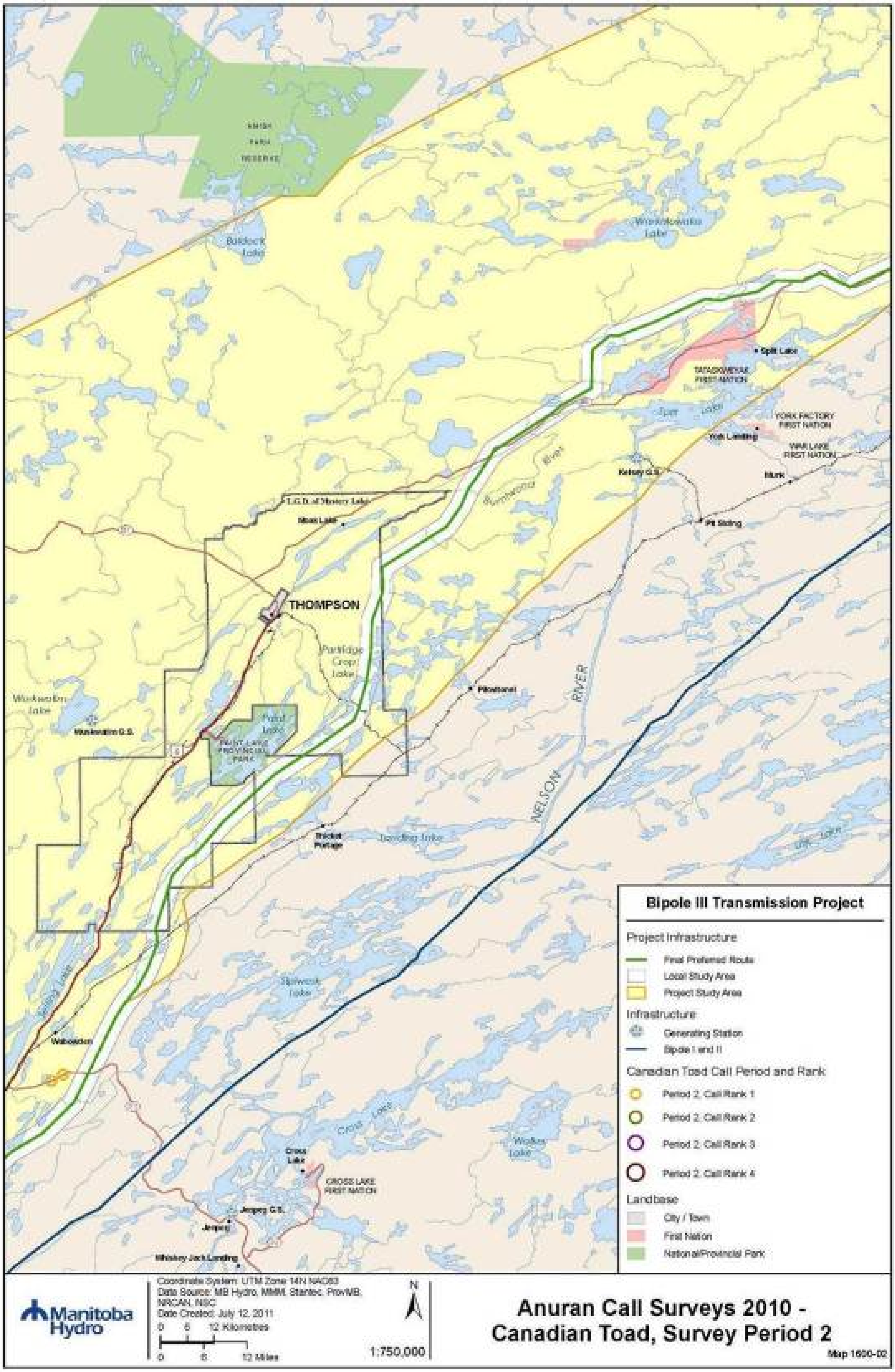
Map Series 1500-1. Bipole III anuran call survey results for American toad, survey period 2.



Map Series 1500-2. Bipole III anuran call survey results for American toad, survey period 2.

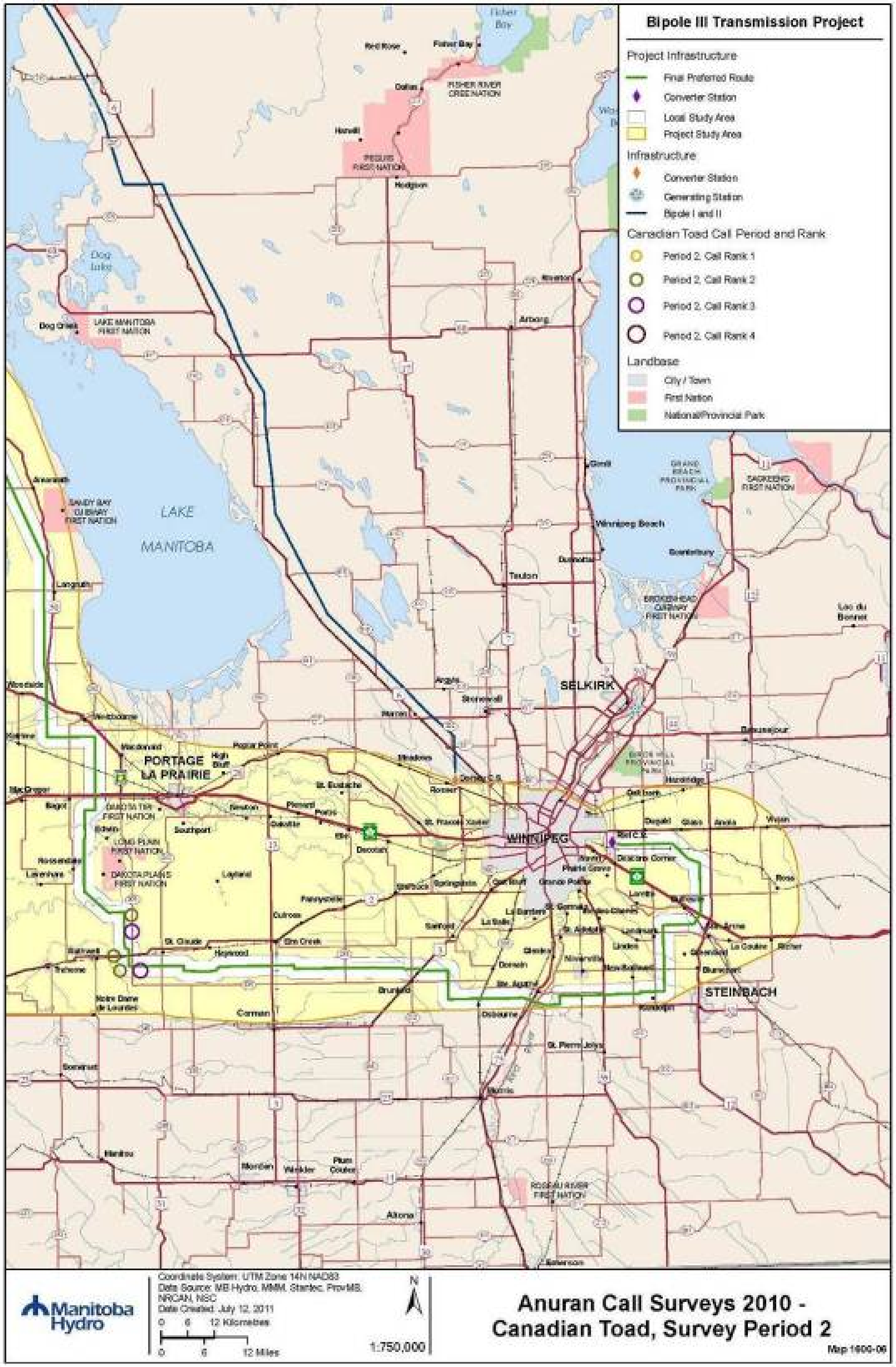


Map Series 1600. Index map for Bipole III anuran call survey results for Canadian toad, survey period 2.

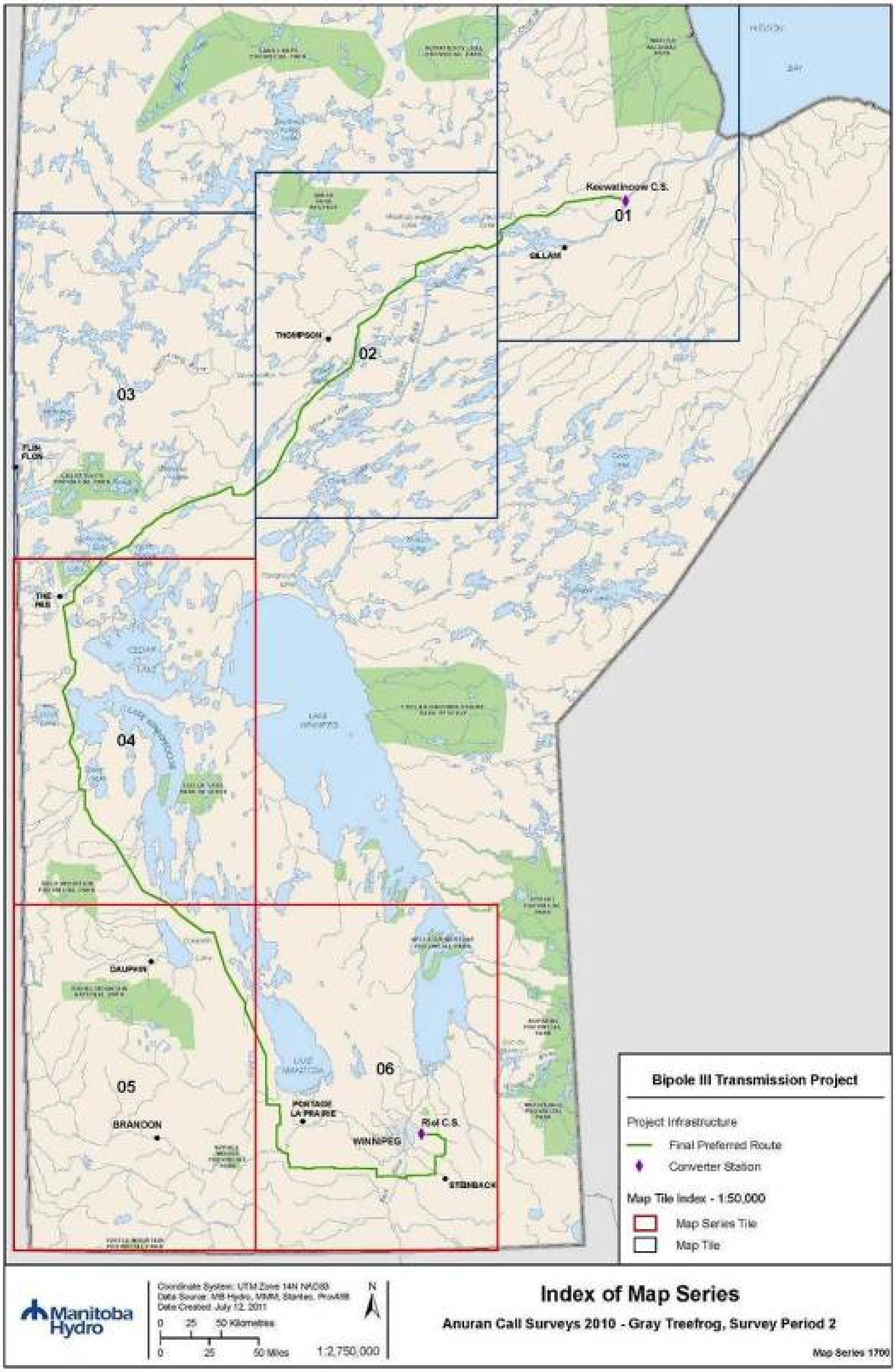


Map Series 1600-1. Bipole III anuran call survey results for Canadian toad, survey period 2.

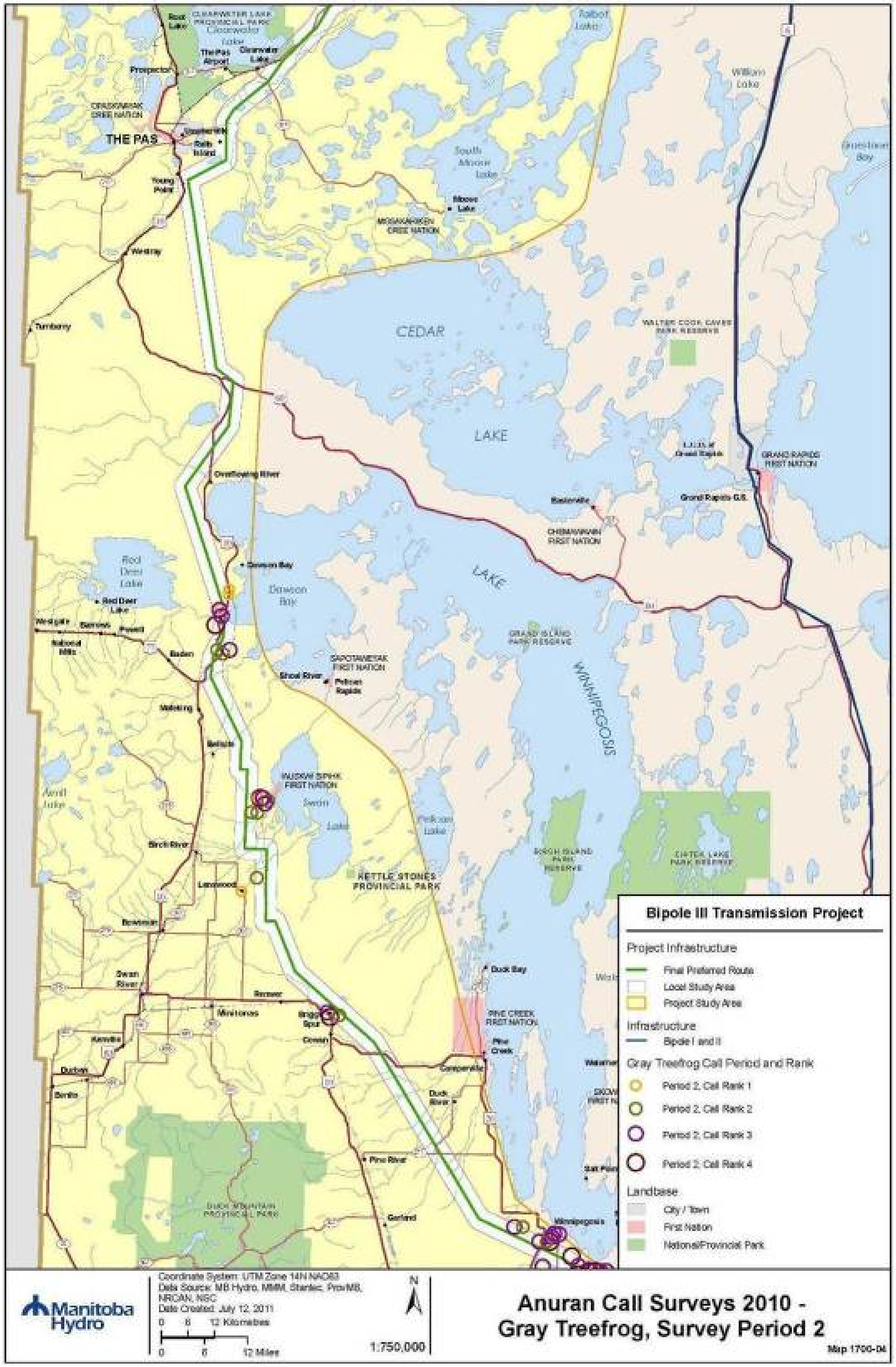
Map Series 1600-2. Bipole III anuran call survey results for Canadian toad, survey period 2.



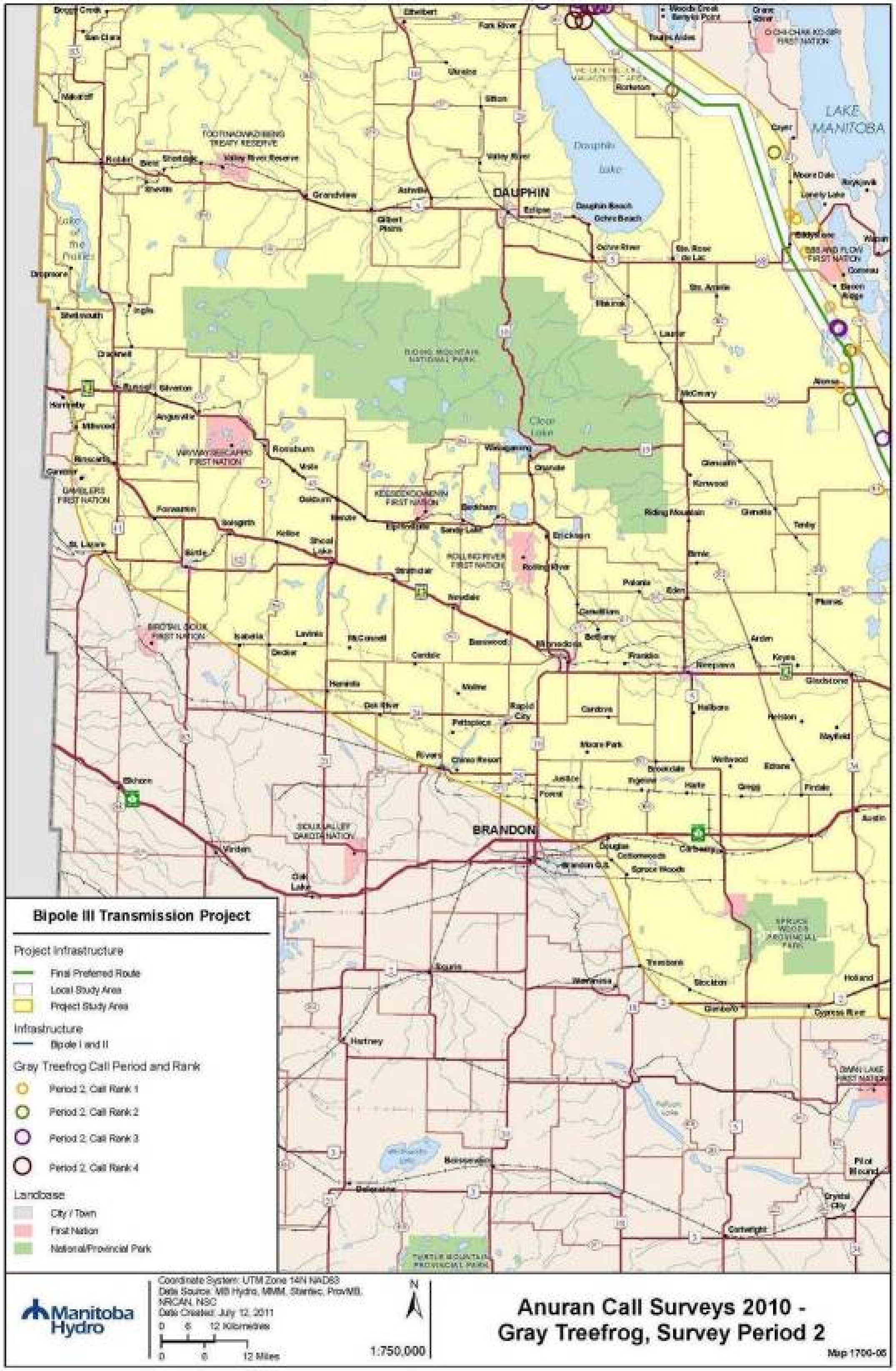
Map Series 1600-3. Bipole III anuran call survey results for Canadian toad, survey period 2.



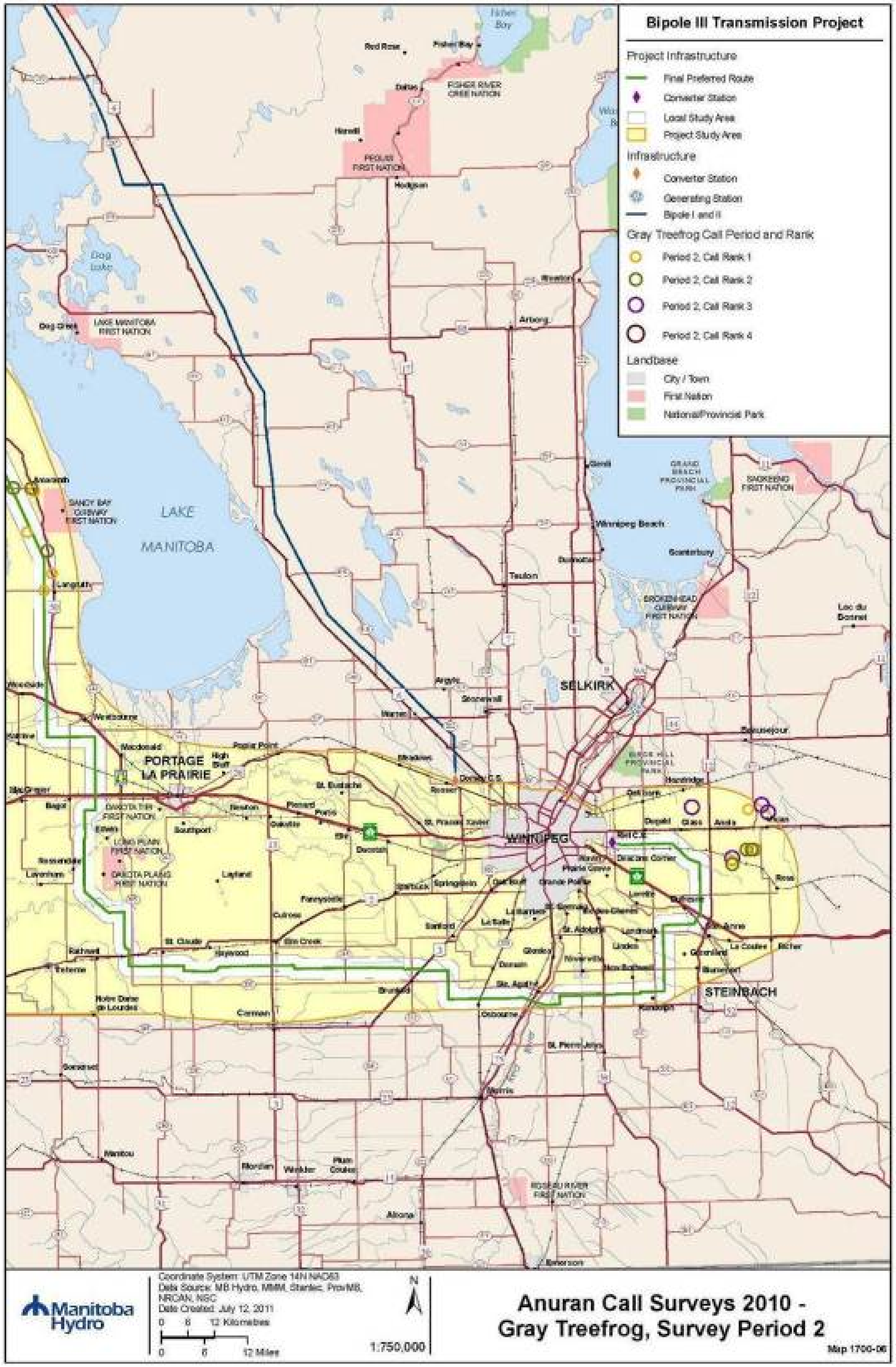
Map Series 1700. Index map for Bipole III anuran call survey results for gray treefrog, survey period 2.



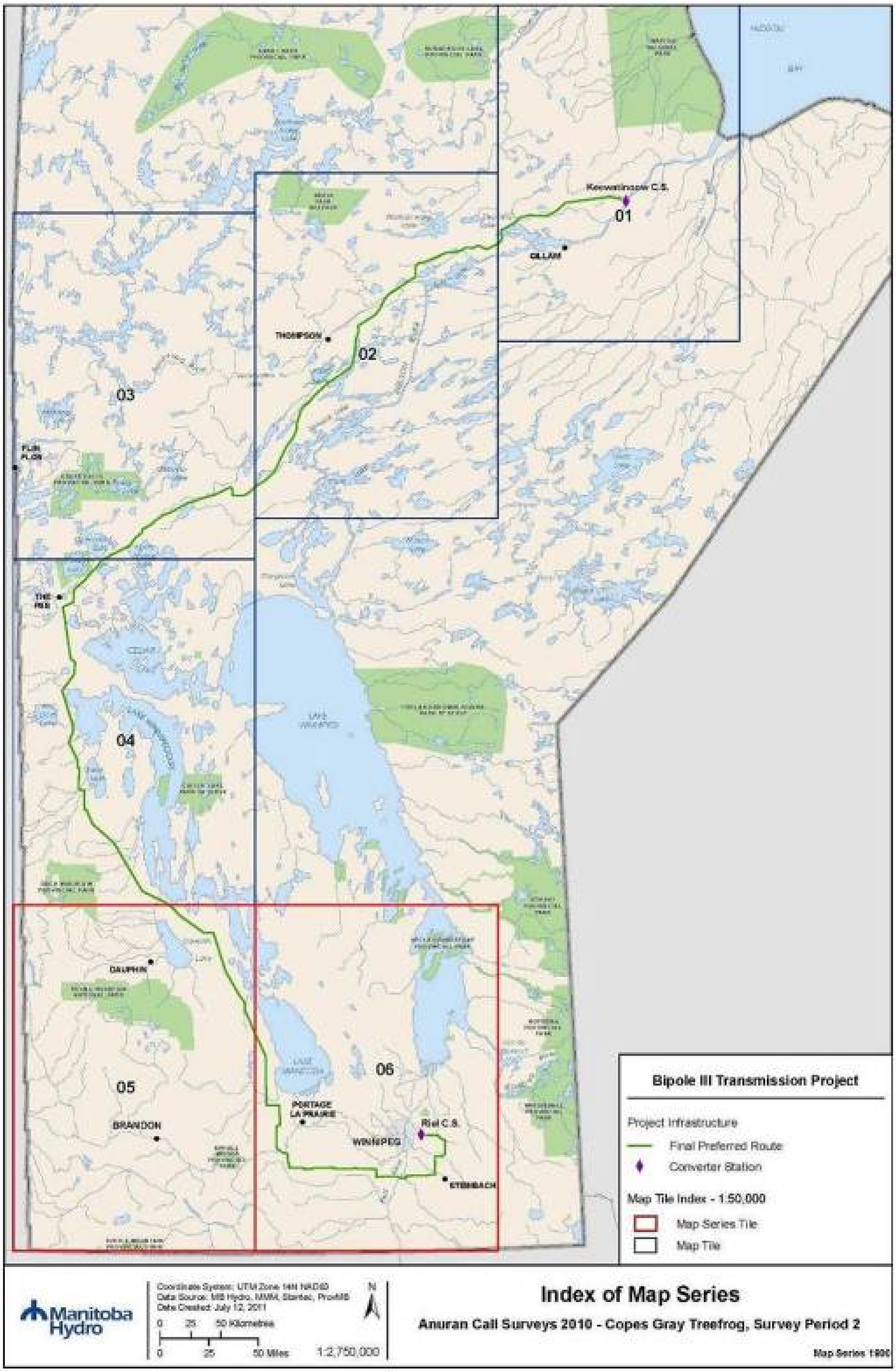
Map Series 1700-1. Bipole III anuran call survey results for gray treefrog, survey period 2.



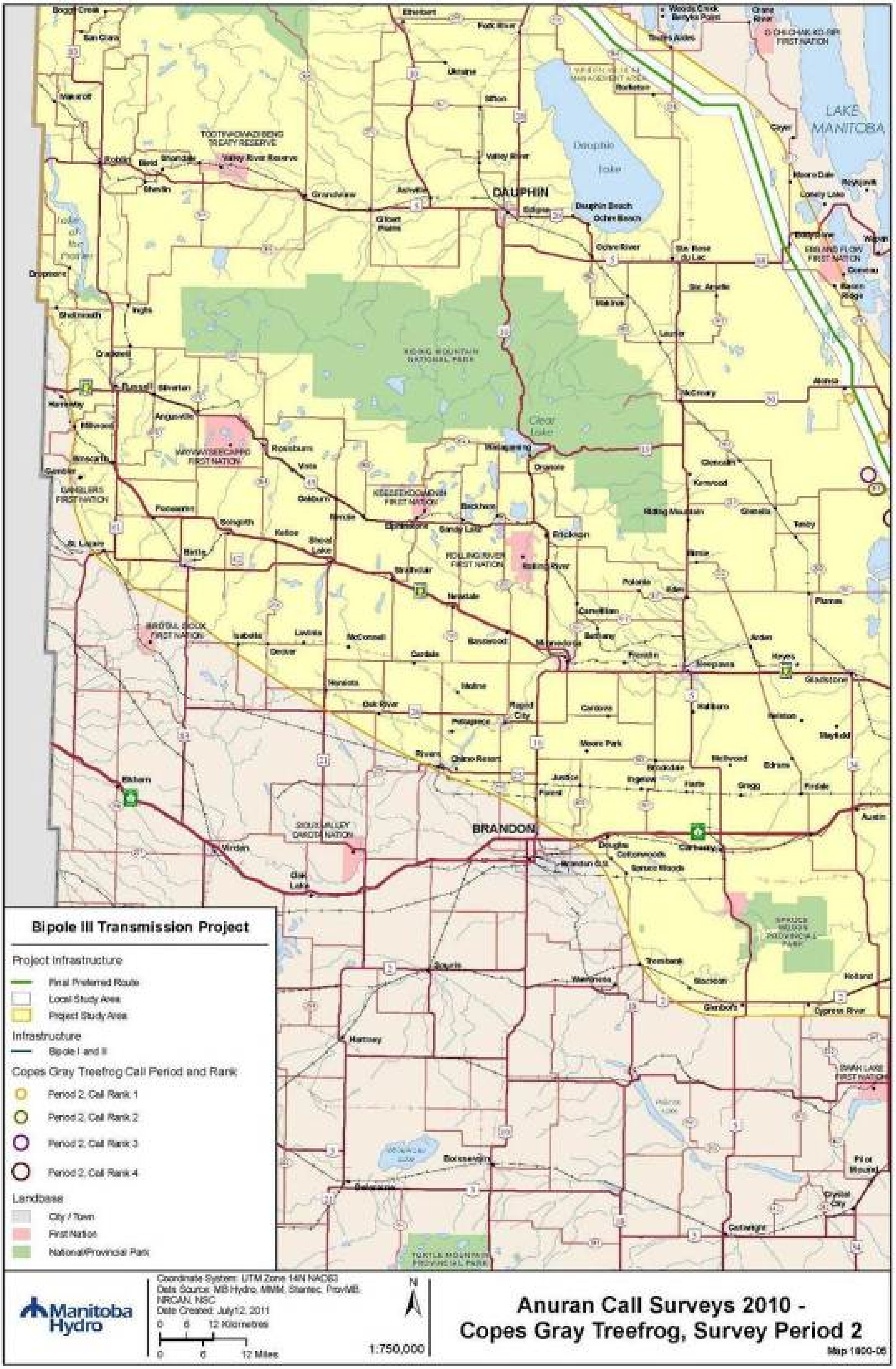
Map Series 1700-2. Bipole III anuran call survey results for gray treefrog, survey period 2.



Map Series 1700-3. Bipole III anuran call survey results for gray treefrog, survey period 2.

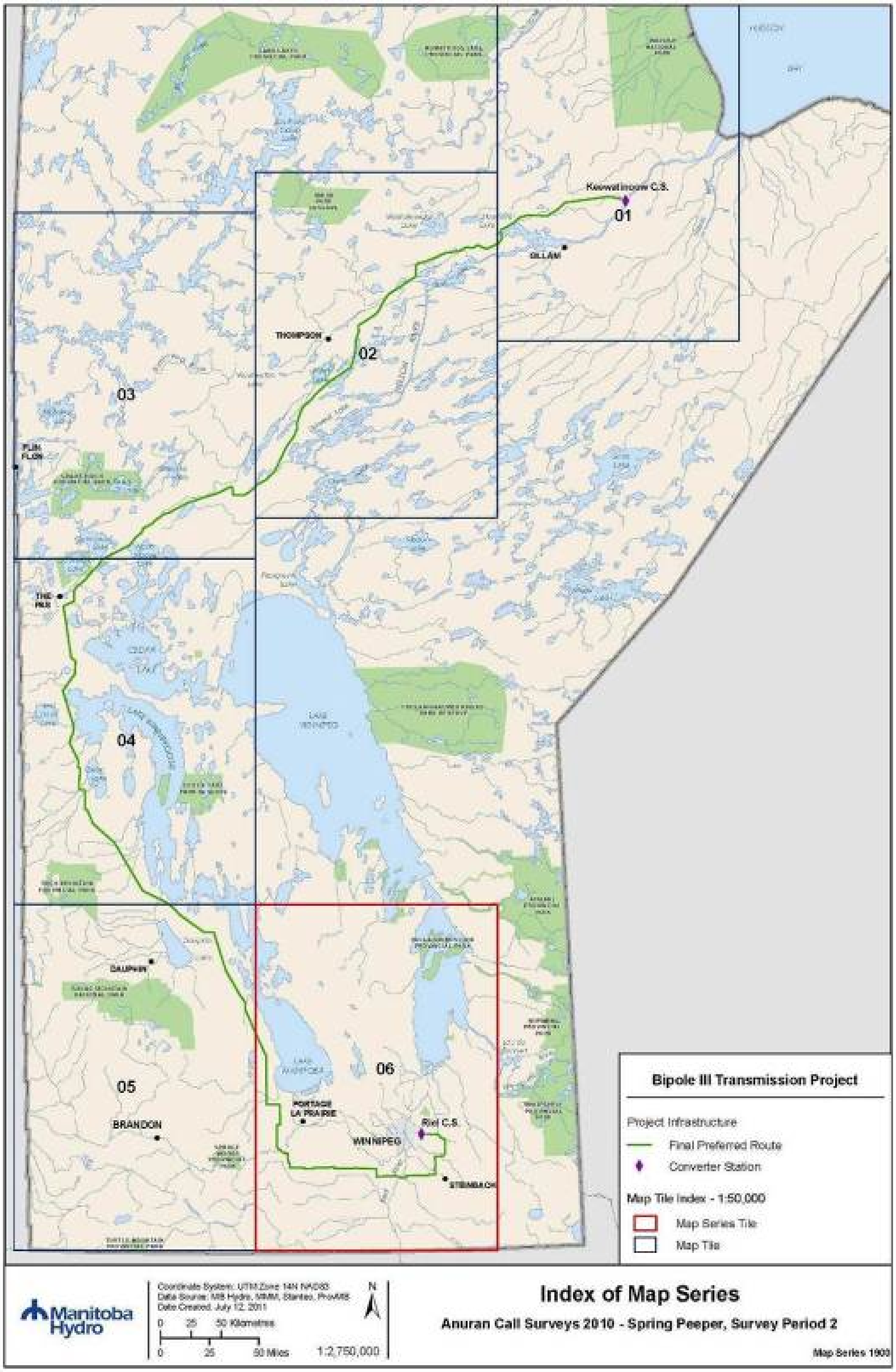


Map Series 1800. Index map for Bipole III anuran call survey results for Copes gray treefrog, survey period 2.



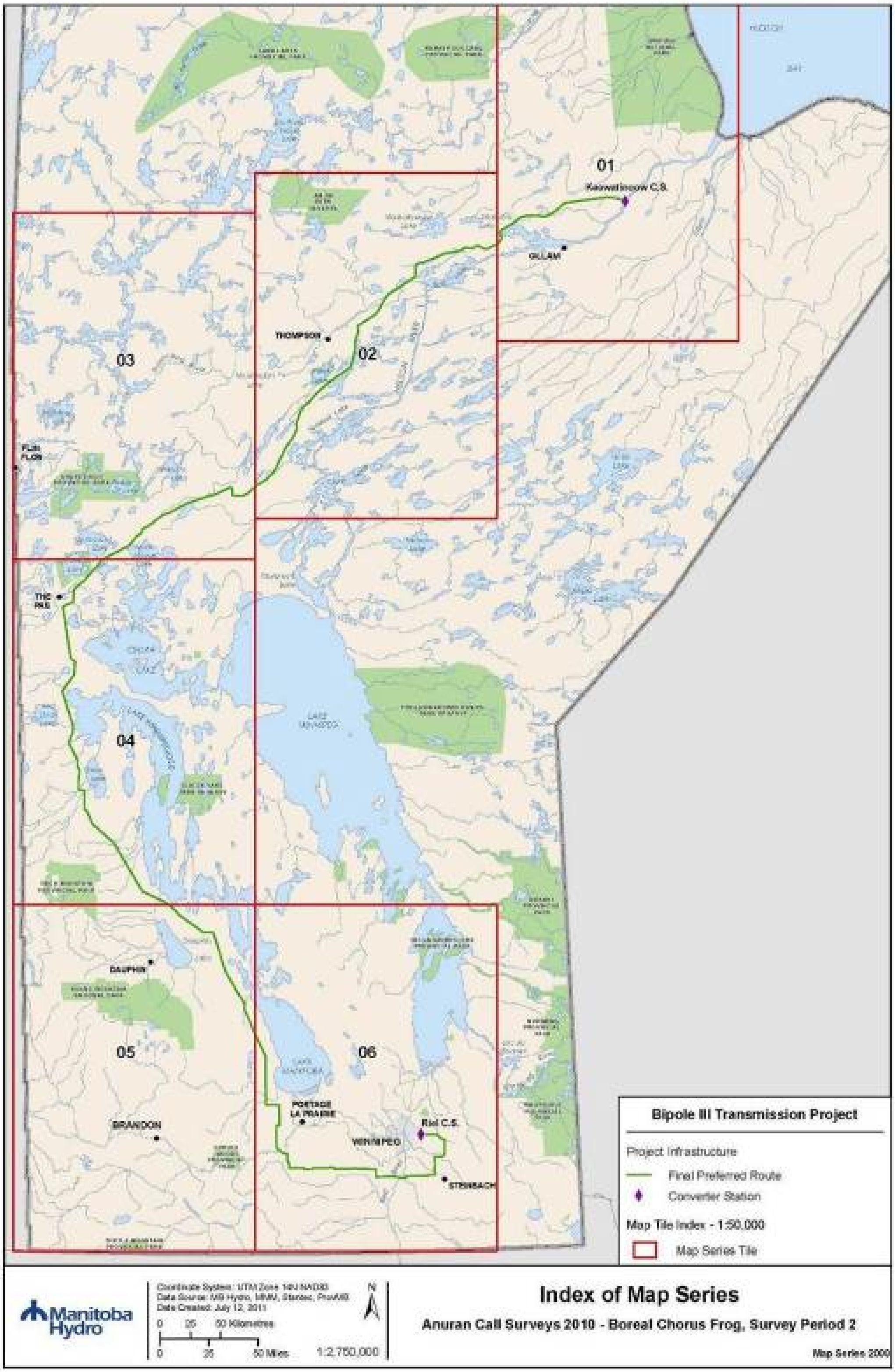
Map Series 1800-1. Bipole III anuran call survey results for Copes gray treefrog, survey period 2.

Map Series 1800-2. Bipole III anuran call survey results for Copes gray treefrog, survey period 2.

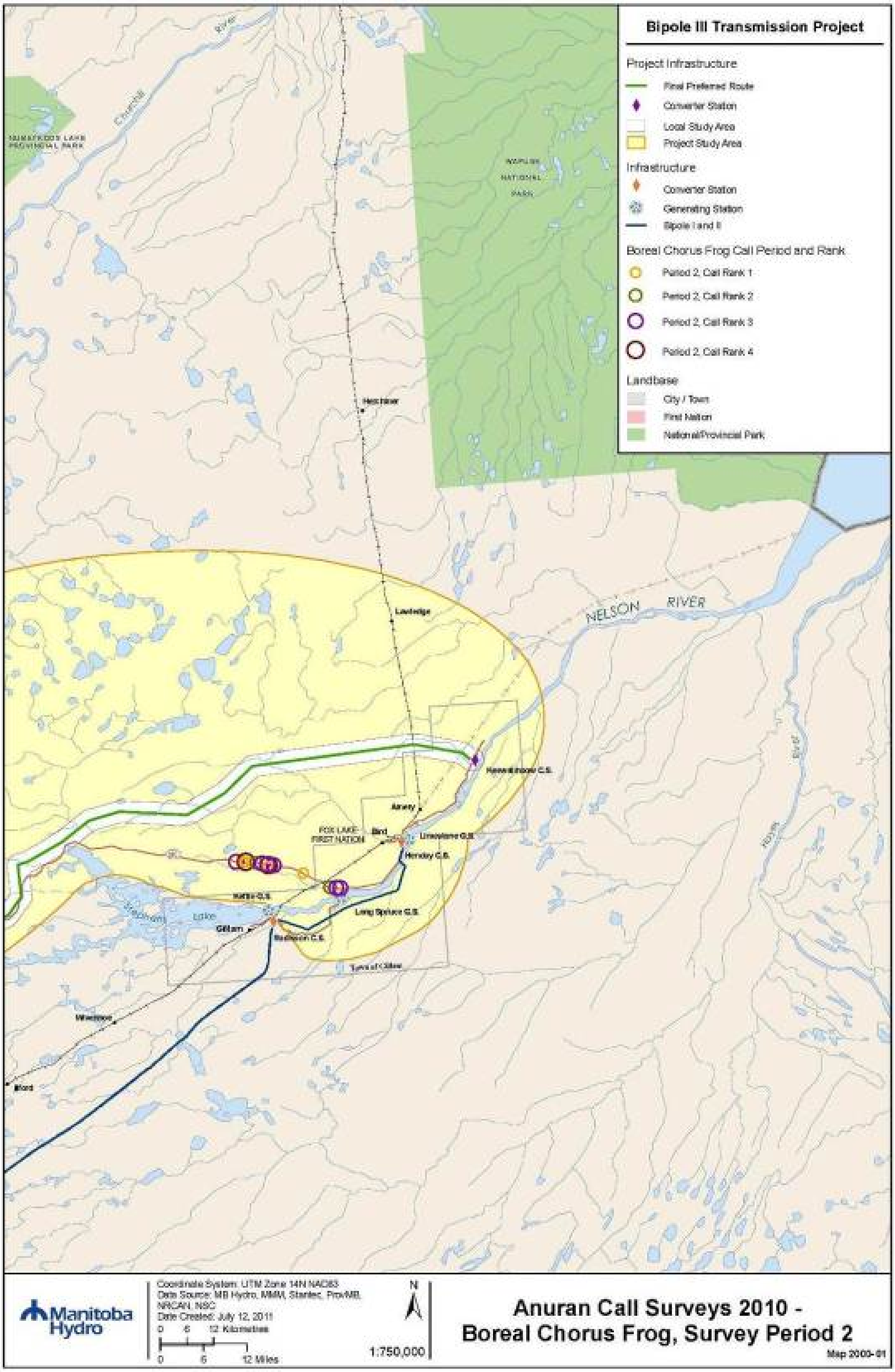


Map Series 1900. Index map for Bipole III anuran call survey results for spring peeper, survey period 2.

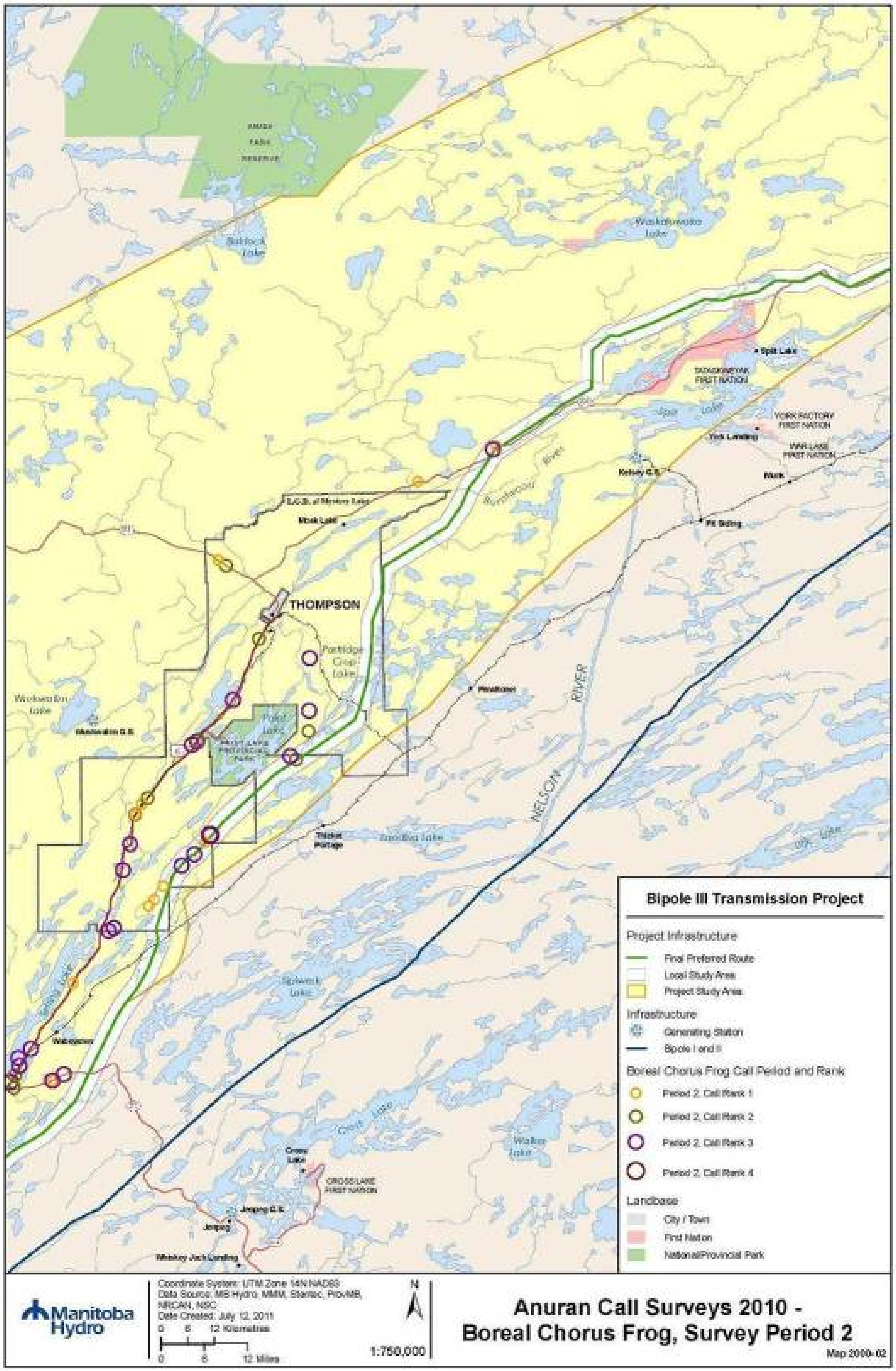
Map Series 1900-1. Bipole III anuran call survey results for spring peeper, survey period 2.



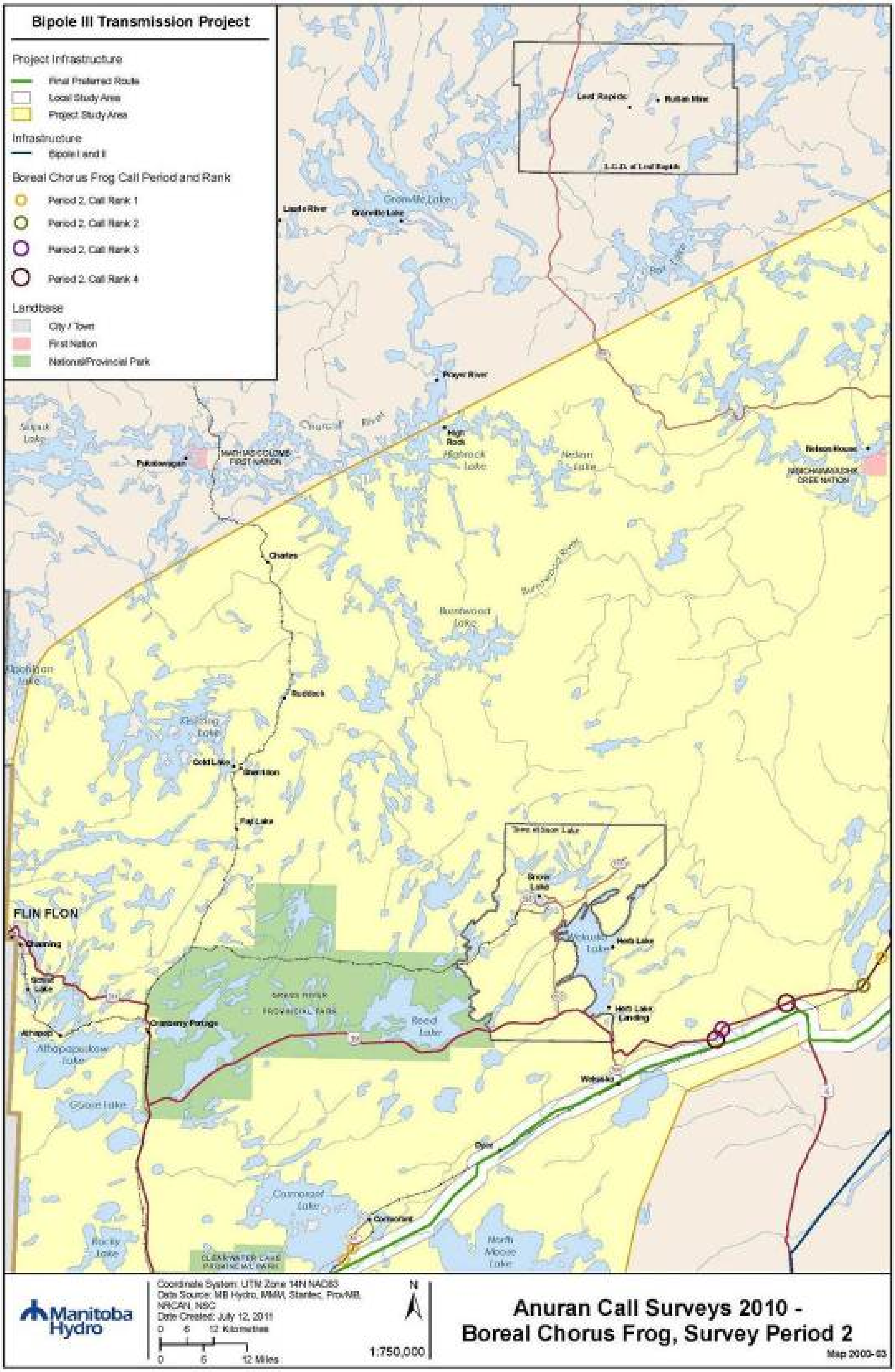
Map Series 2000. Index map for Bipole III anuran call survey results for boreal chorus frog, survey period 2.



Map Series 2000-1. Bipole III anuran call survey results for boreal chorus frog, survey period 2.

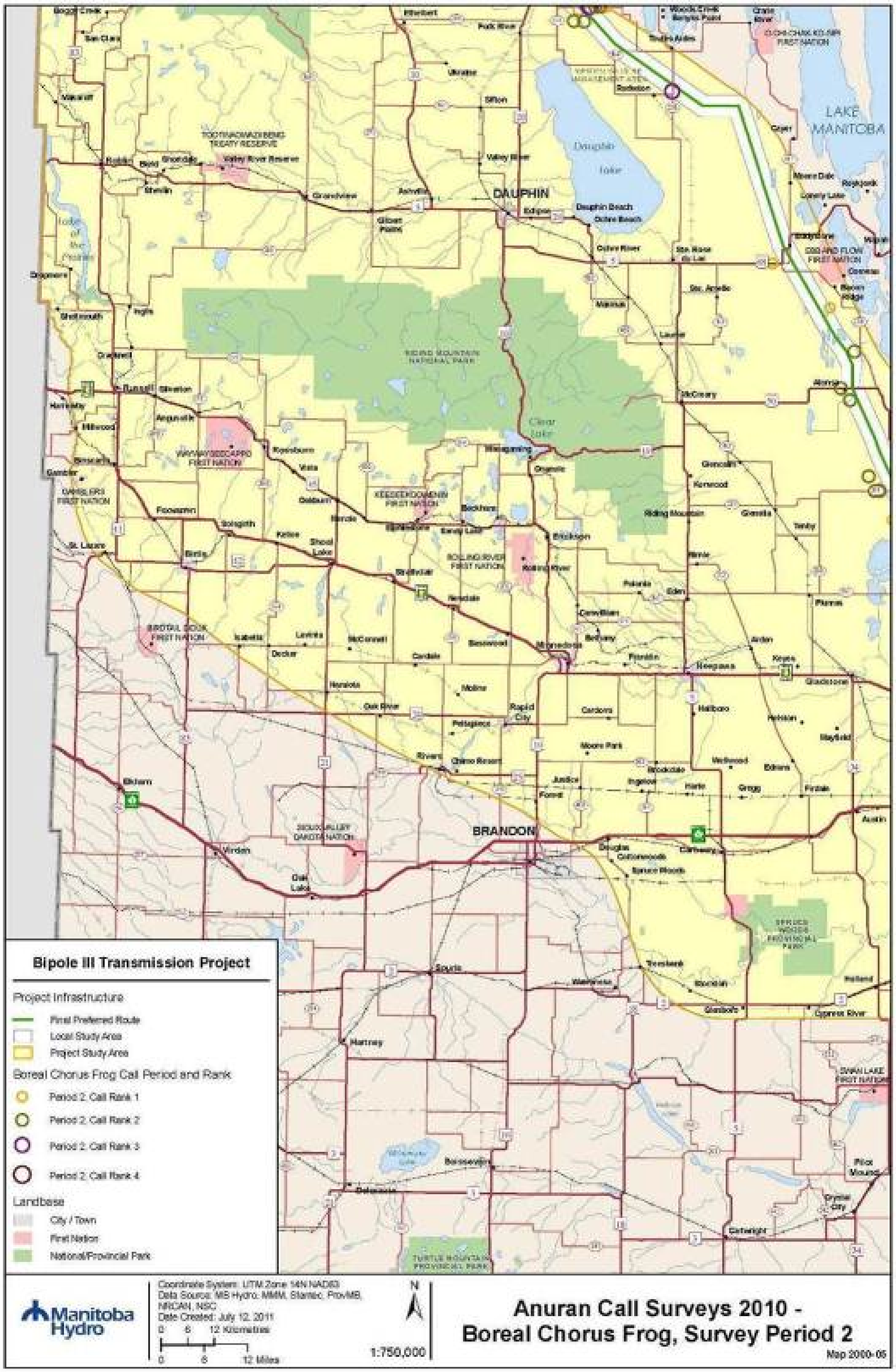


Map Series 2000-2. Bipole III anuran call survey results for boreal chorus frog, survey period 2.

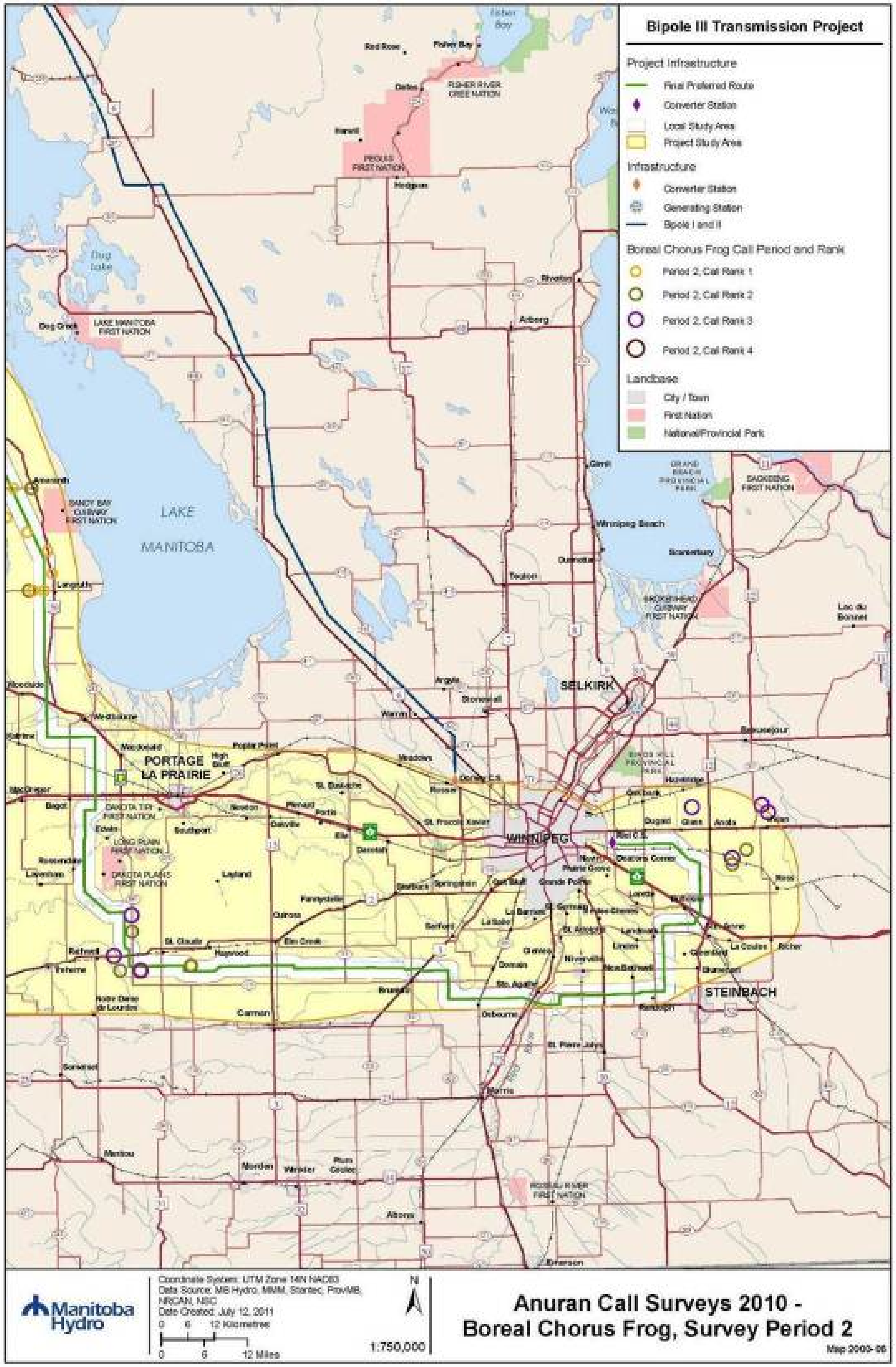


Map Series 2000-3. Bipole III anuran call survey results for boreal chorus frog, survey period 2.

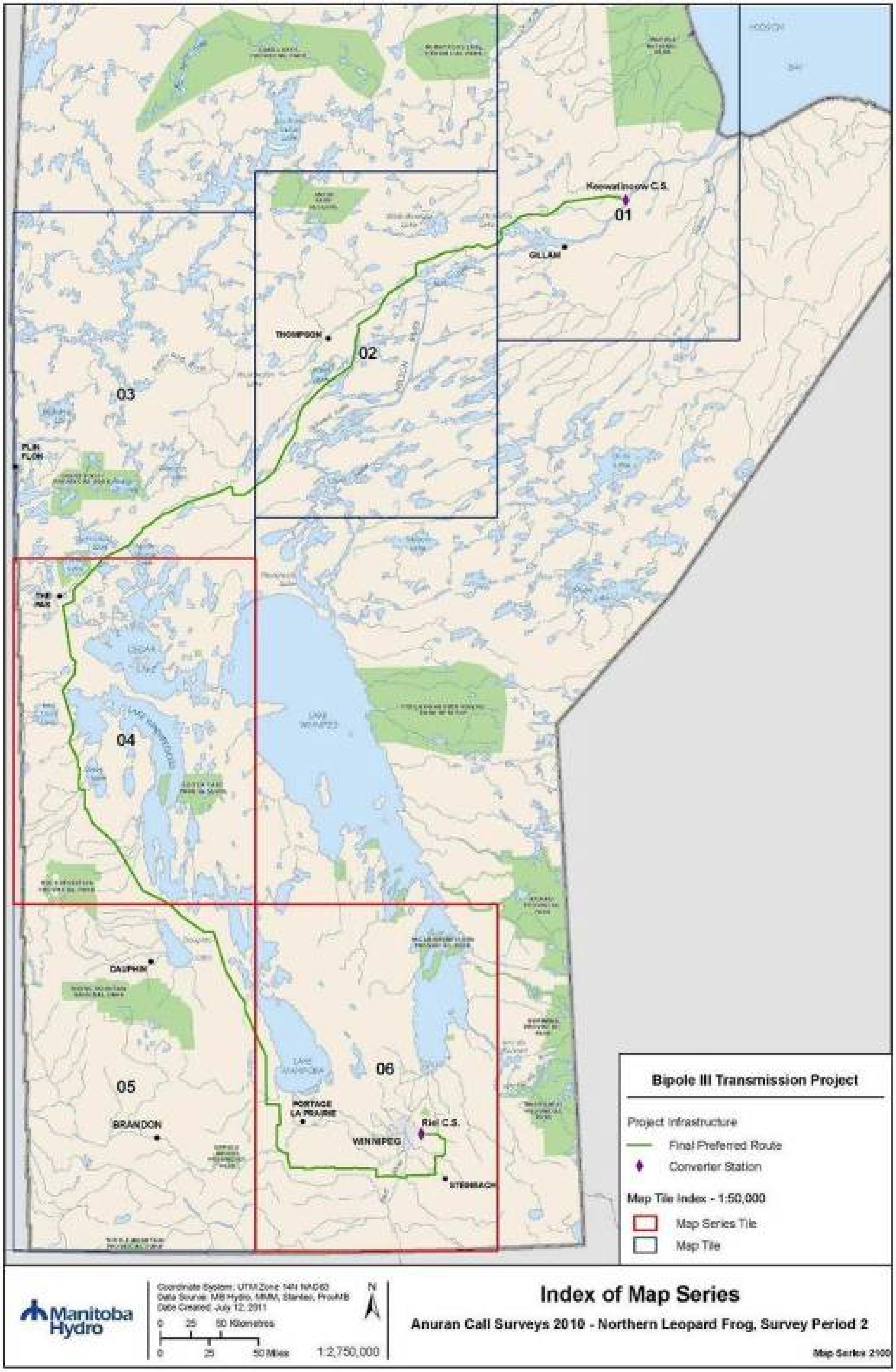
Map Series 2000-4. Bipole III anuran call survey results for boreal chorus frog, survey period 2.



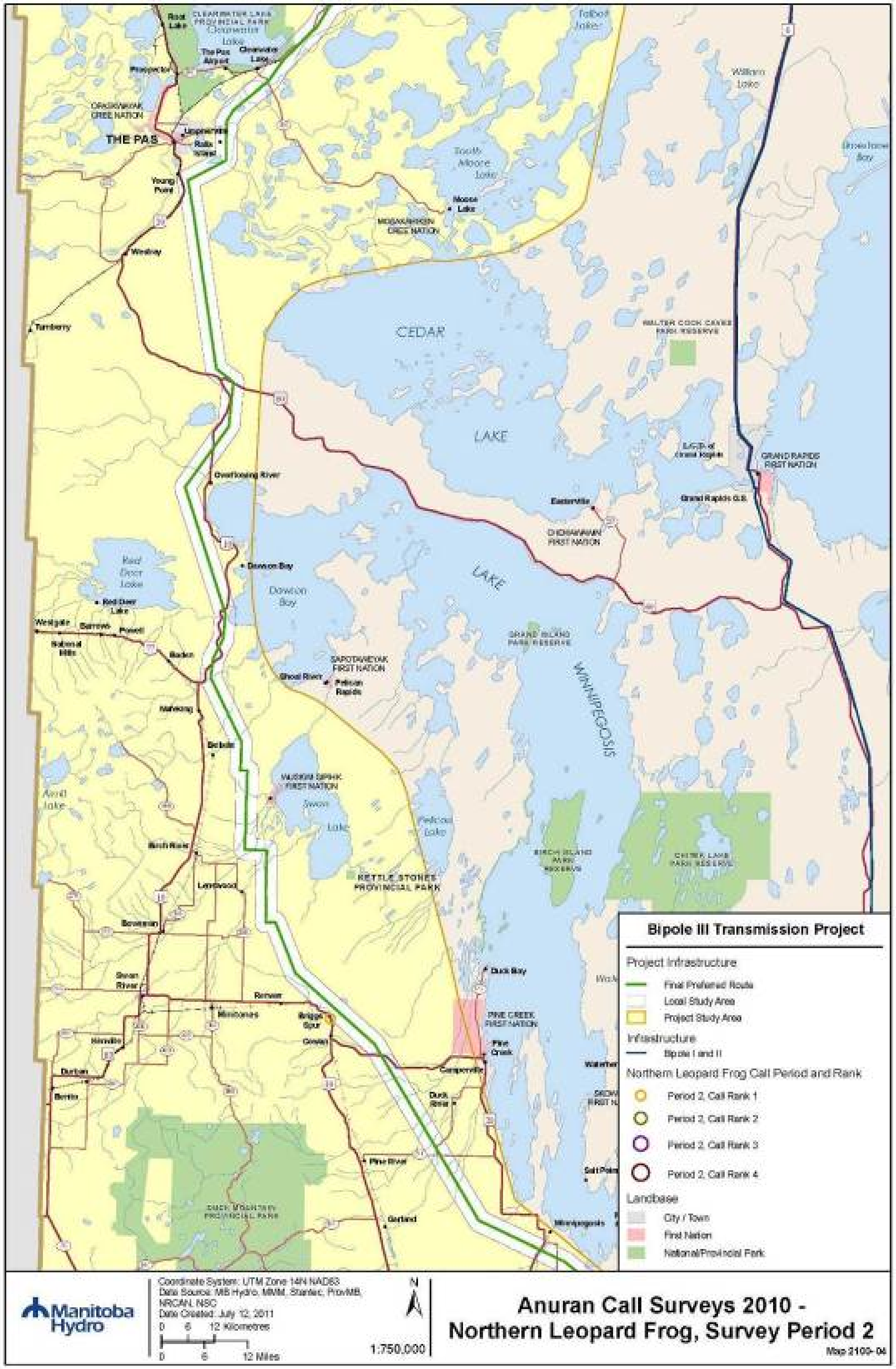
Map Series 2000-5. Bipole III anuran call survey results for boreal chorus frog, survey period 2.



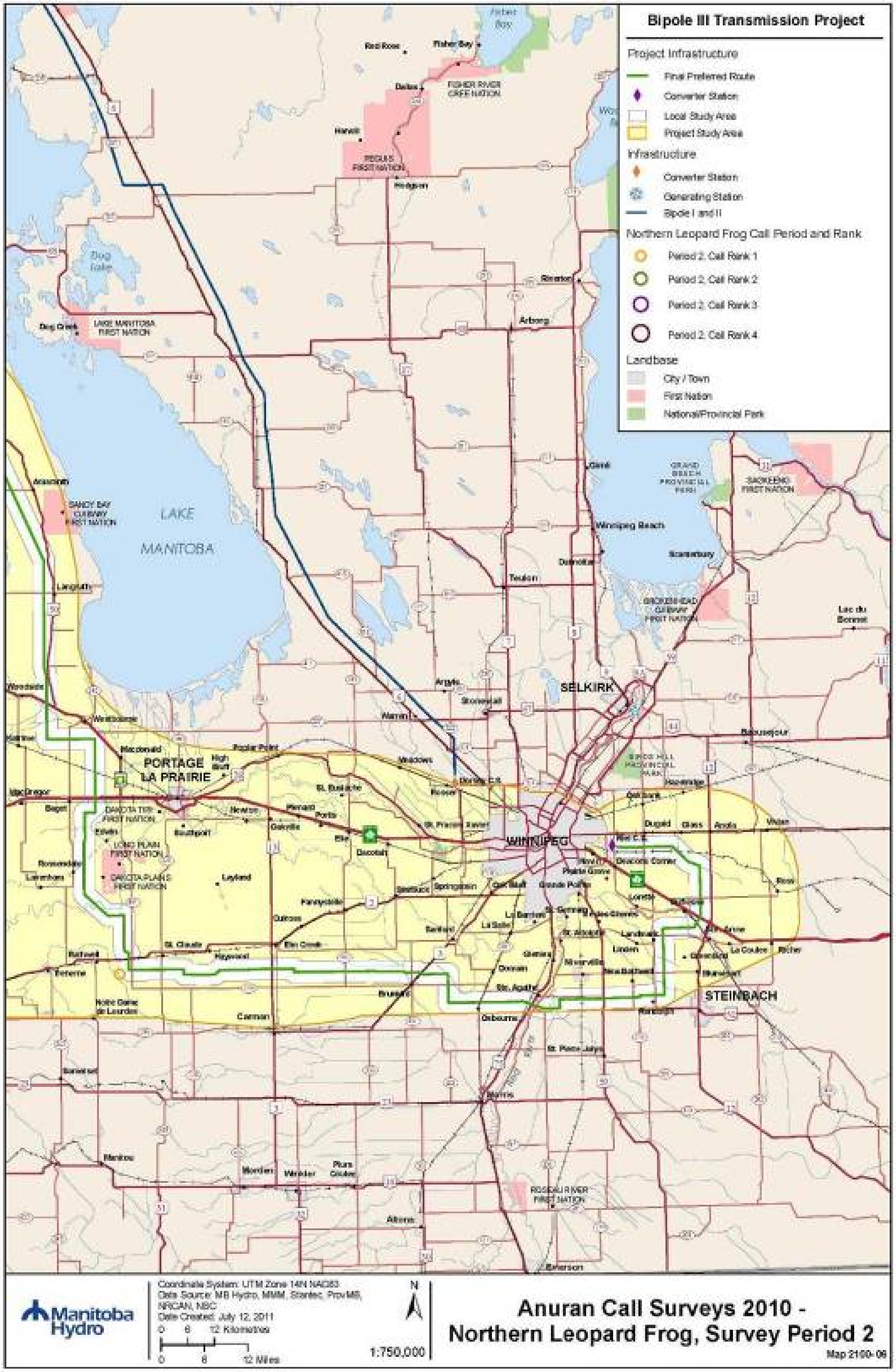
Map Series 2000-6. Bipole III anuran call survey results for boreal chorus frog, survey period 2.



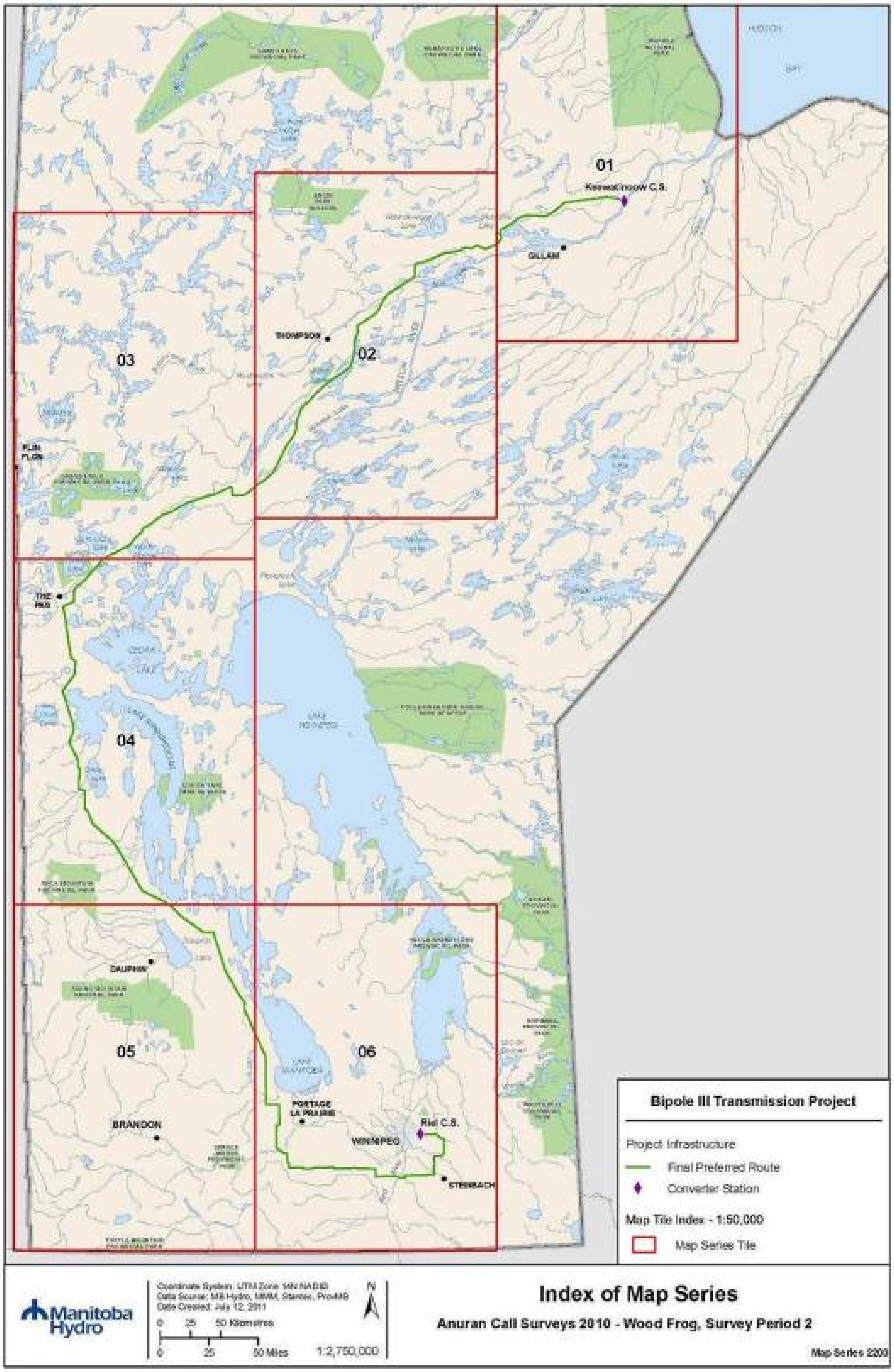
Map Series 2100. Index map for Bipole III anuran call survey results for northern leopard frog, survey period 2.



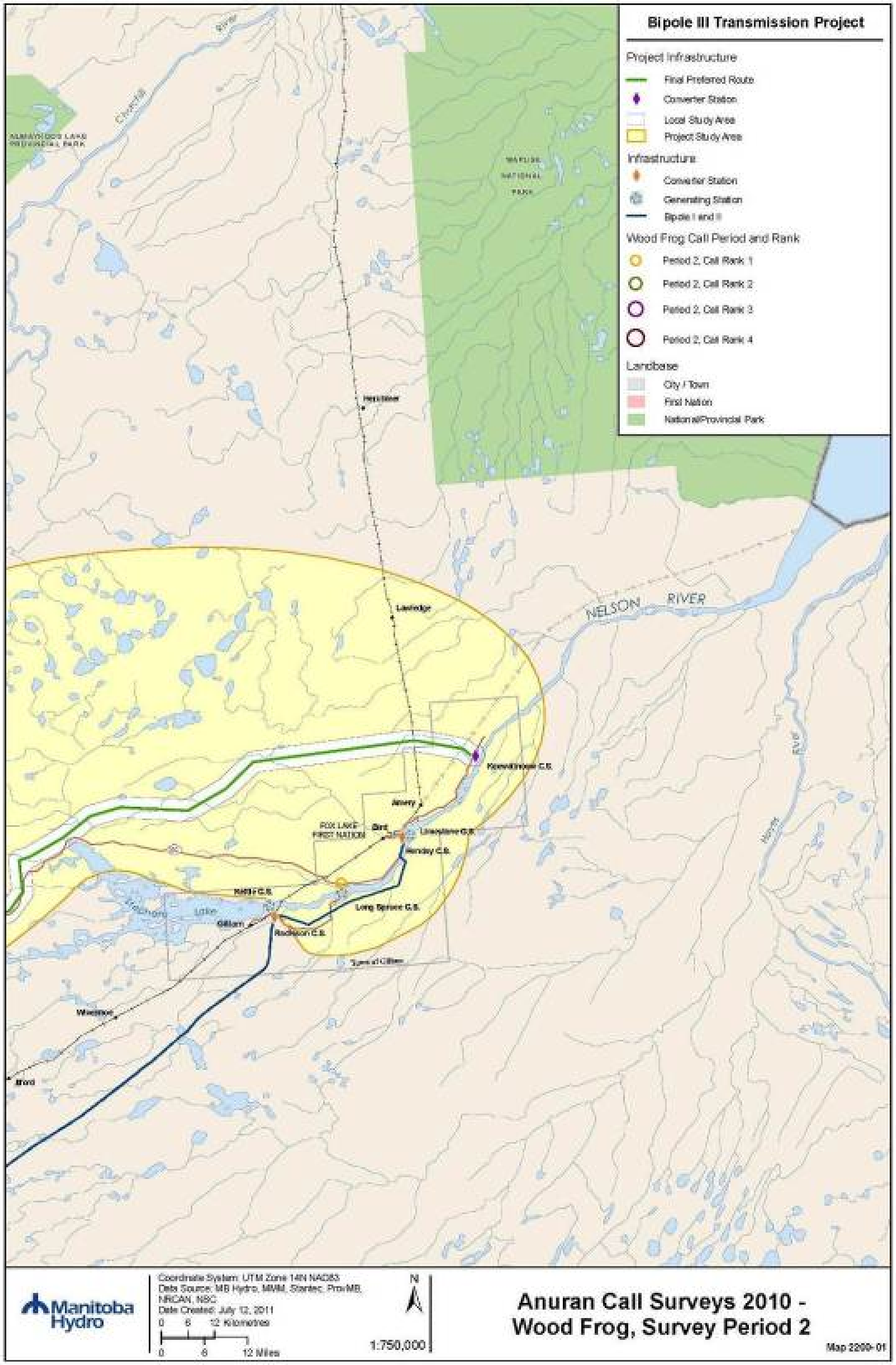
Map Series 2100-1. Bipole III anuran call survey results for northern leopard frog, survey period 2.



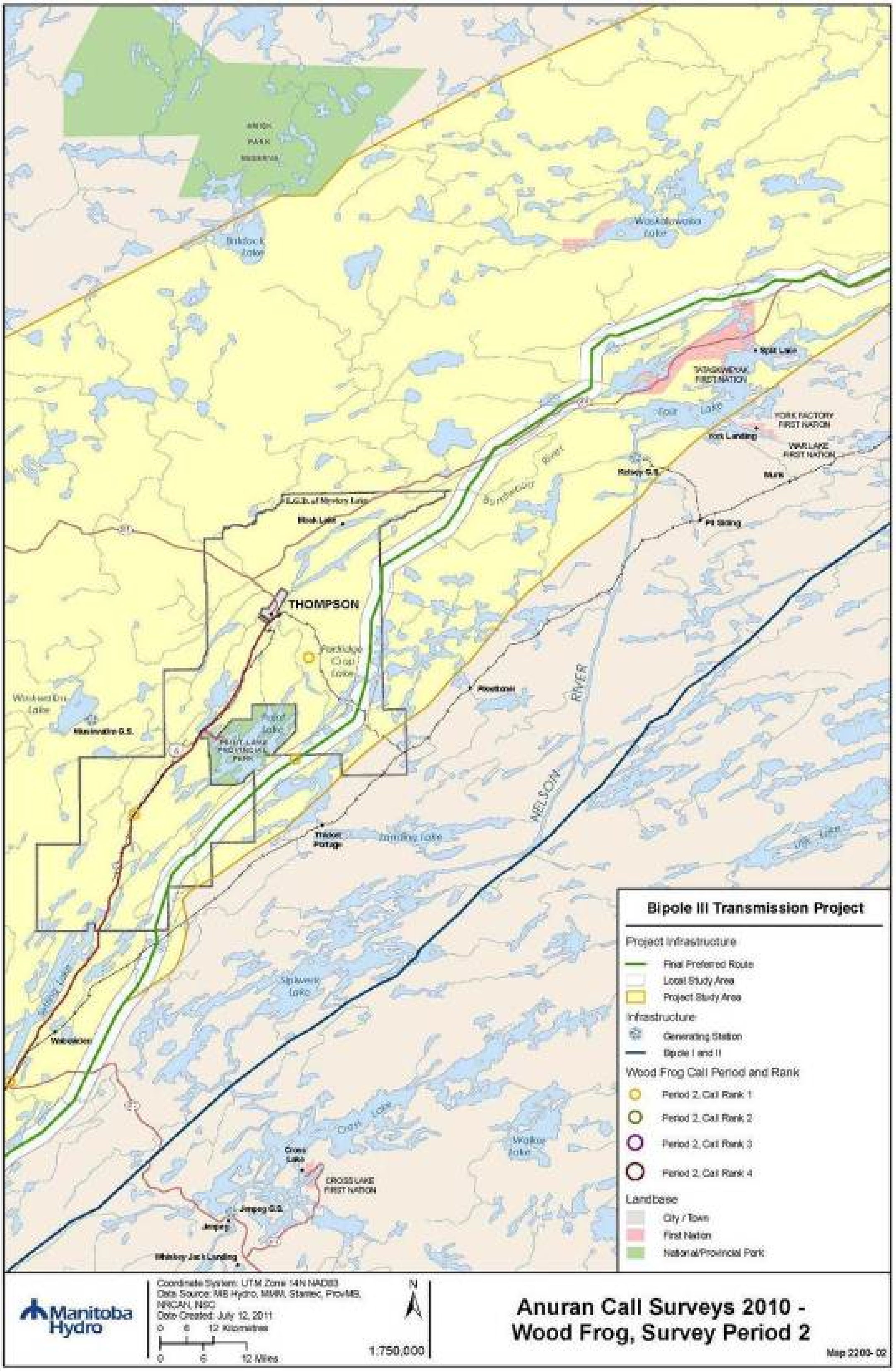
Map Series 2100-2. Bipole III anuran call survey results for northern leopard frog, survey period 2.



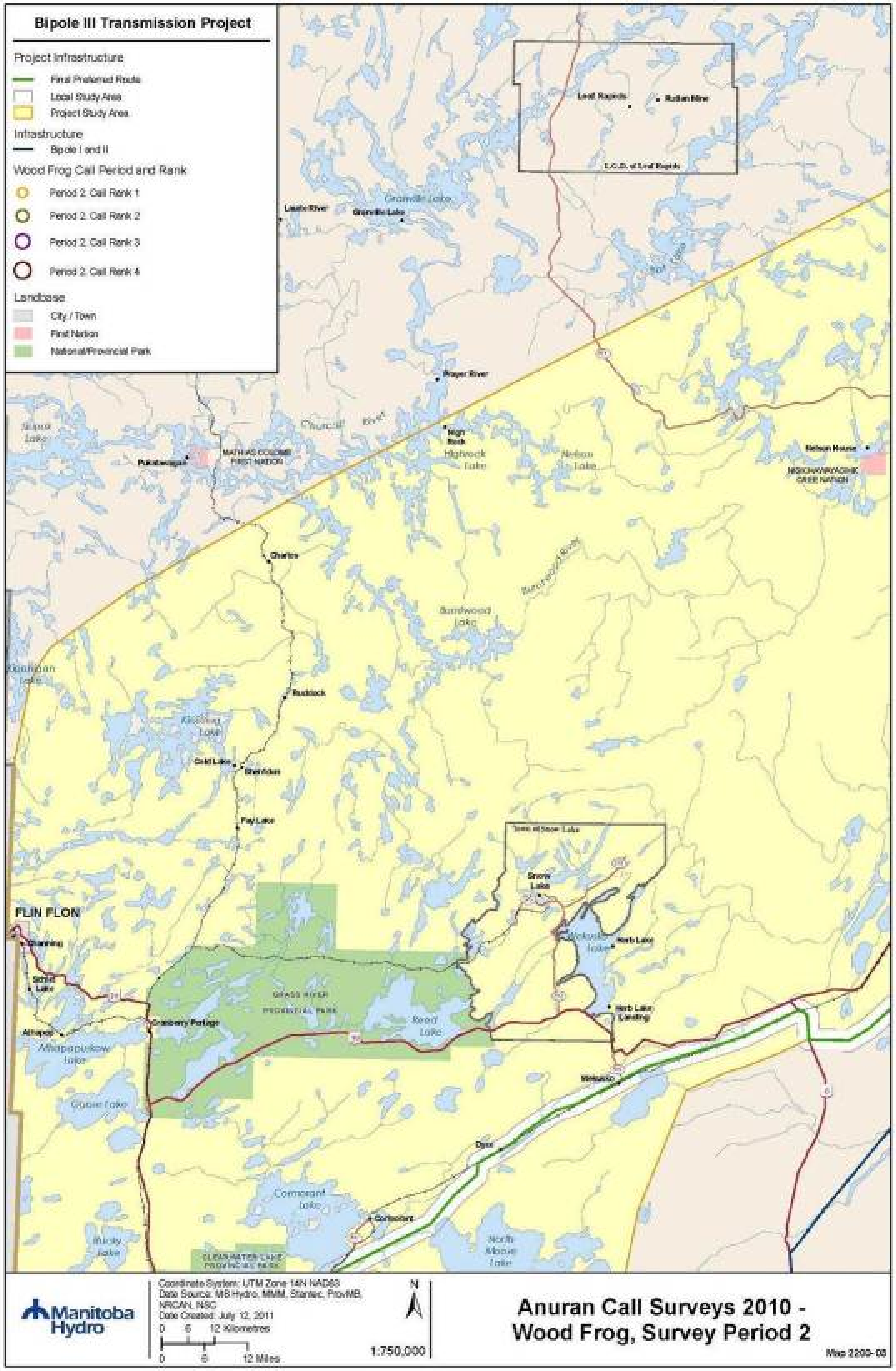
Map Series 2200. Index map for Bipole III anuran call survey results for wood frog, survey period 2.



Map Series 2200-1. Bipole III anuran call survey results for wood frog, survey period 2.

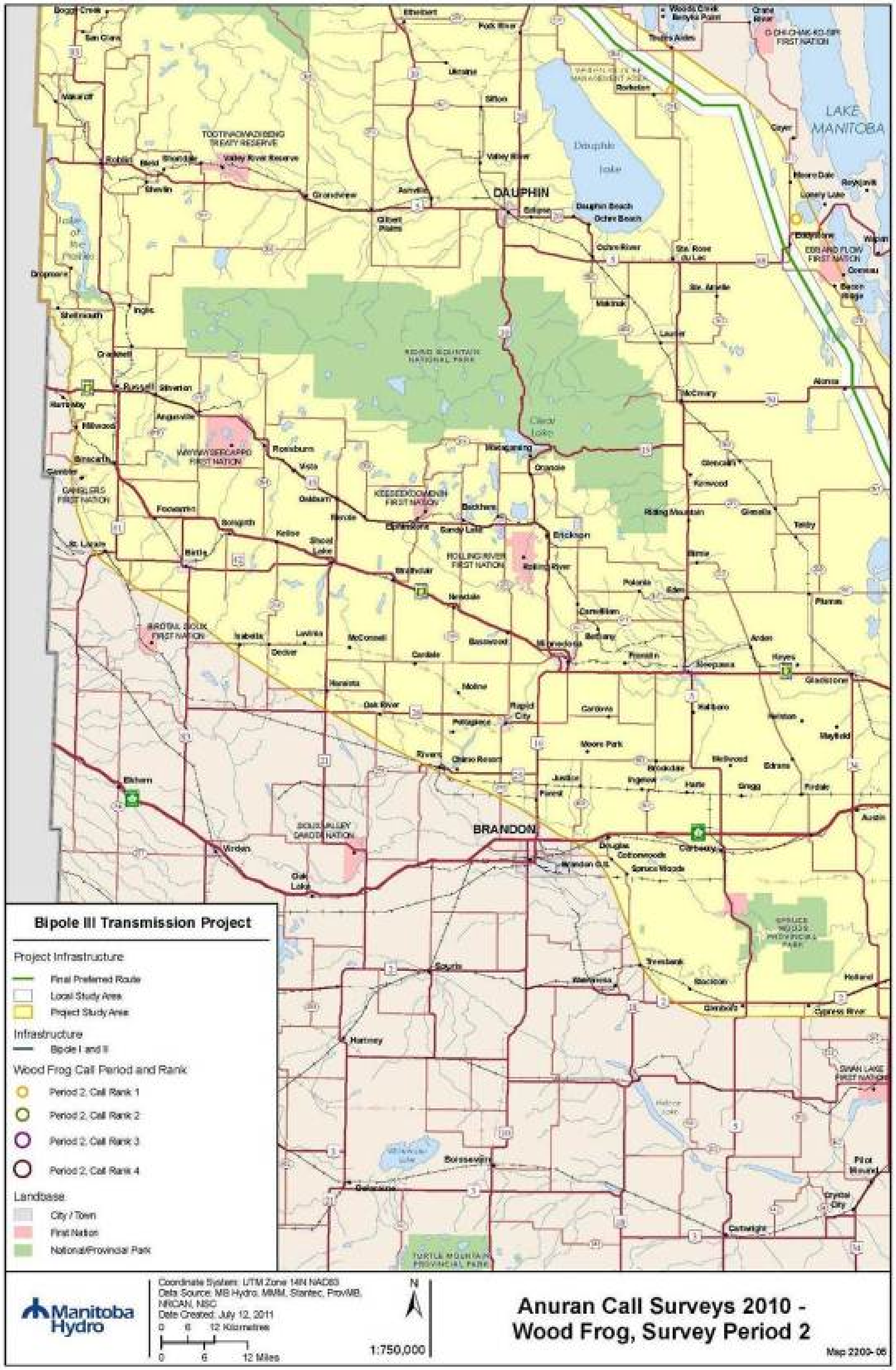


Map Series 2200-2. Bipole III anuran call survey results for wood frog, survey period 2.

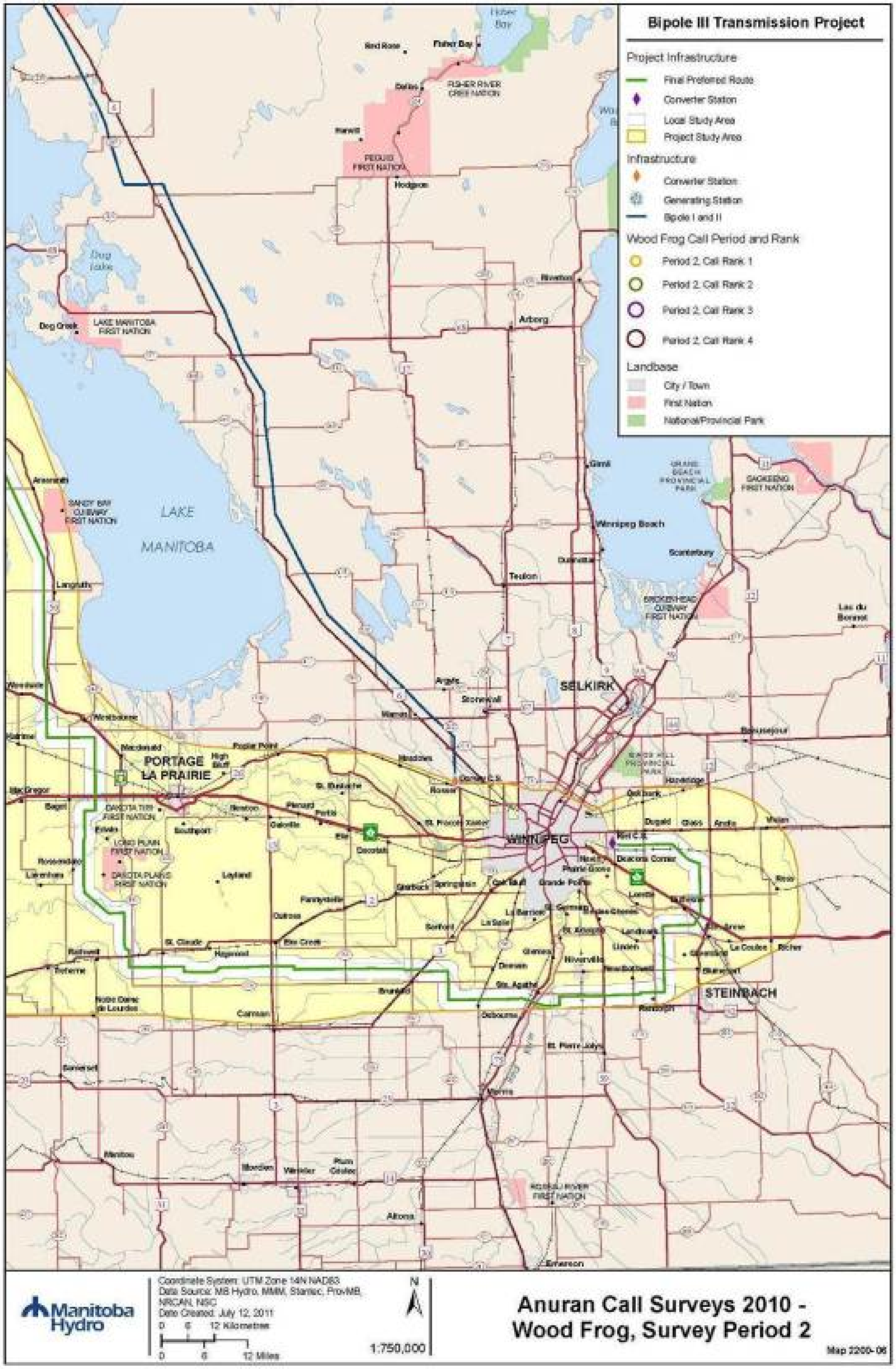


Map Series 2200-3. Bipole III anuran call survey results for wood frog, survey period 2.

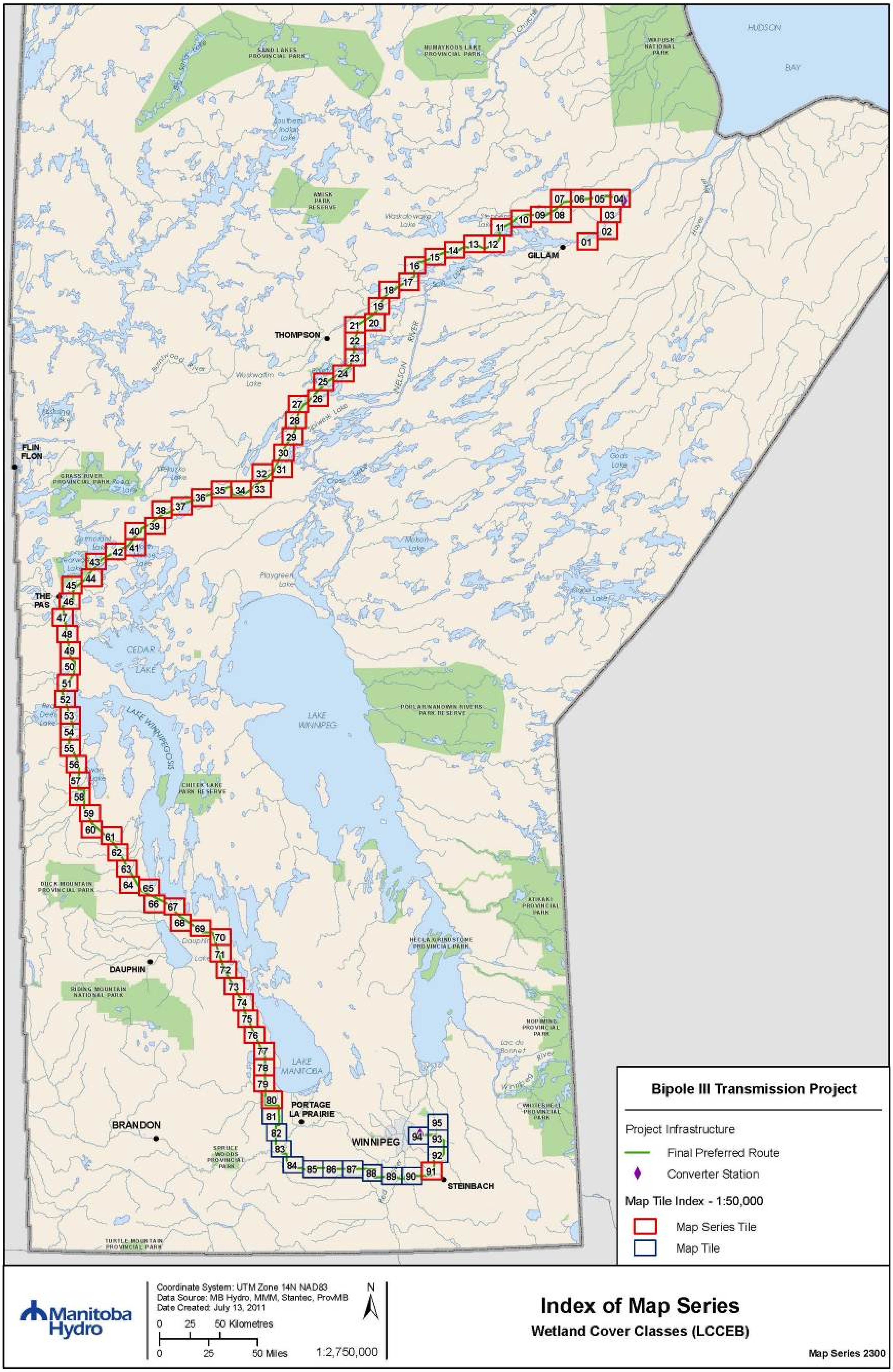
Map Series 2200-4. Bipole III anuran call survey results for wood frog, survey period 2.



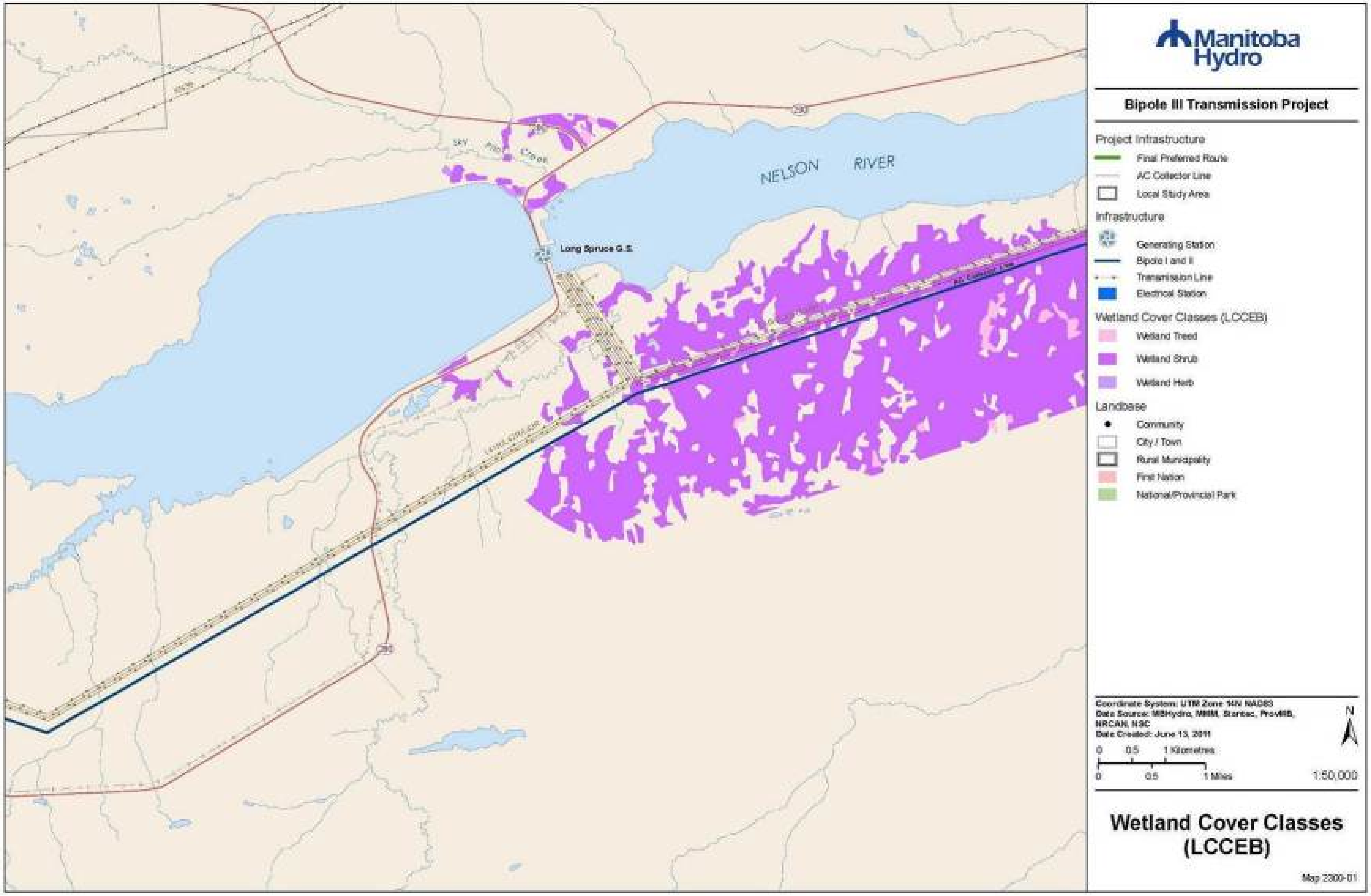
Map Series 2200-5. Bipole III anuran call survey results for wood frog, survey period 2.



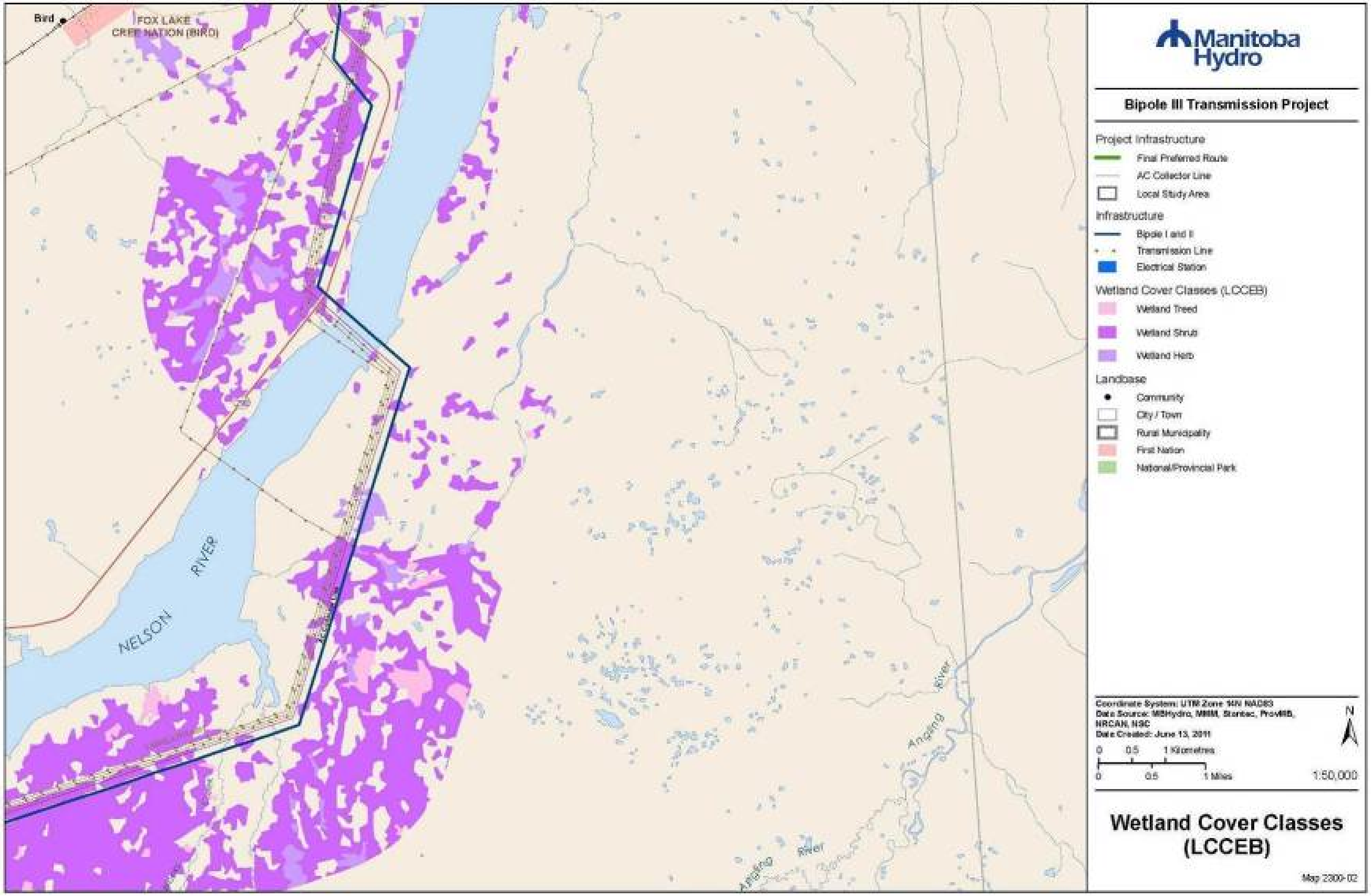
Map Series 2200-6. Bipole III anuran call survey results for wood frog, survey period 2.



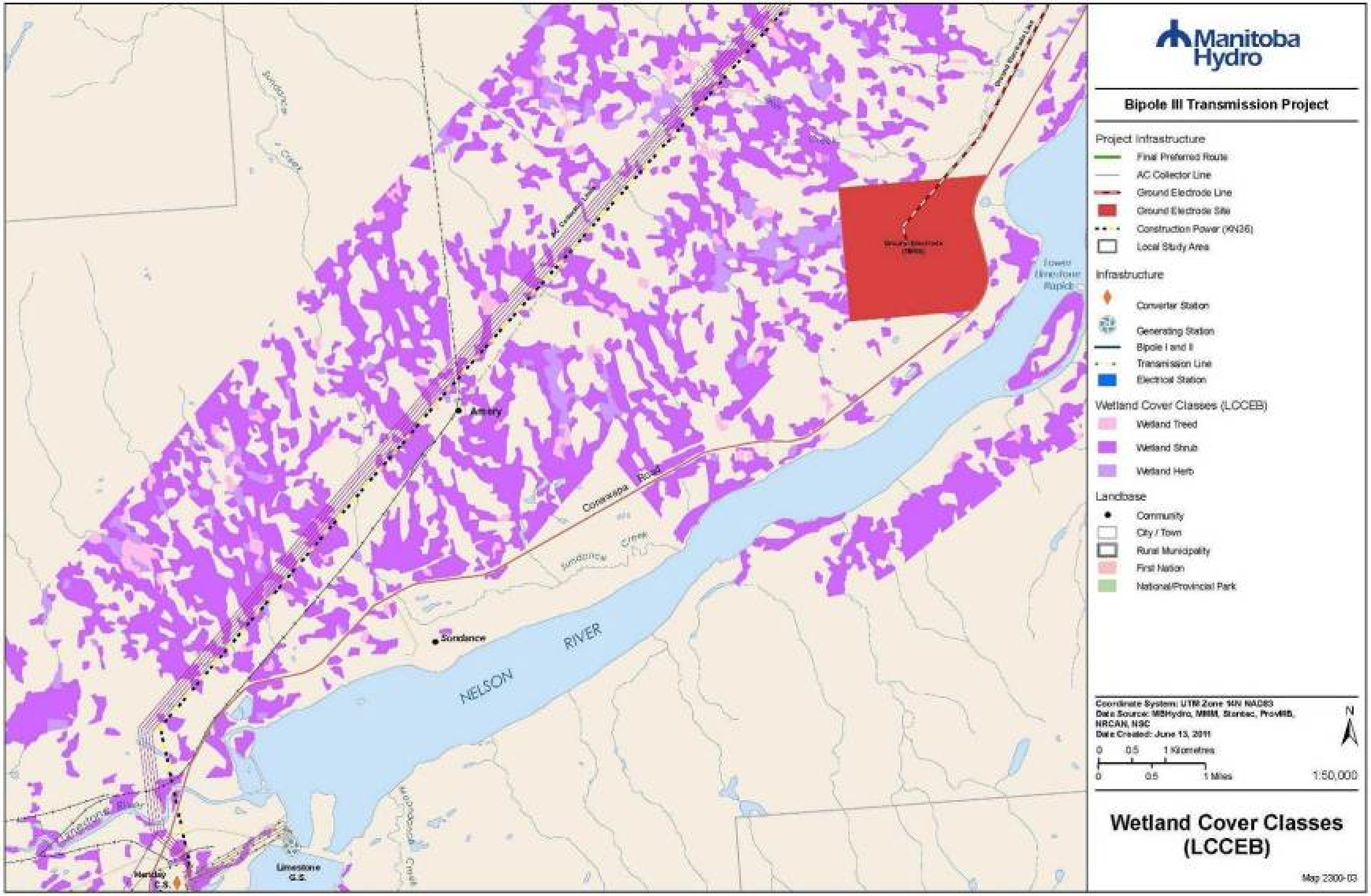
Map Series 2300. Index map of wetland habitat distribution overlapping the Bipole III Project Study Area.



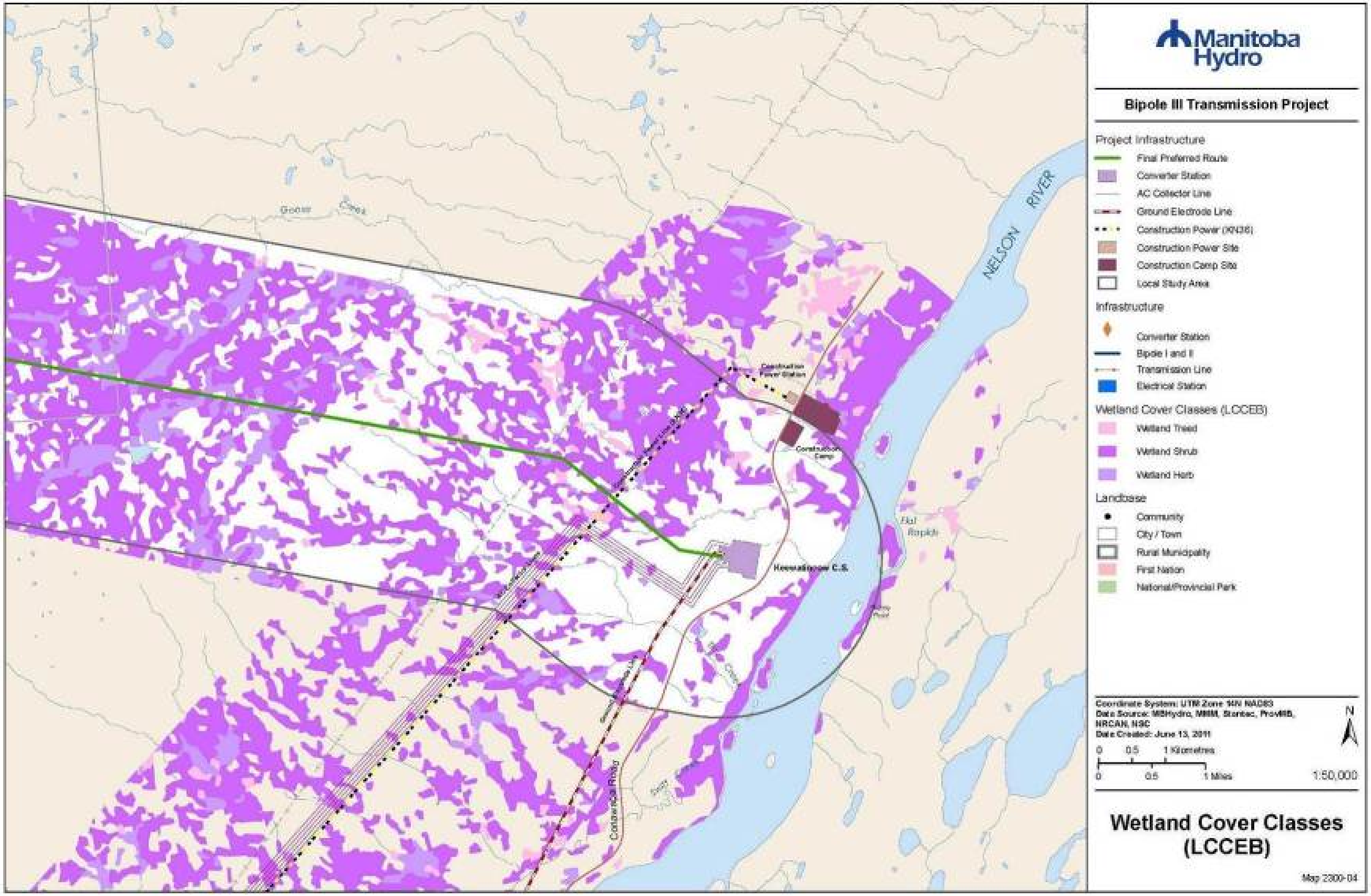
Map Series 2300-1. Distribution of wetland habitat within the Bipole III Project Study Area.



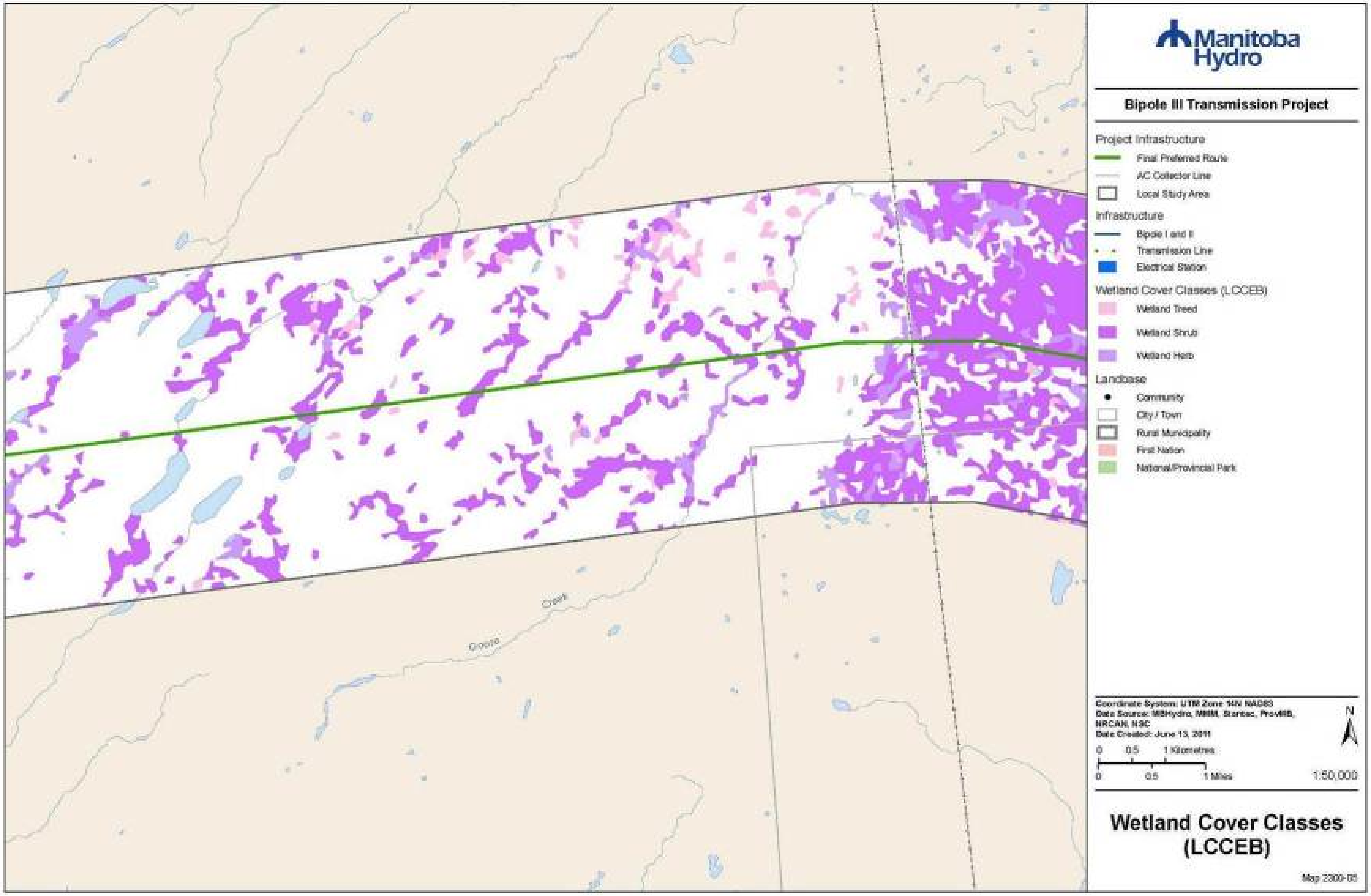
Map Series 2300-2. Distribution of wetland habitat within the Bipole III Project Study Area.



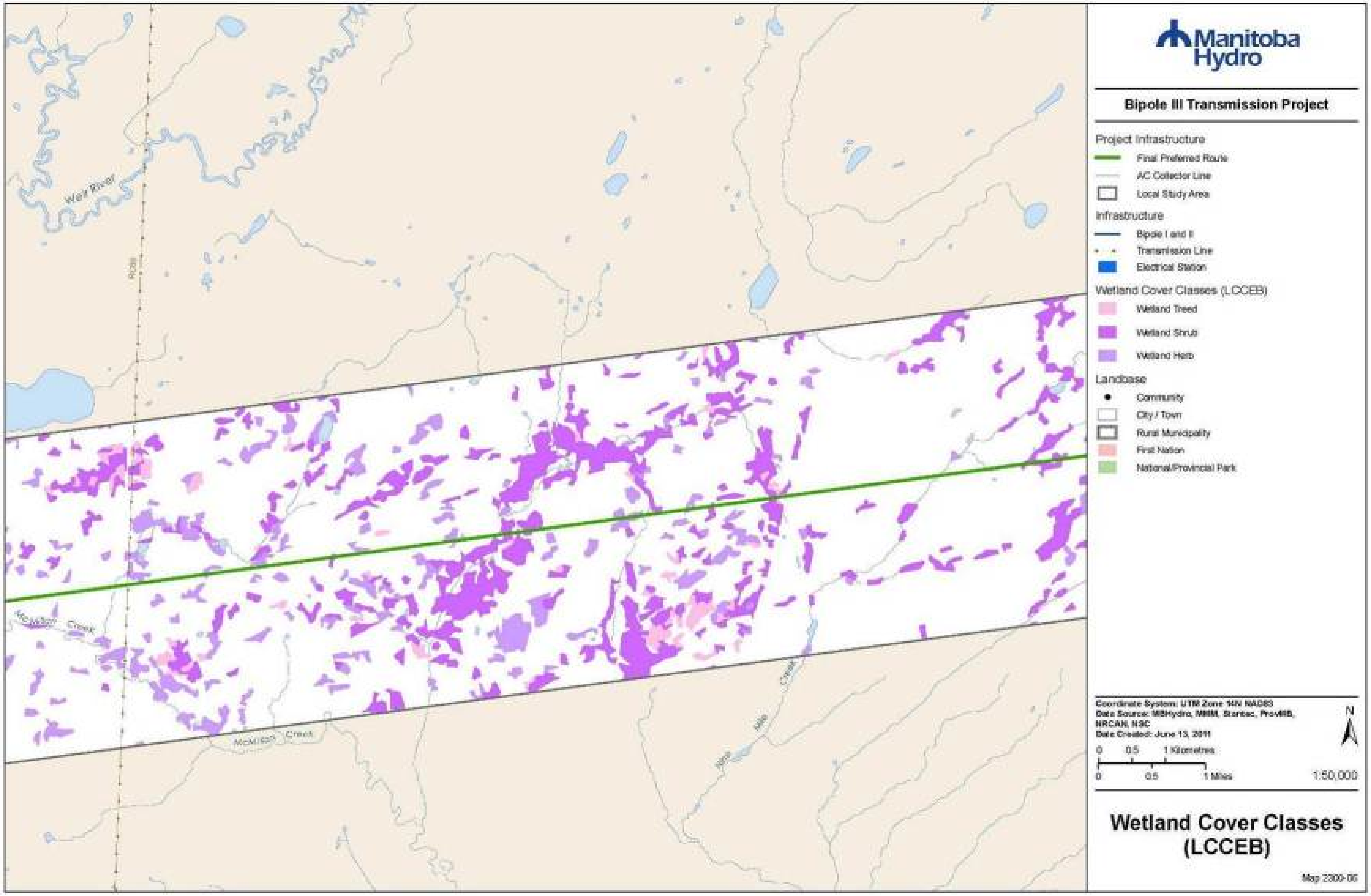
Map Series 2300-3. Distribution of wetland habitat within the Bipole III Project Study Area.



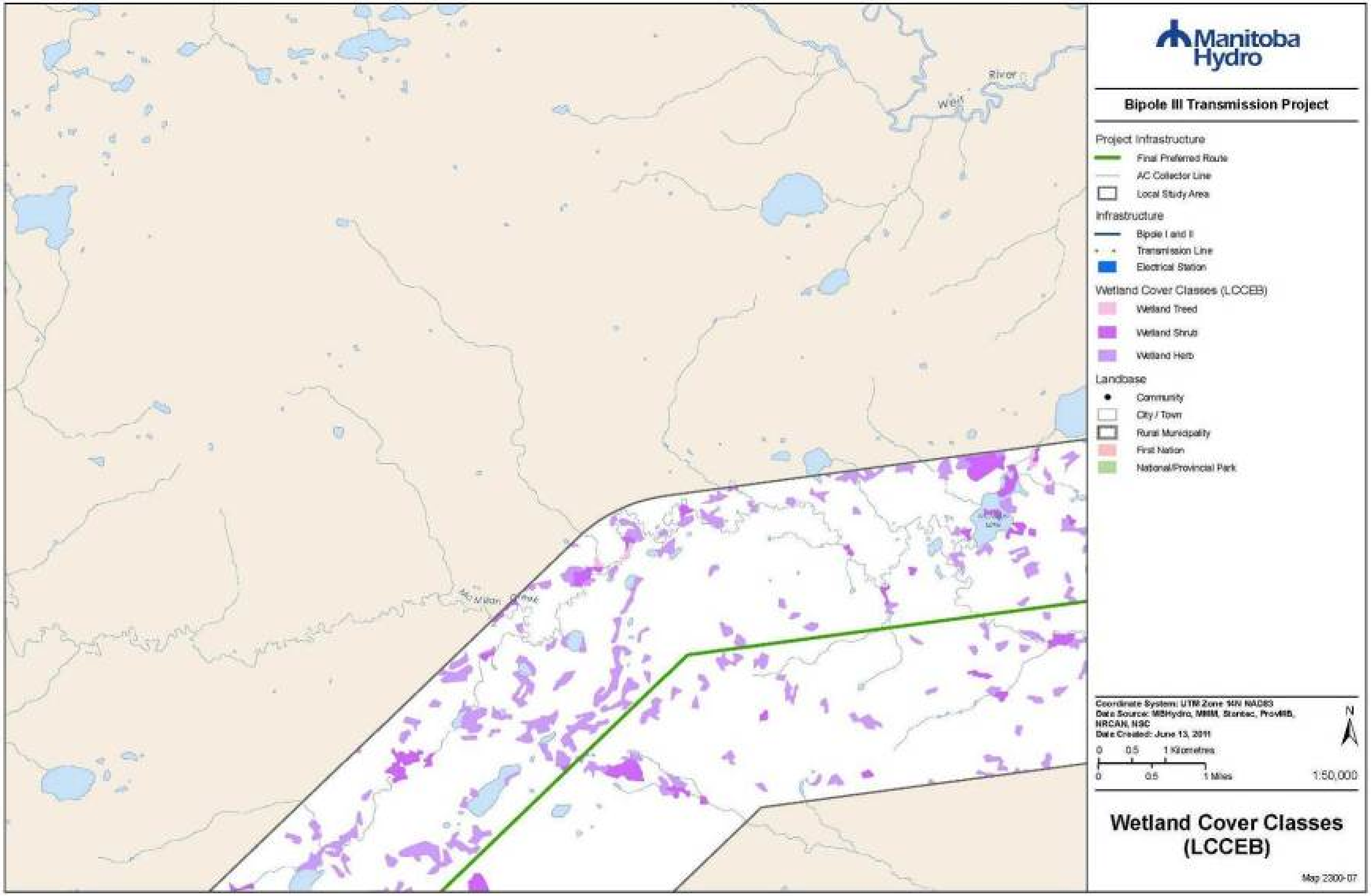
Map Series 2300-4. Distribution of wetland habitat within the Bipole III Project Study Area.



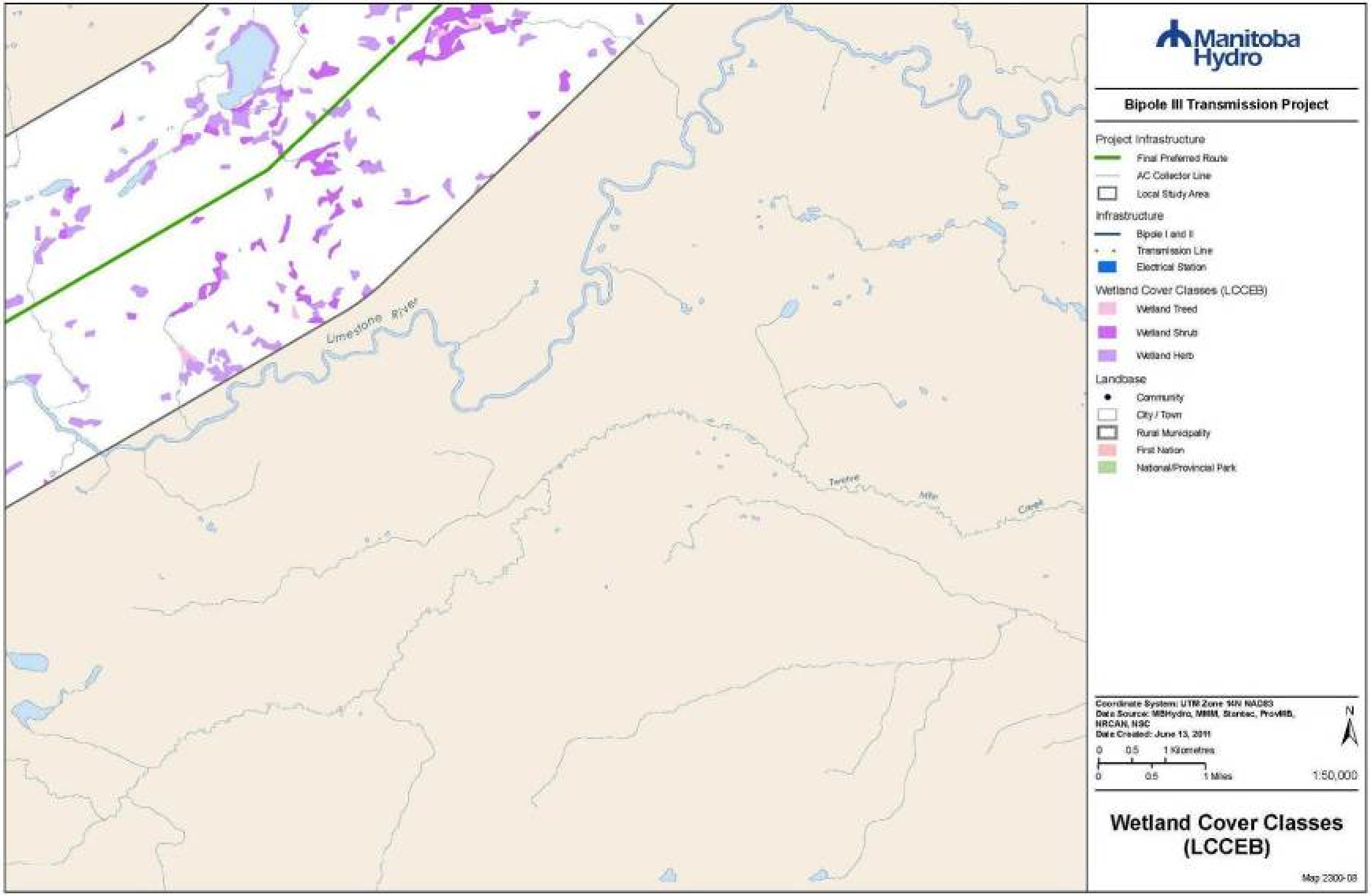
Map Series 2300-5. Distribution of wetland habitat within the Bipole III Project Study Area.



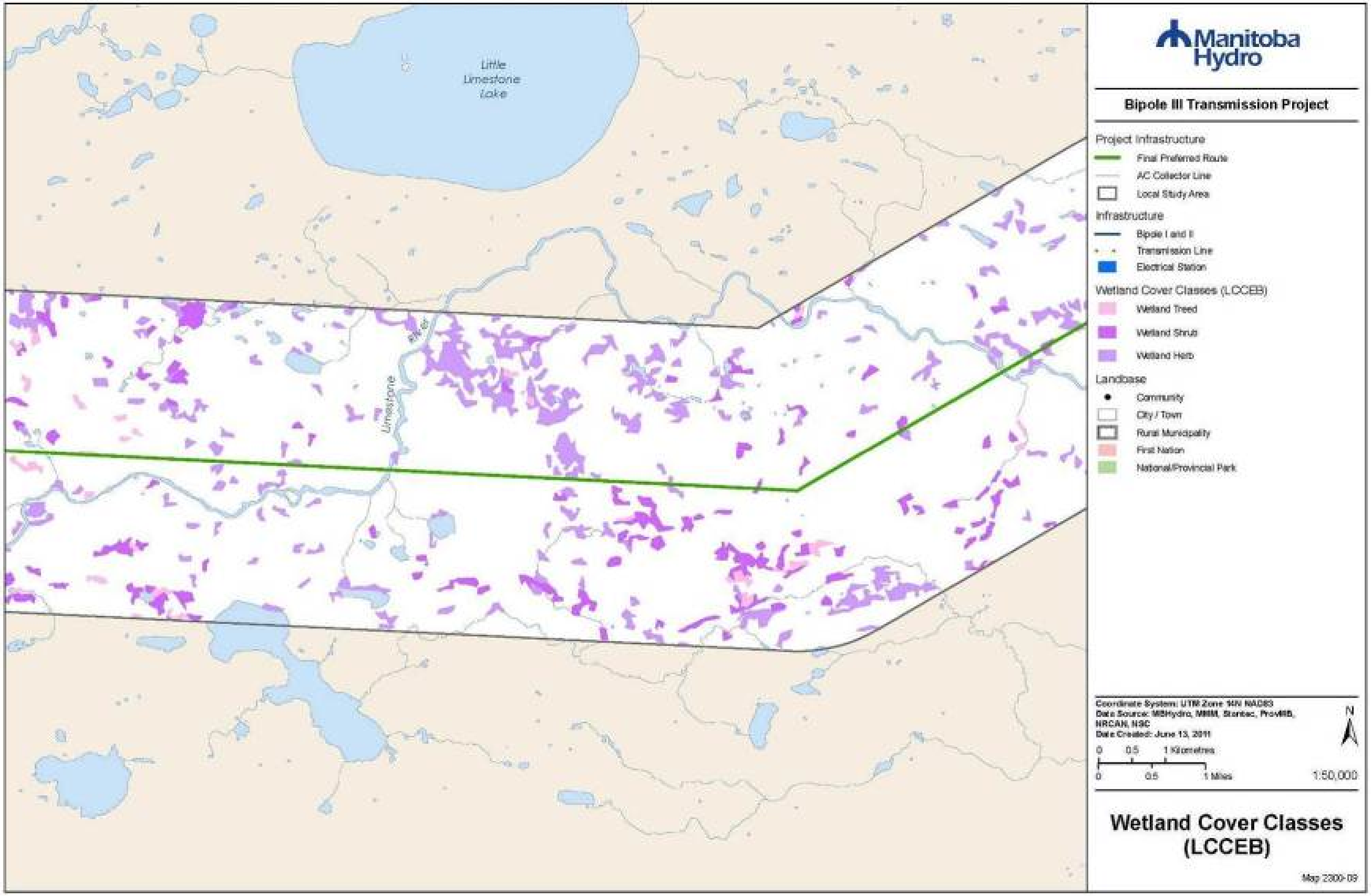
Map Series 2300-6. Distribution of wetland habitat within the Bipole III Project Study Area.



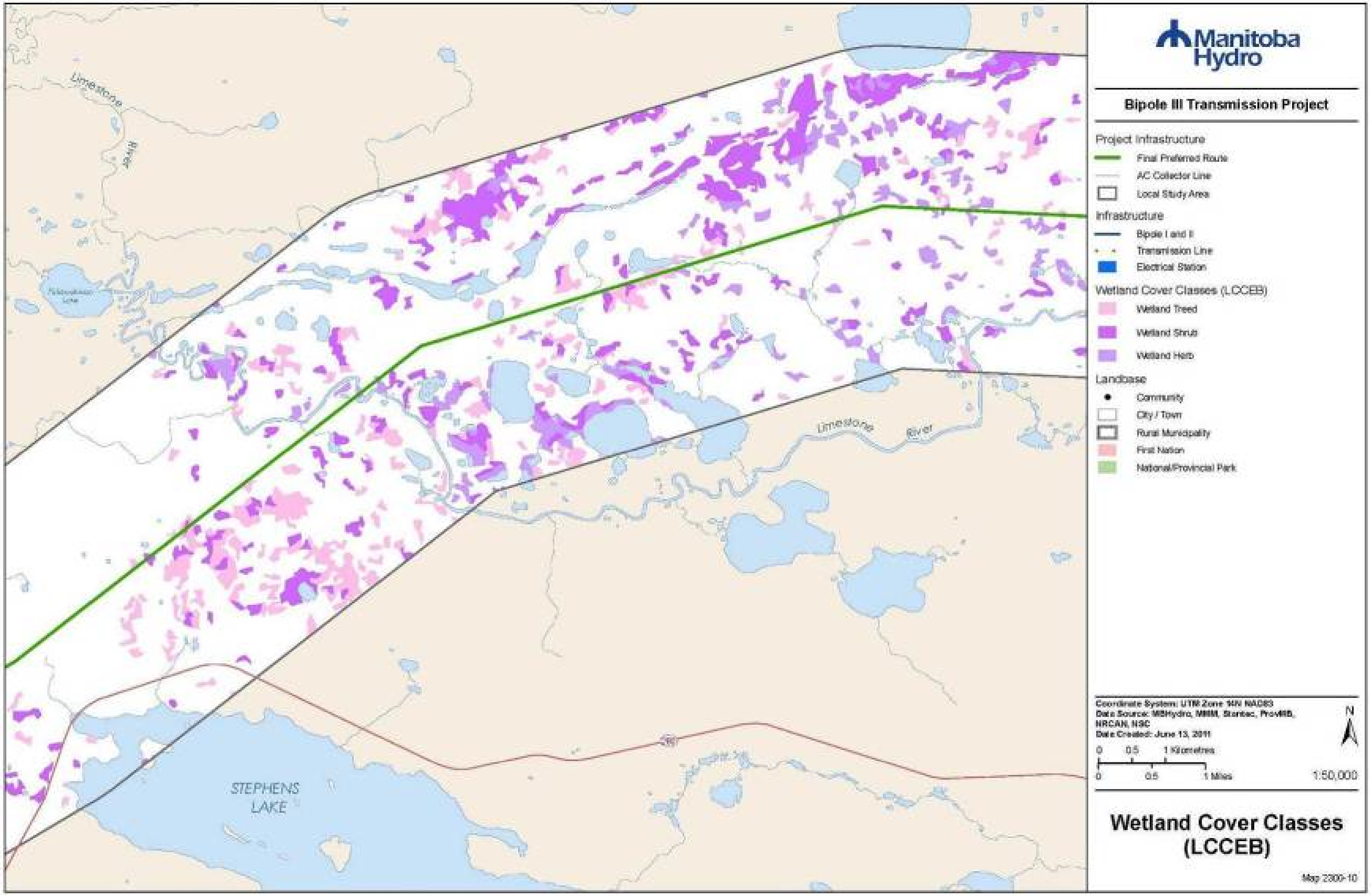
Map Series 2300-7. Distribution of wetland habitat within the Bipole III Project Study Area.



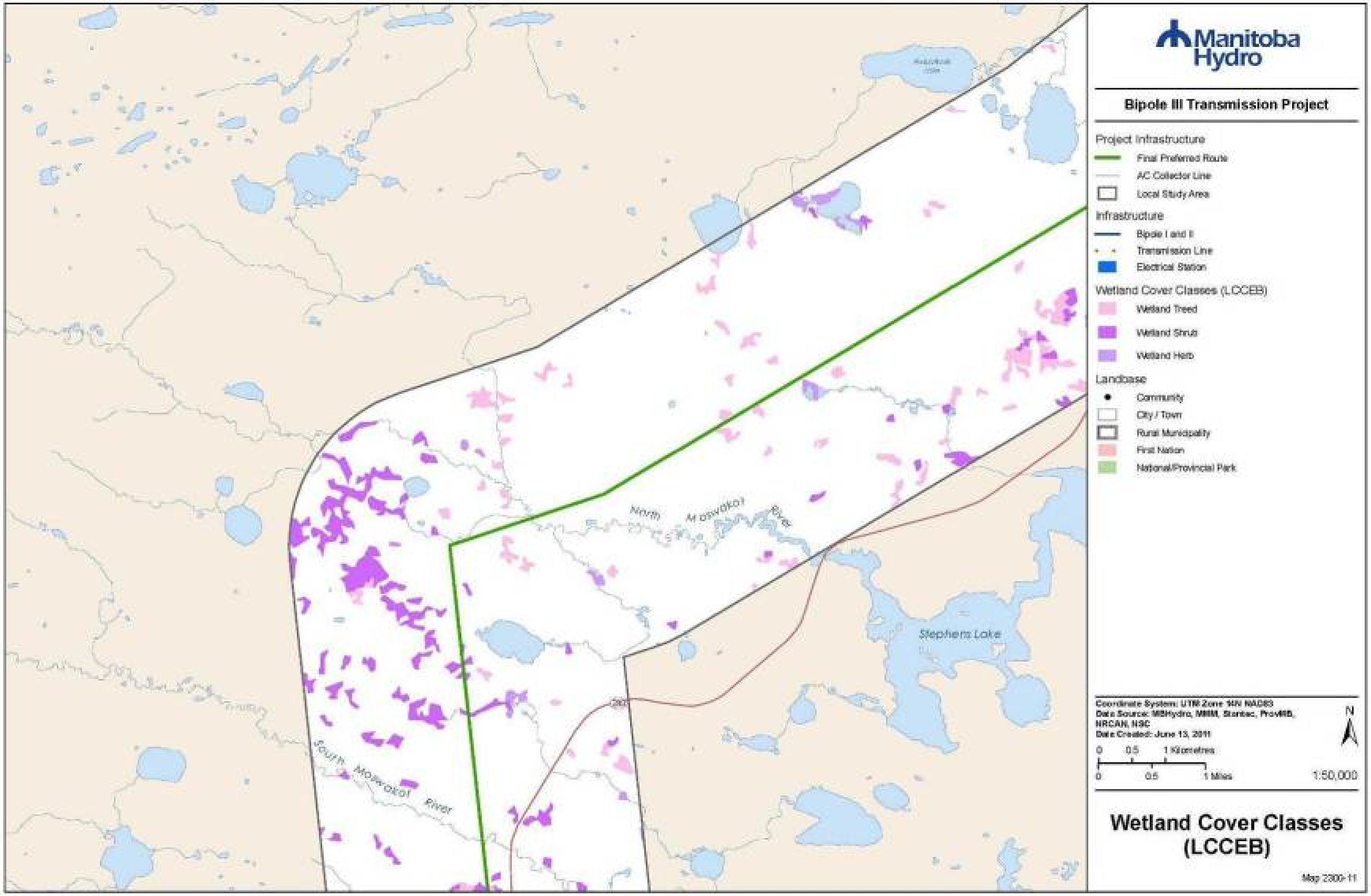
Map Series 2300-8. Distribution of wetland habitat within the Bipole III Project Study Area.



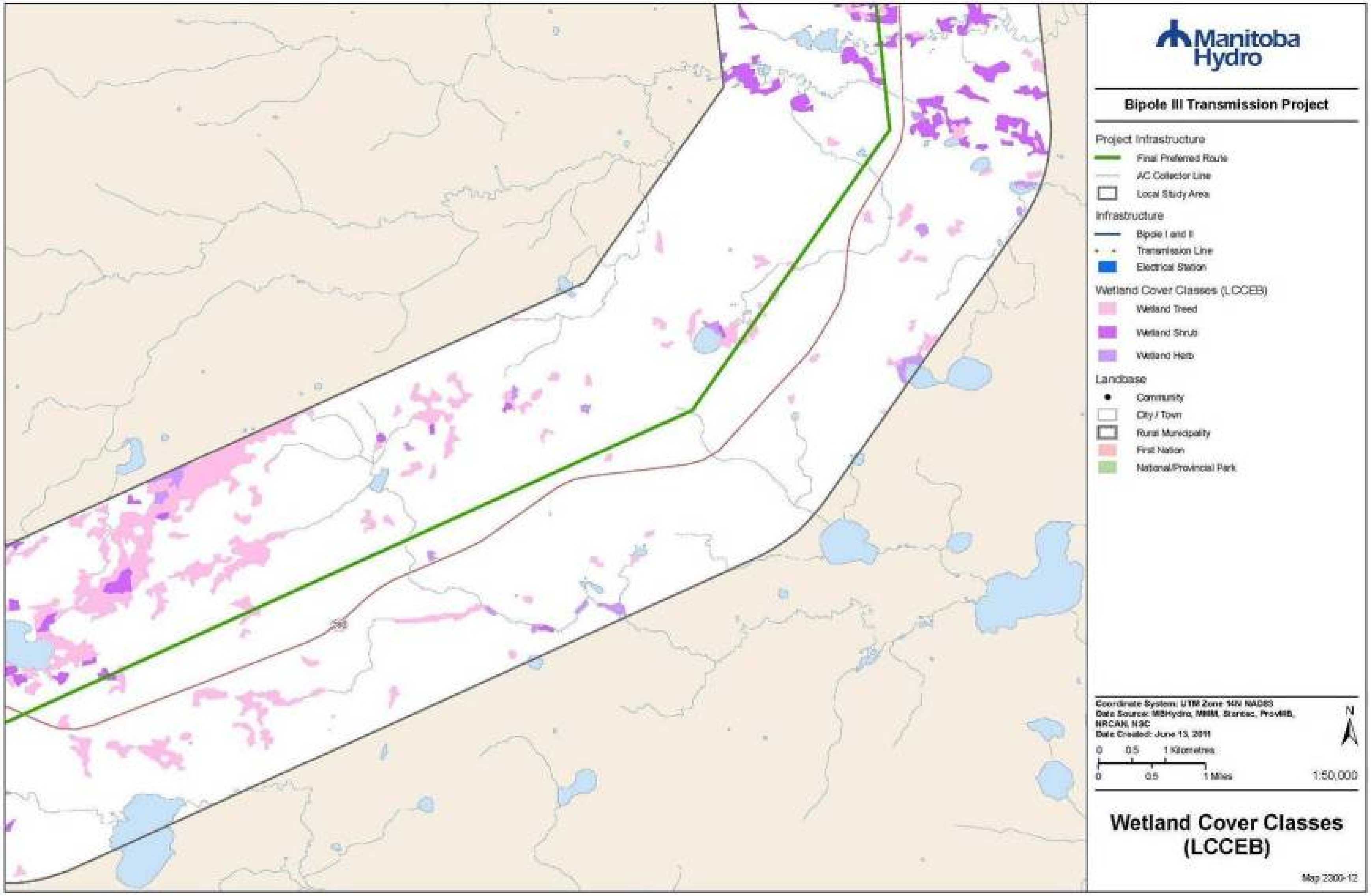
Map Series 2300-9. Distribution of wetland habitat within the Bipole III Project Study Area.



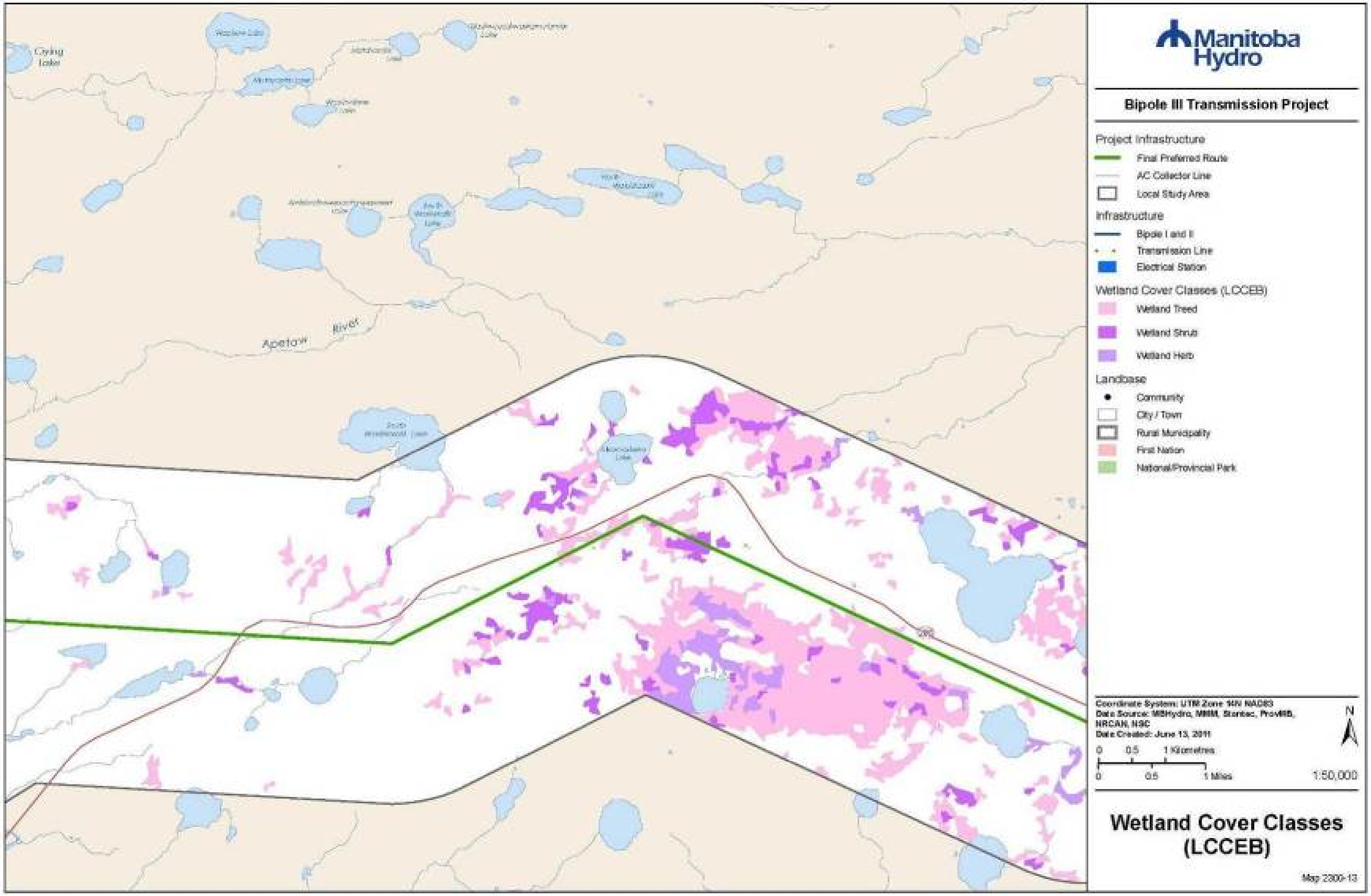
Map Series 2300-10. Distribution of wetland habitat within the Bipole III Project Study Area.



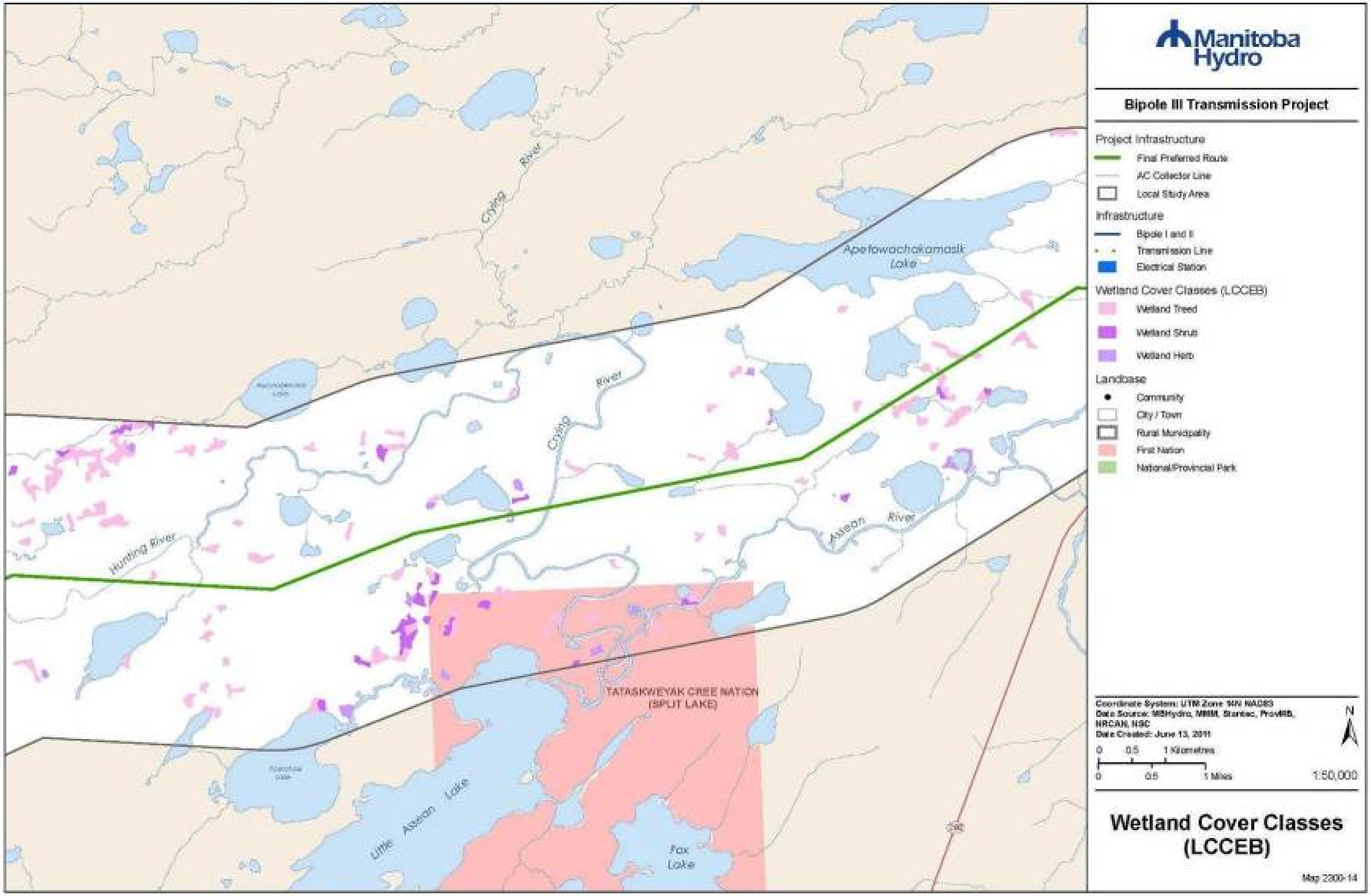
Map Series 2300-11. Distribution of wetland habitat within the Bipole III Project Study Area.



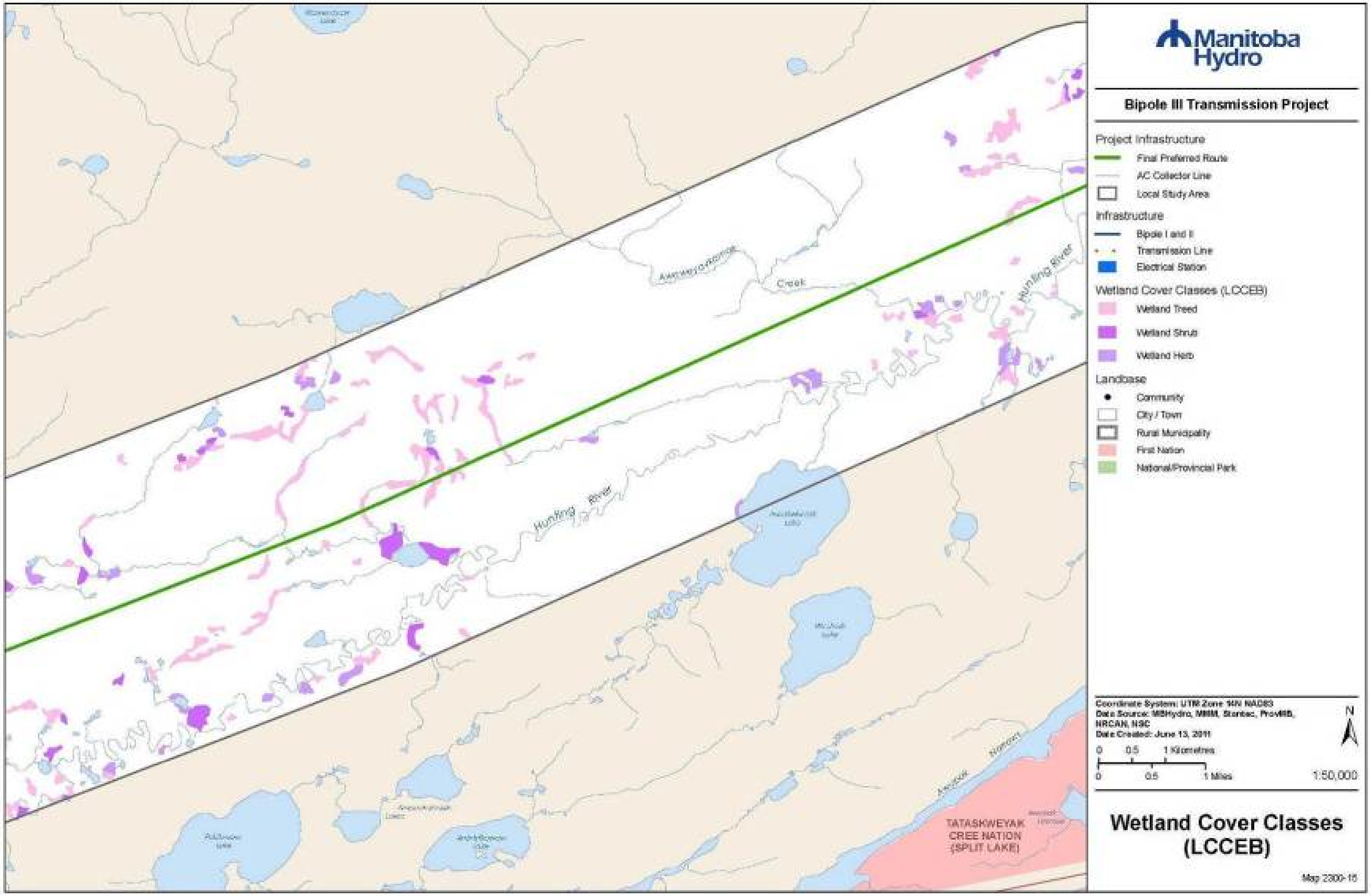
Map Series 2300-12. Distribution of wetland habitat within the Bipole III Project Study Area.



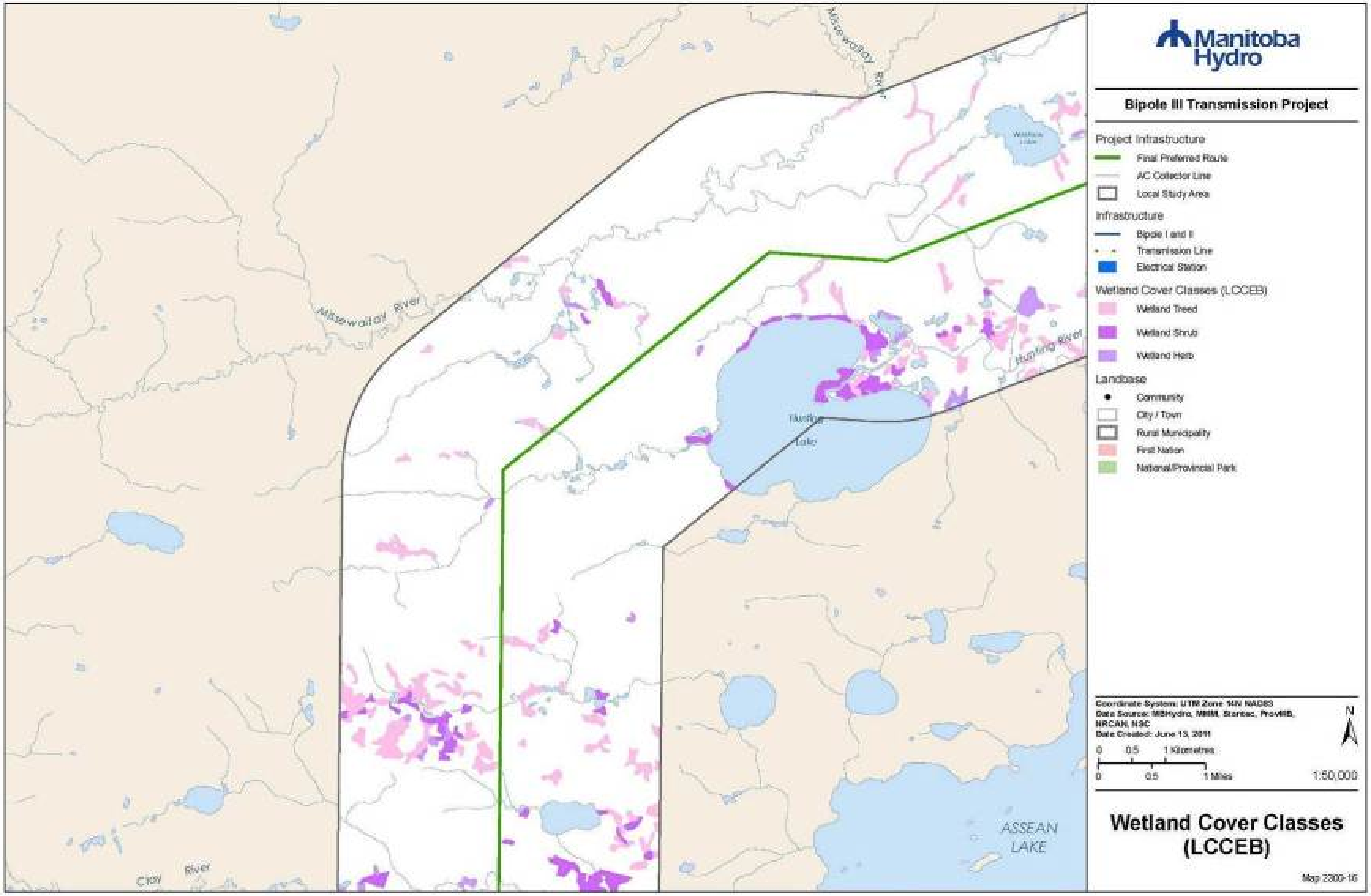
Map Series 2300-13. Distribution of wetland habitat within the Bipole III Project Study Area.



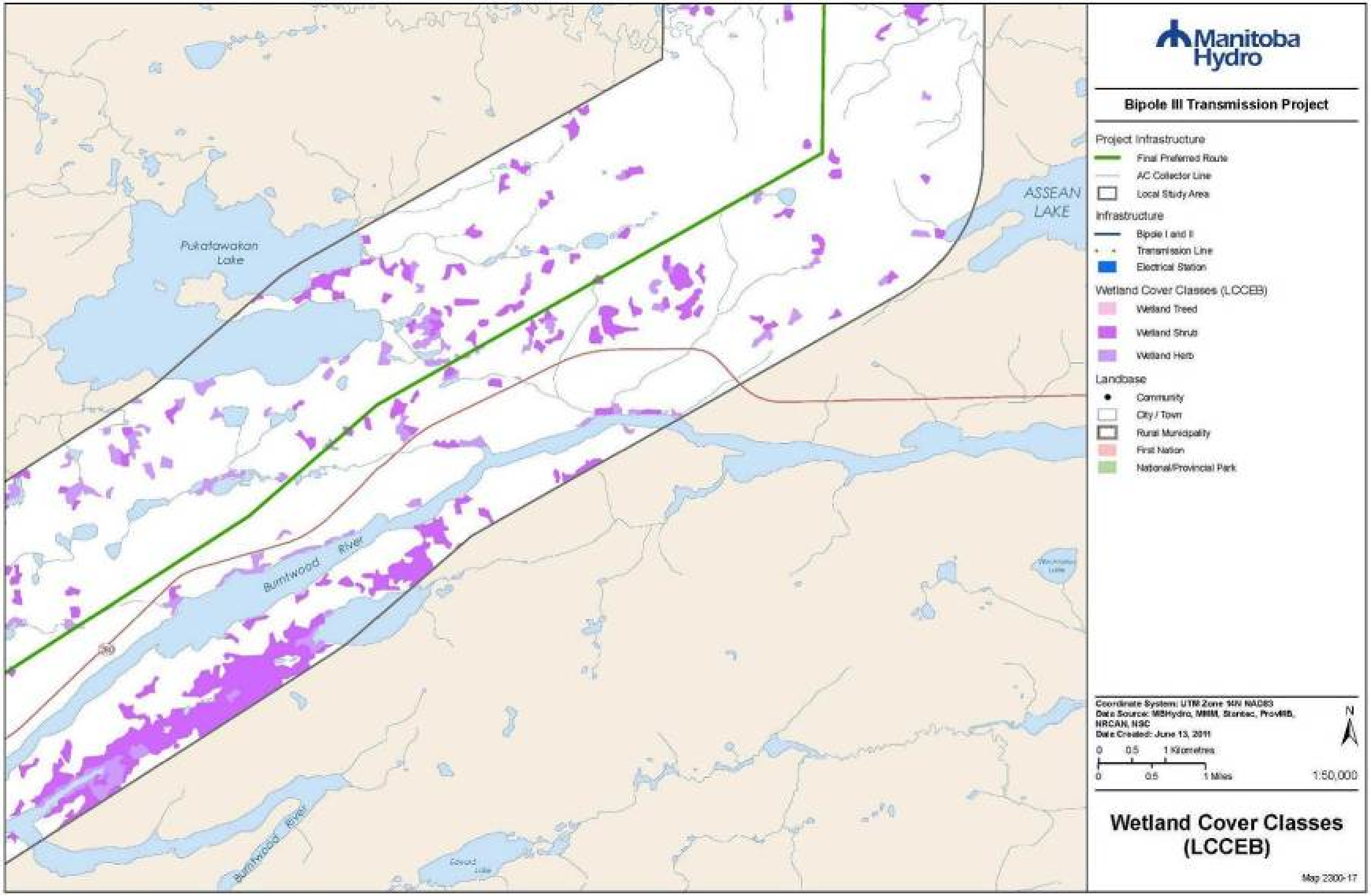
Map Series 2300-14. Distribution of wetland habitat within the Bipole III Project Study Area.



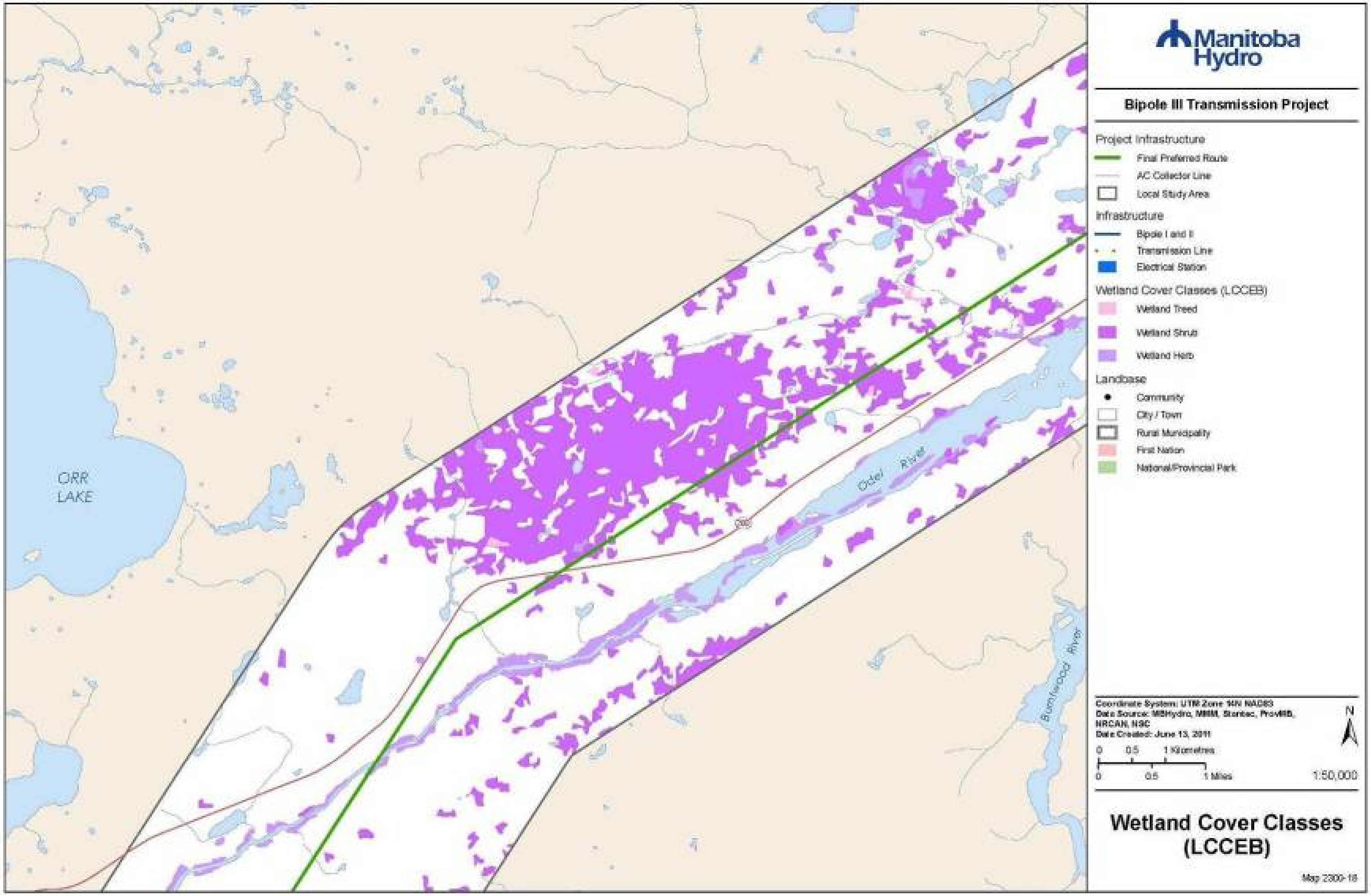
Map Series 2300-15. Distribution of wetland habitat within the Bipole III Project Study Area.



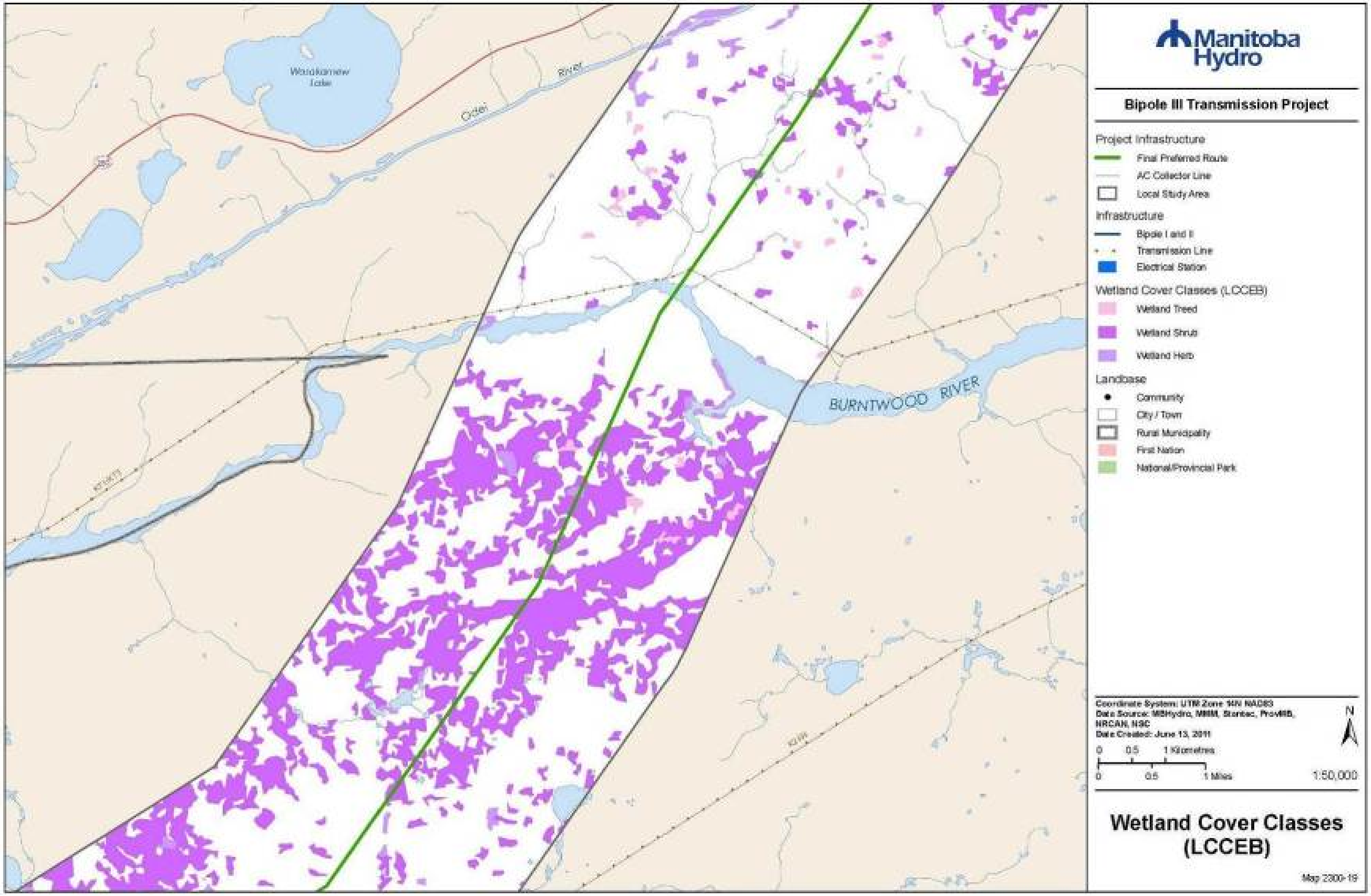
Map Series 2300-16. Distribution of wetland habitat within the Bipole III Project Study Area.



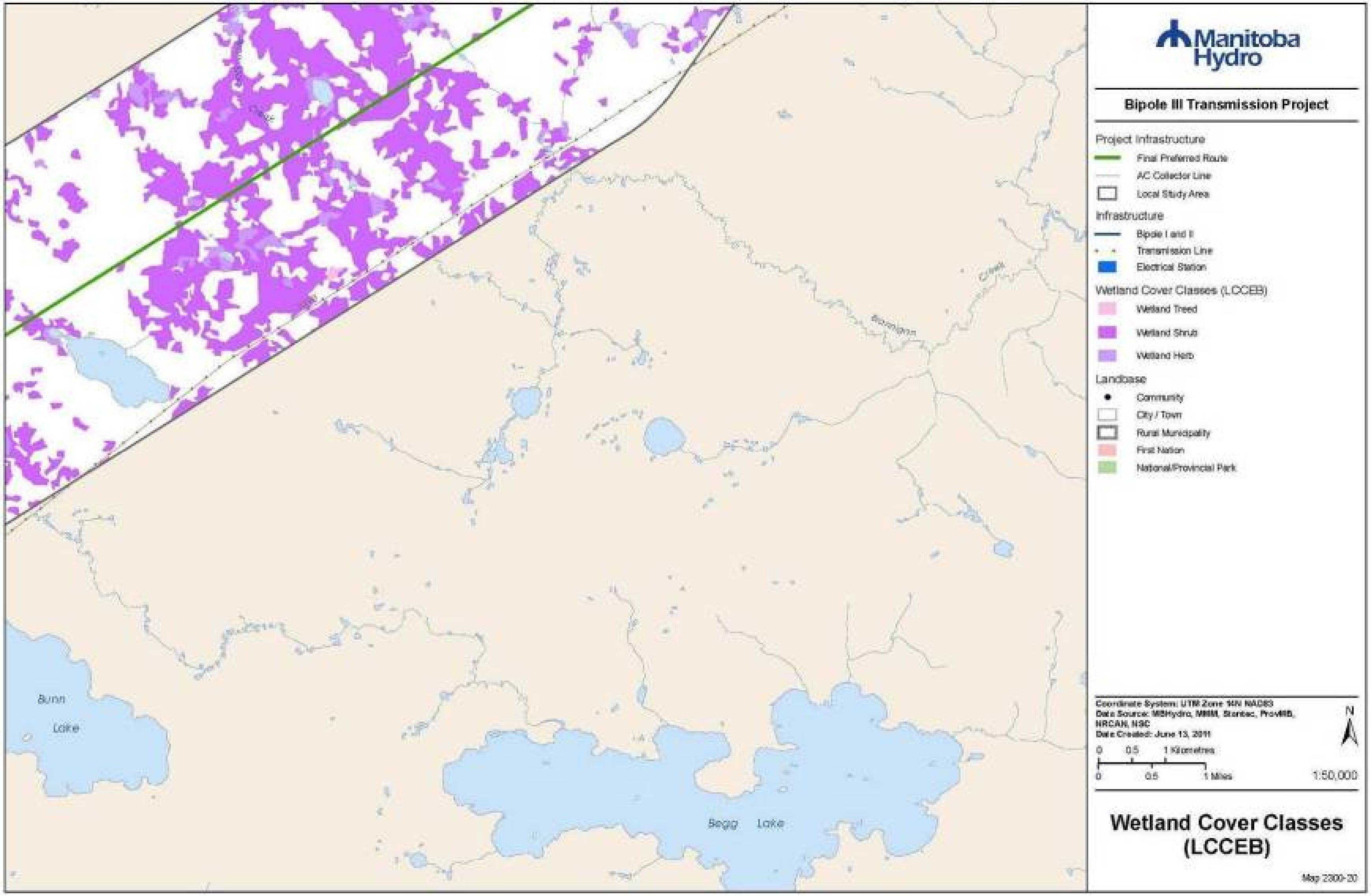
Map Series 2300-17. Distribution of wetland habitat within the Bipole III Project Study Area.



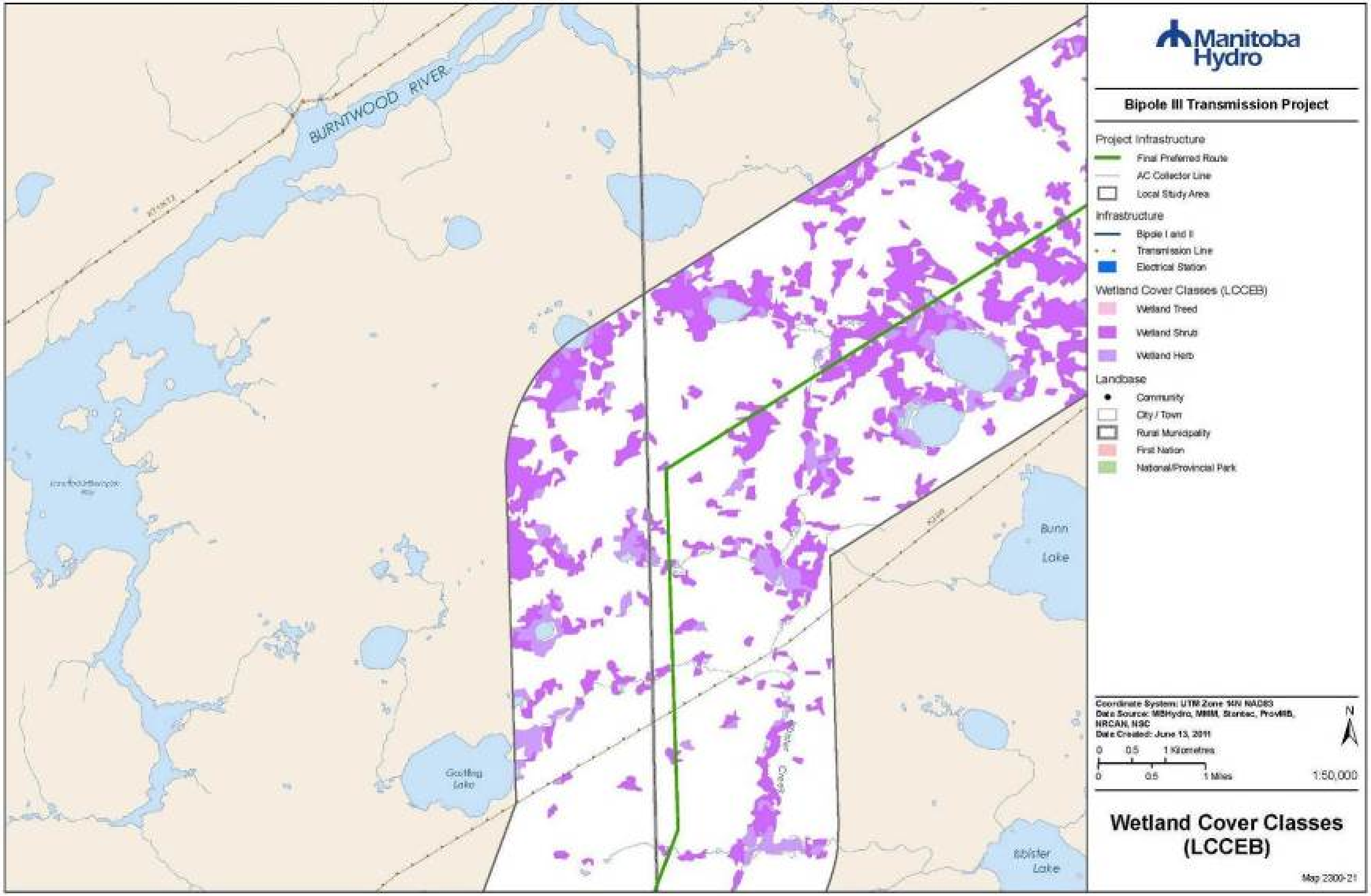
Map Series 2300-18. Distribution of wetland habitat within the Bipole III Project Study Area.



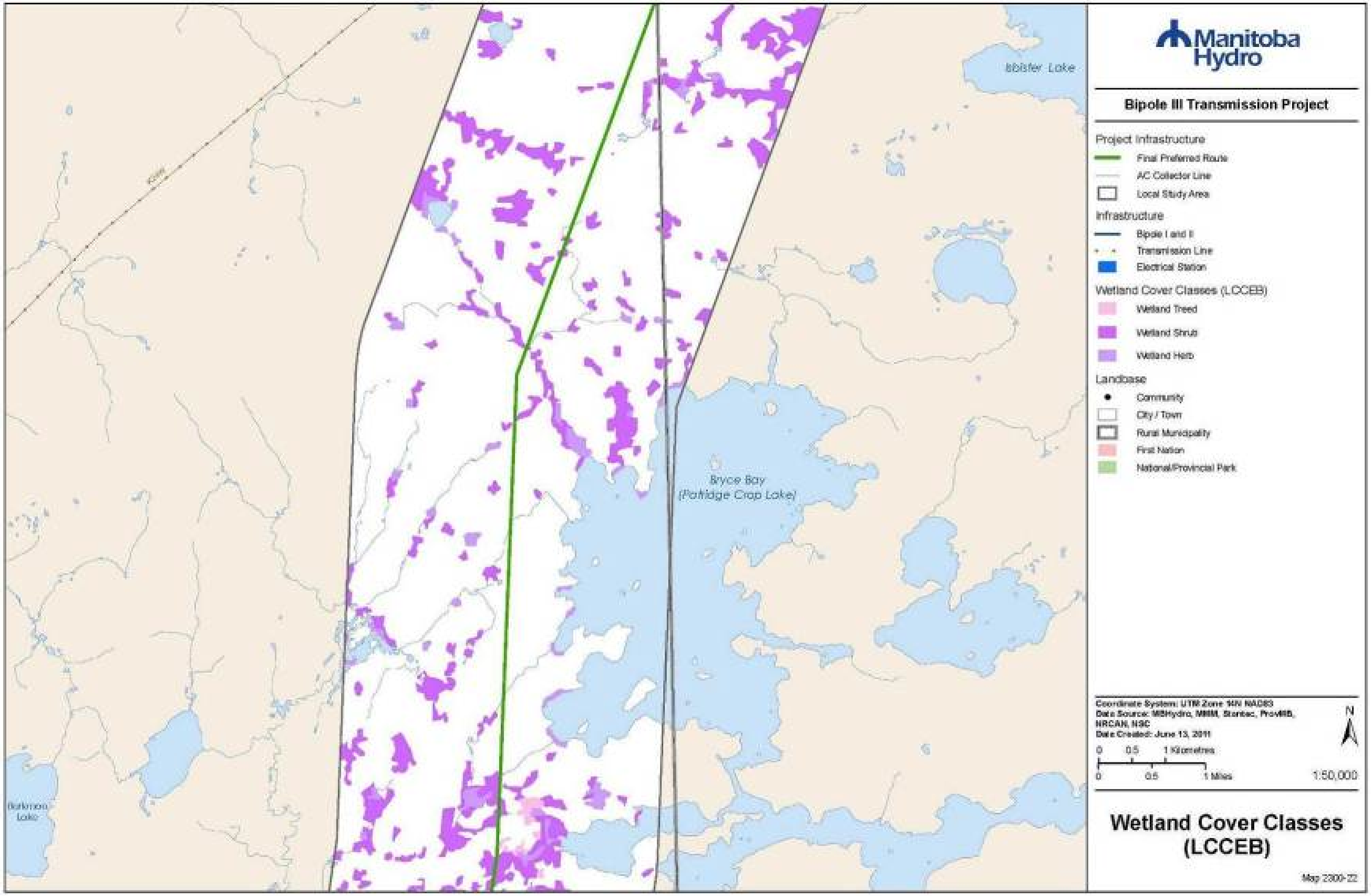
Map Series 2300-19. Distribution of wetland habitat within the Bipole III Project Study Area.



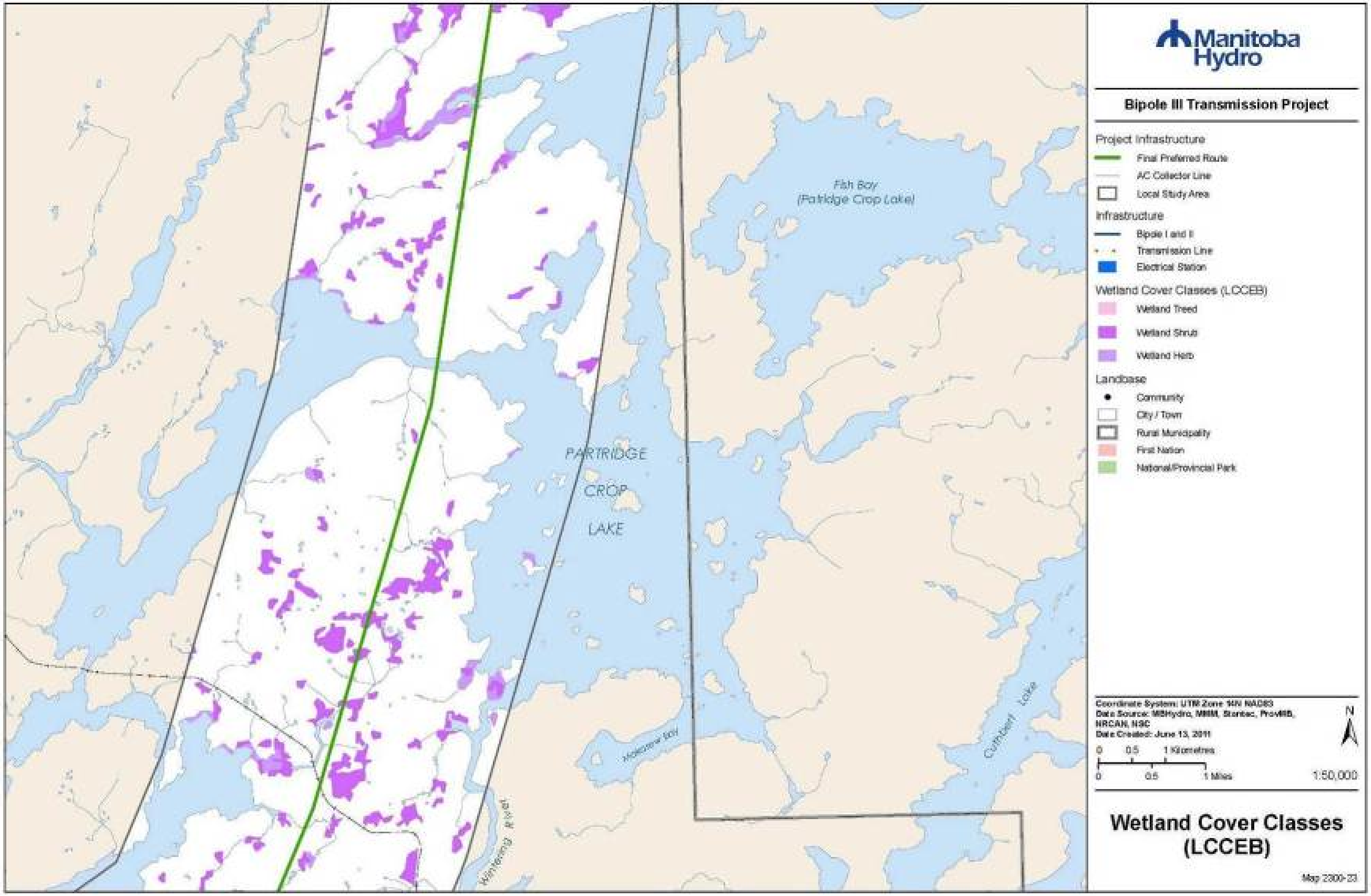
Map Series 2300-20. Distribution of wetland habitat within the Bipole III Project Study Area.



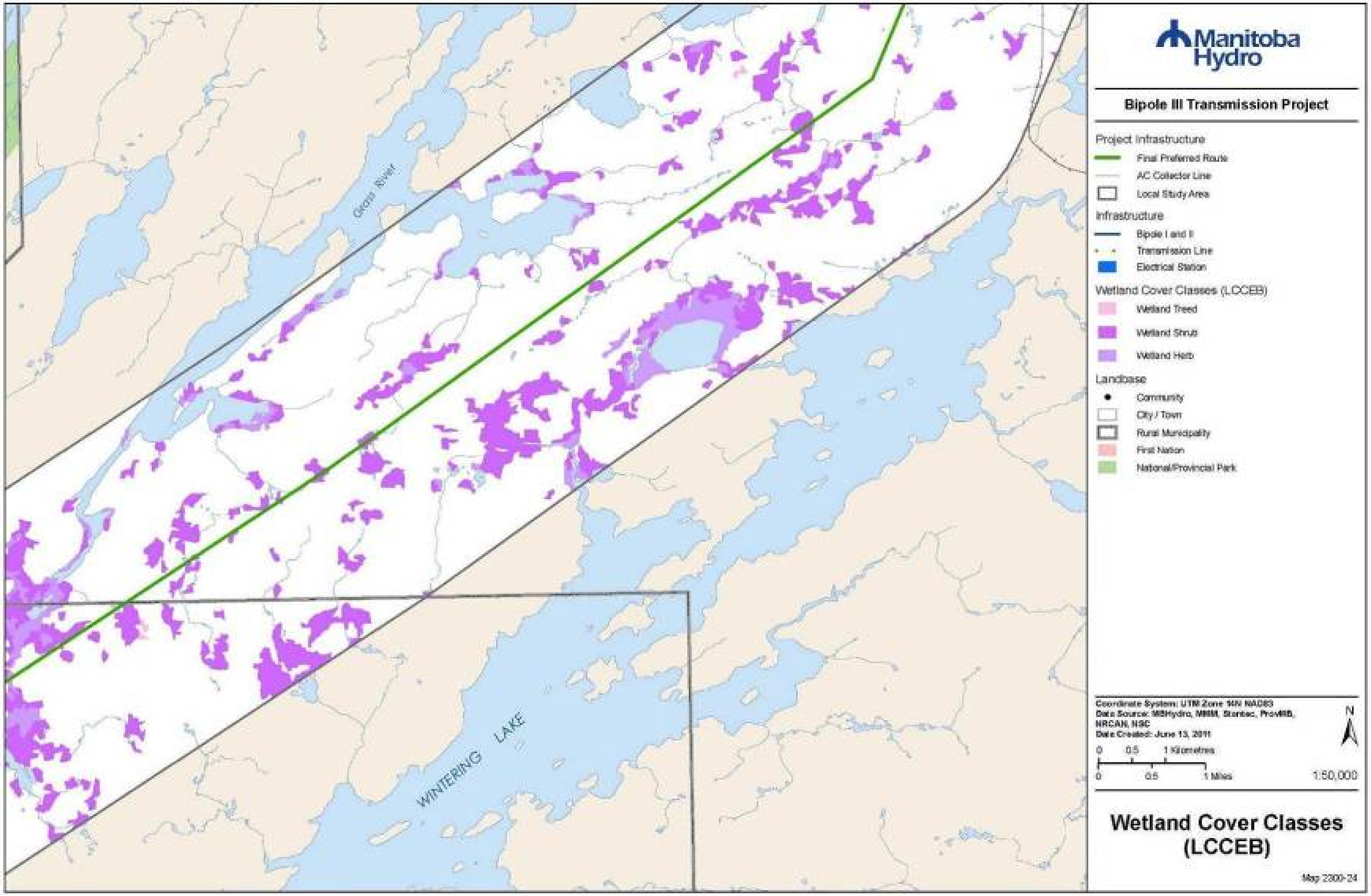
Map Series 2300-21. Distribution of wetland habitat within the Bipole III Project Study Area.



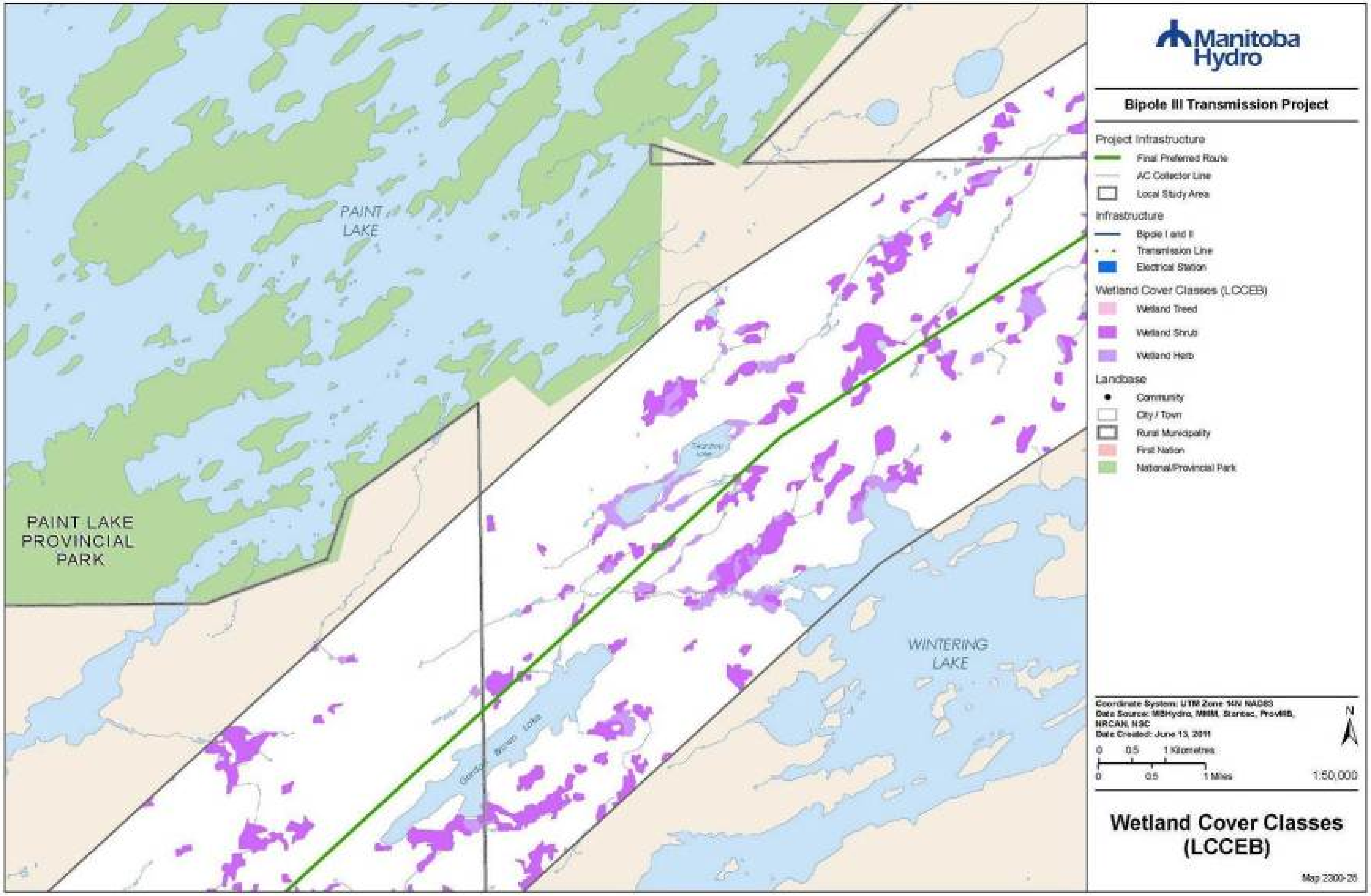
Map Series 2300-22. Distribution of wetland habitat within the Bipole III Project Study Area.



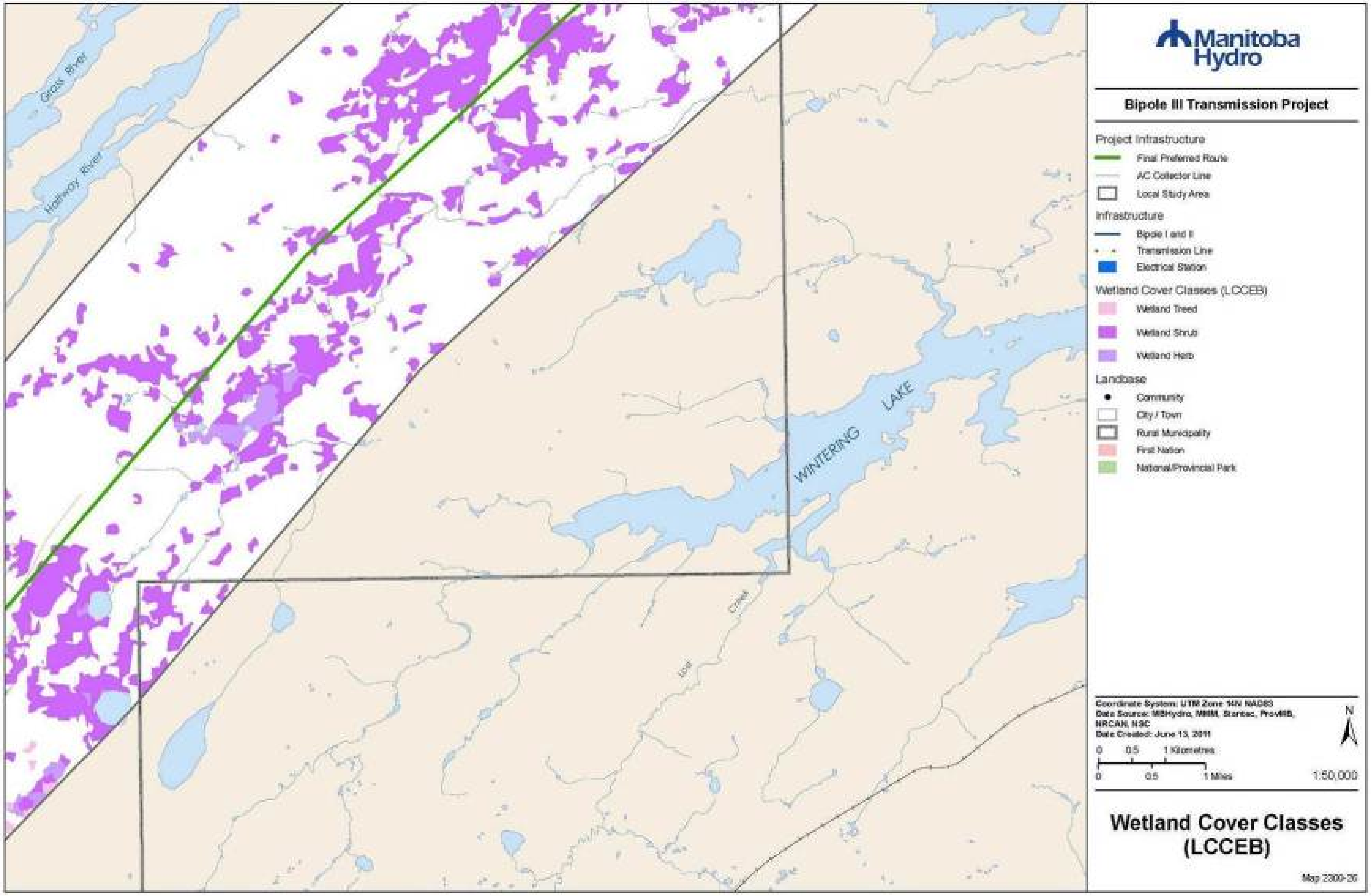
Map Series 2300-23. Distribution of wetland habitat within the Bipole III Project Study Area.



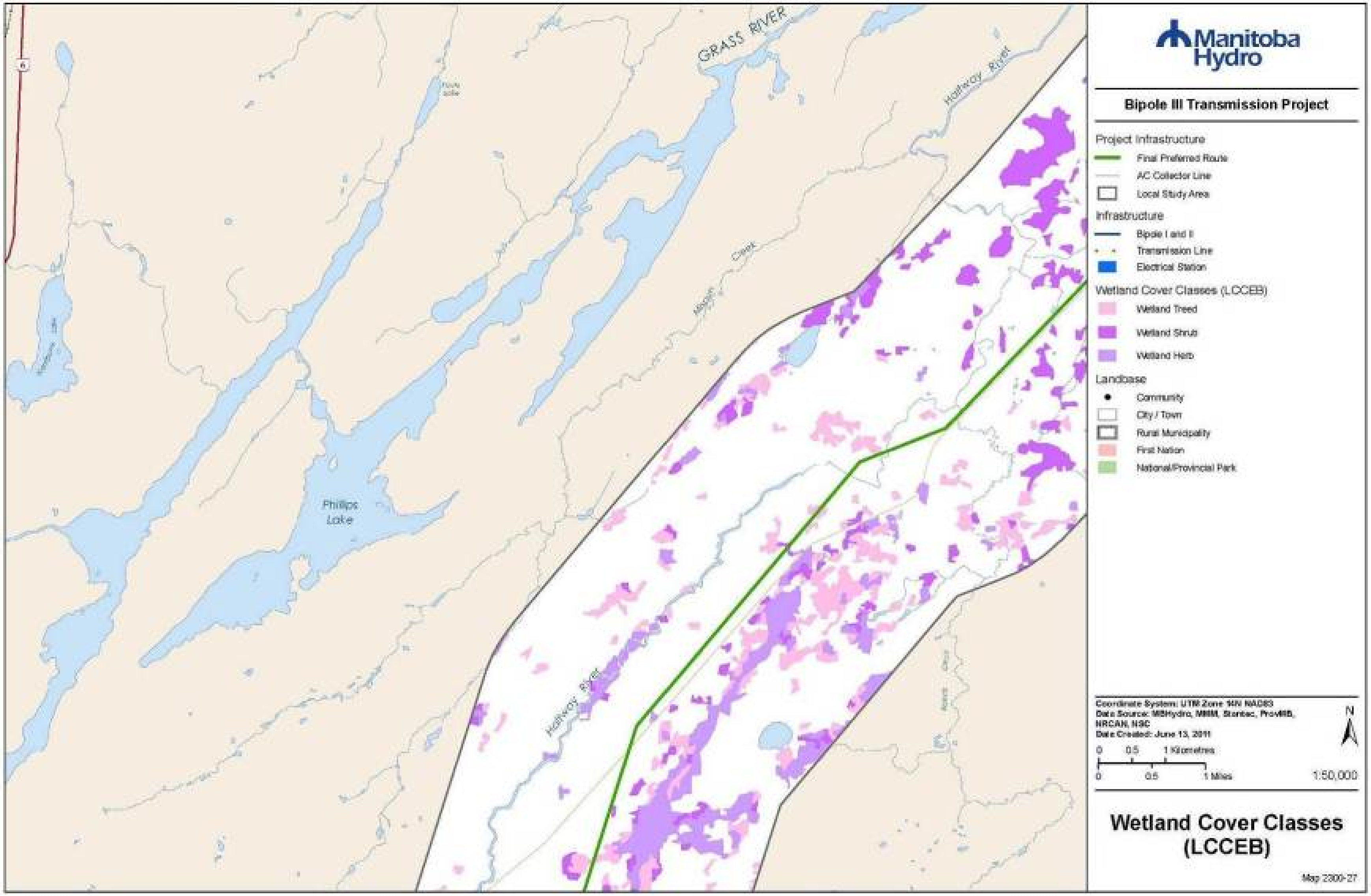
Map Series 2300-24. Distribution of wetland habitat within the Bipole III Project Study Area.



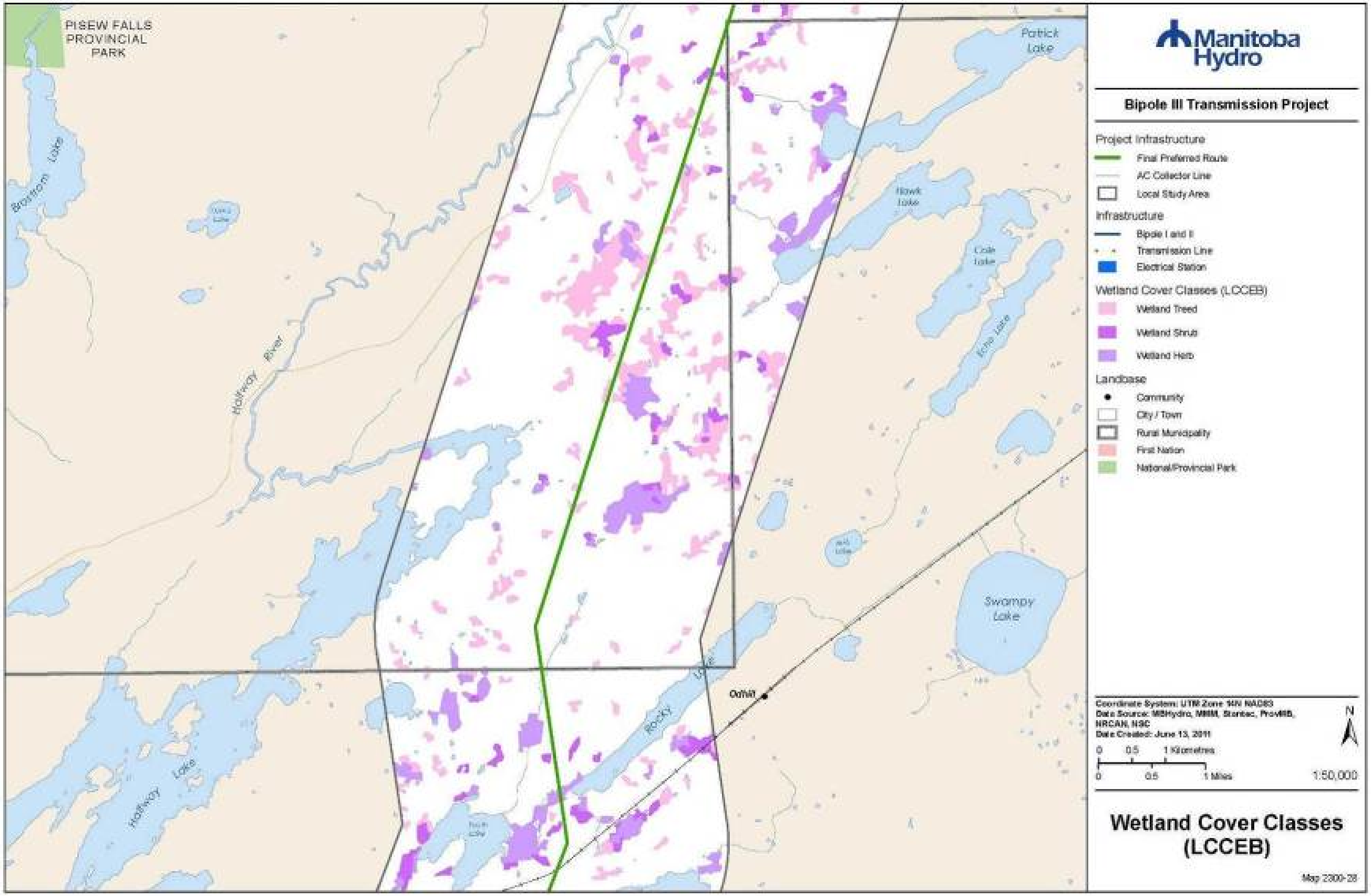
Map Series 2300--25. Distribution of wetland habitat within the Bipole III Project Study Area.



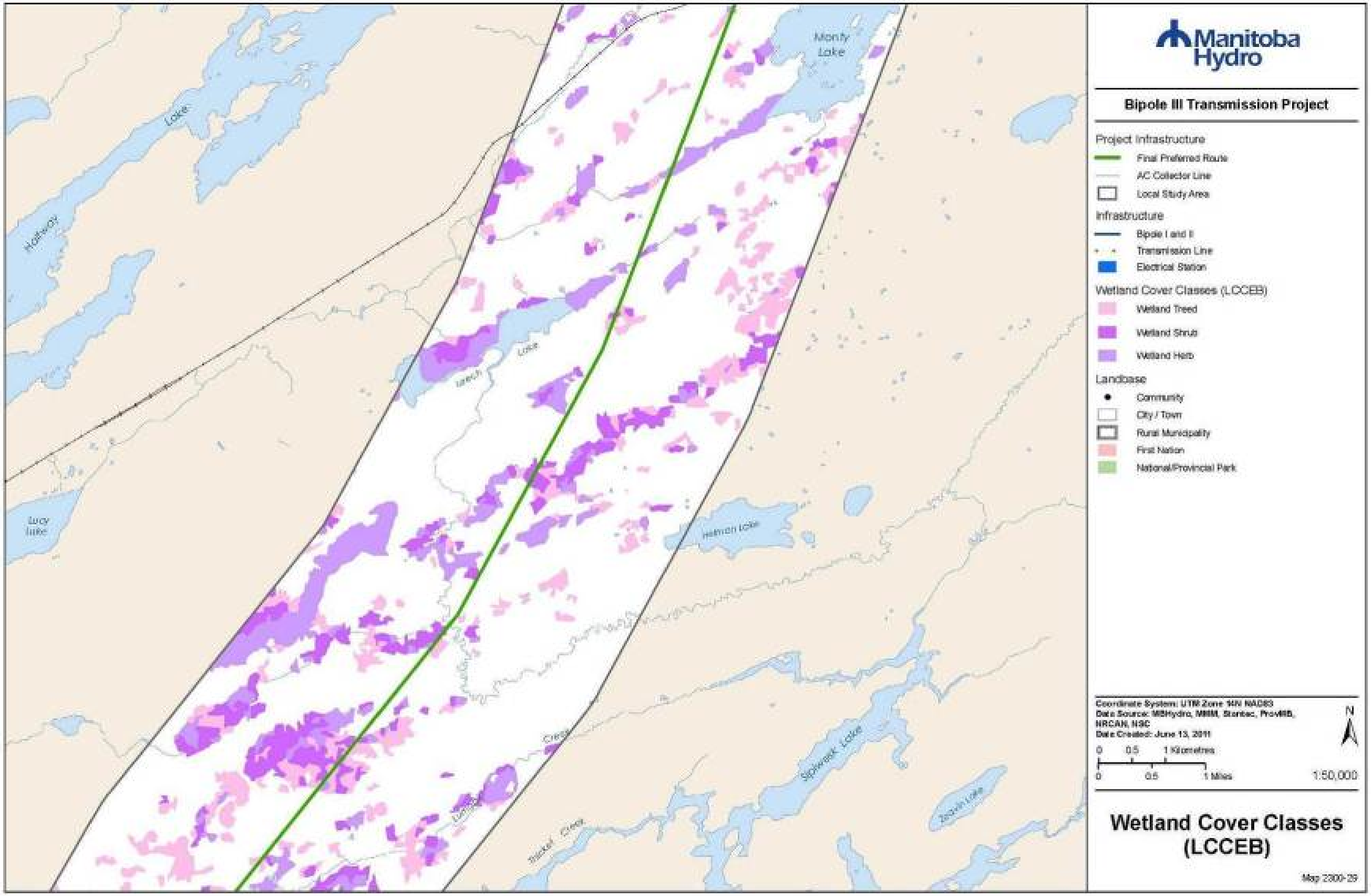
Map Series 2300-26. Distribution of wetland habitat within the Bipole III Project Study Area.



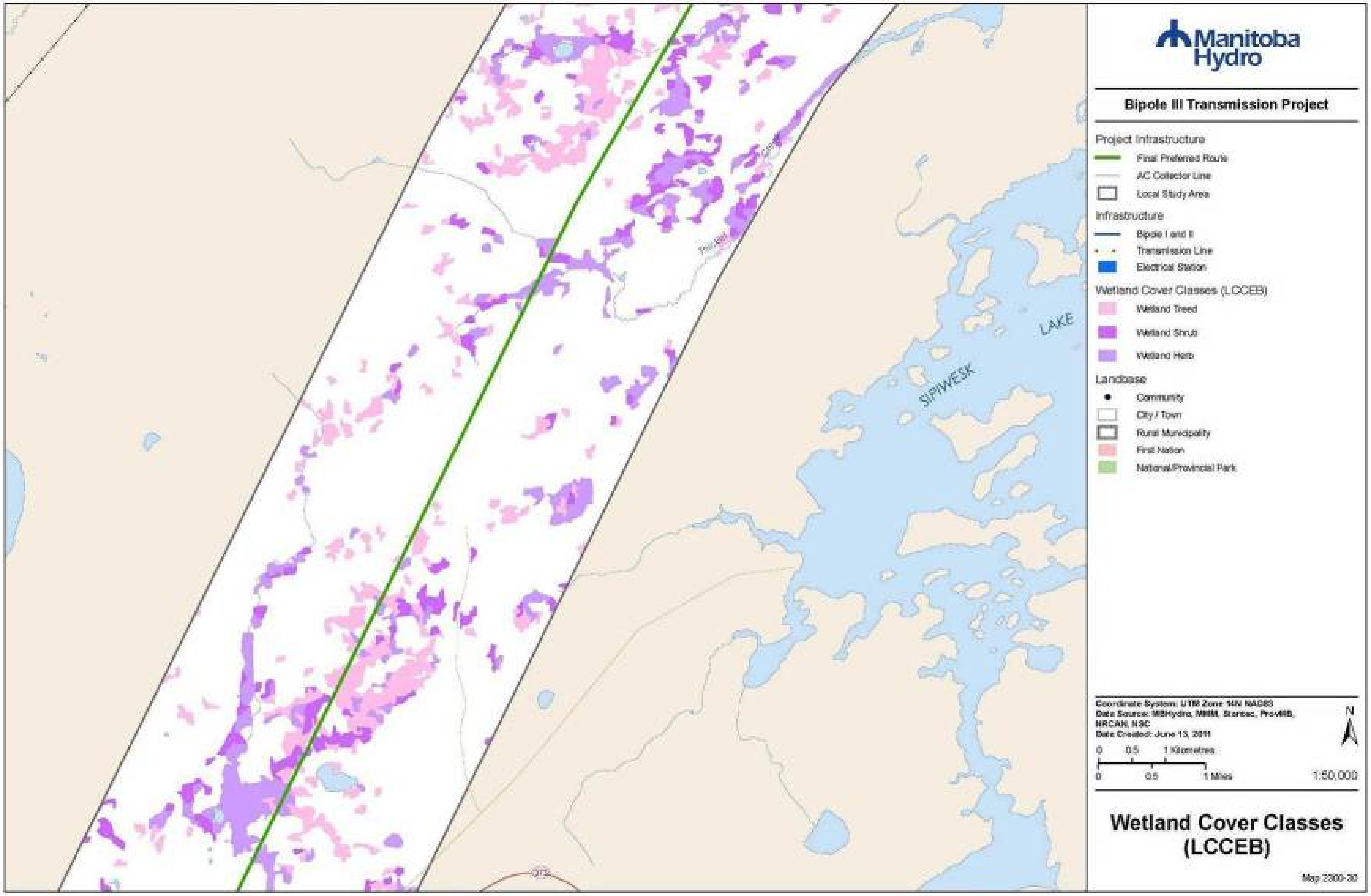
Map Series 2300-27. Distribution of wetland habitat within the Bipole III Project Study Area.



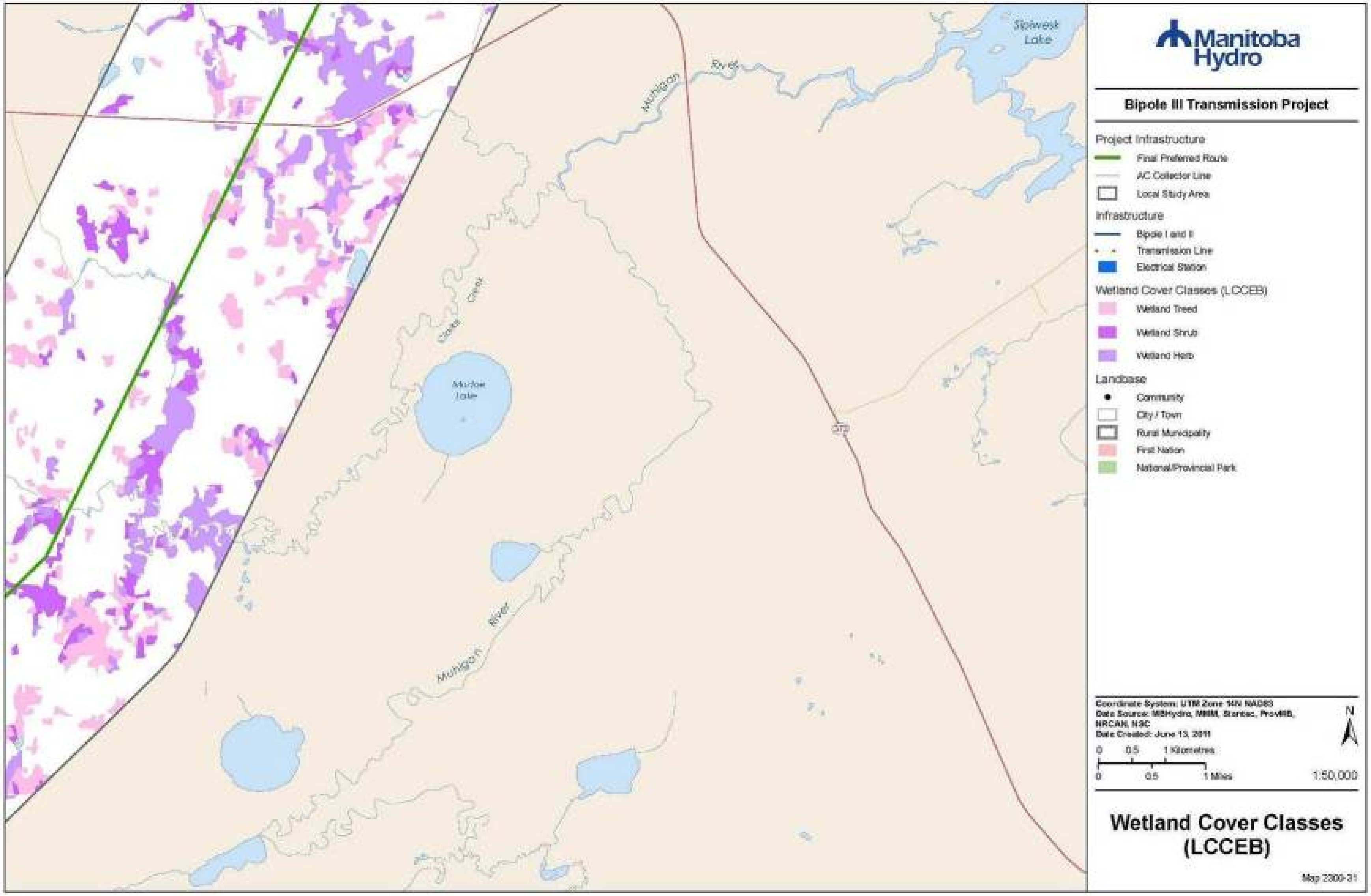
Map Series 2300-28. Distribution of wetland habitat within the Bipole III Project Study Area.



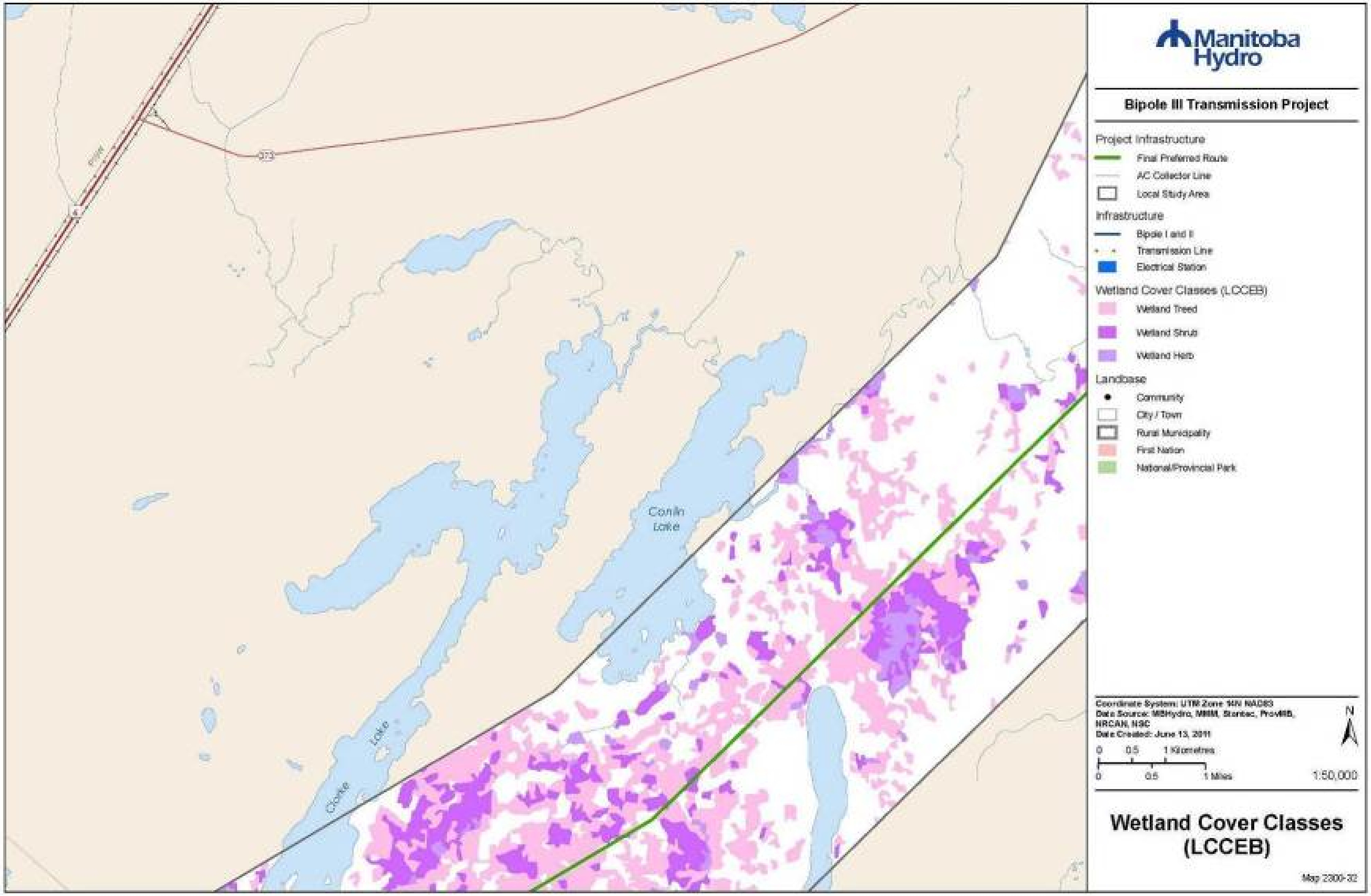
Map Series 2300-29. Distribution of wetland habitat within the Bipole III Project Study Area.



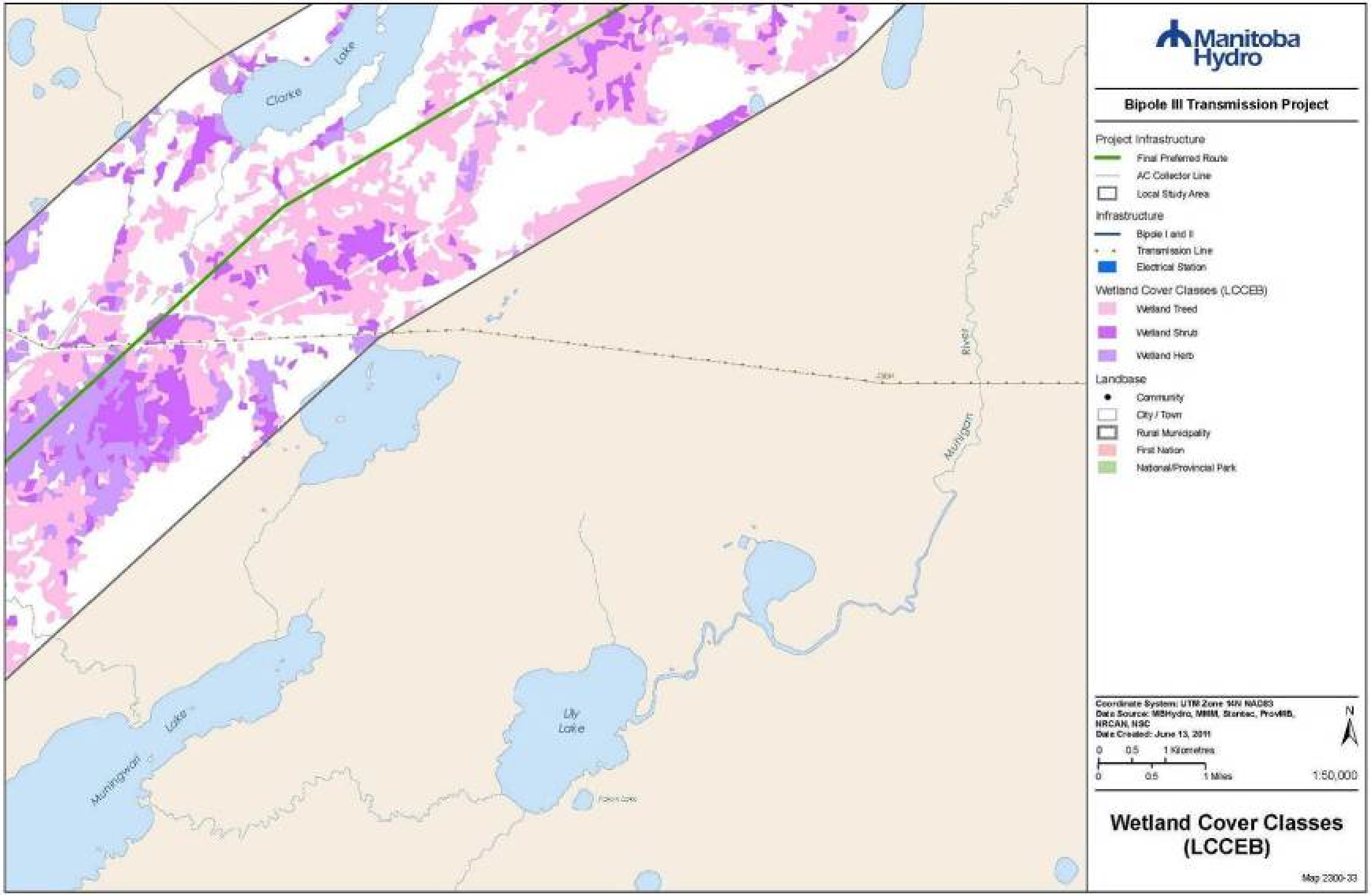
Map Series 2300-30. Distribution of wetland habitat within the Bipole III Project Study Area.



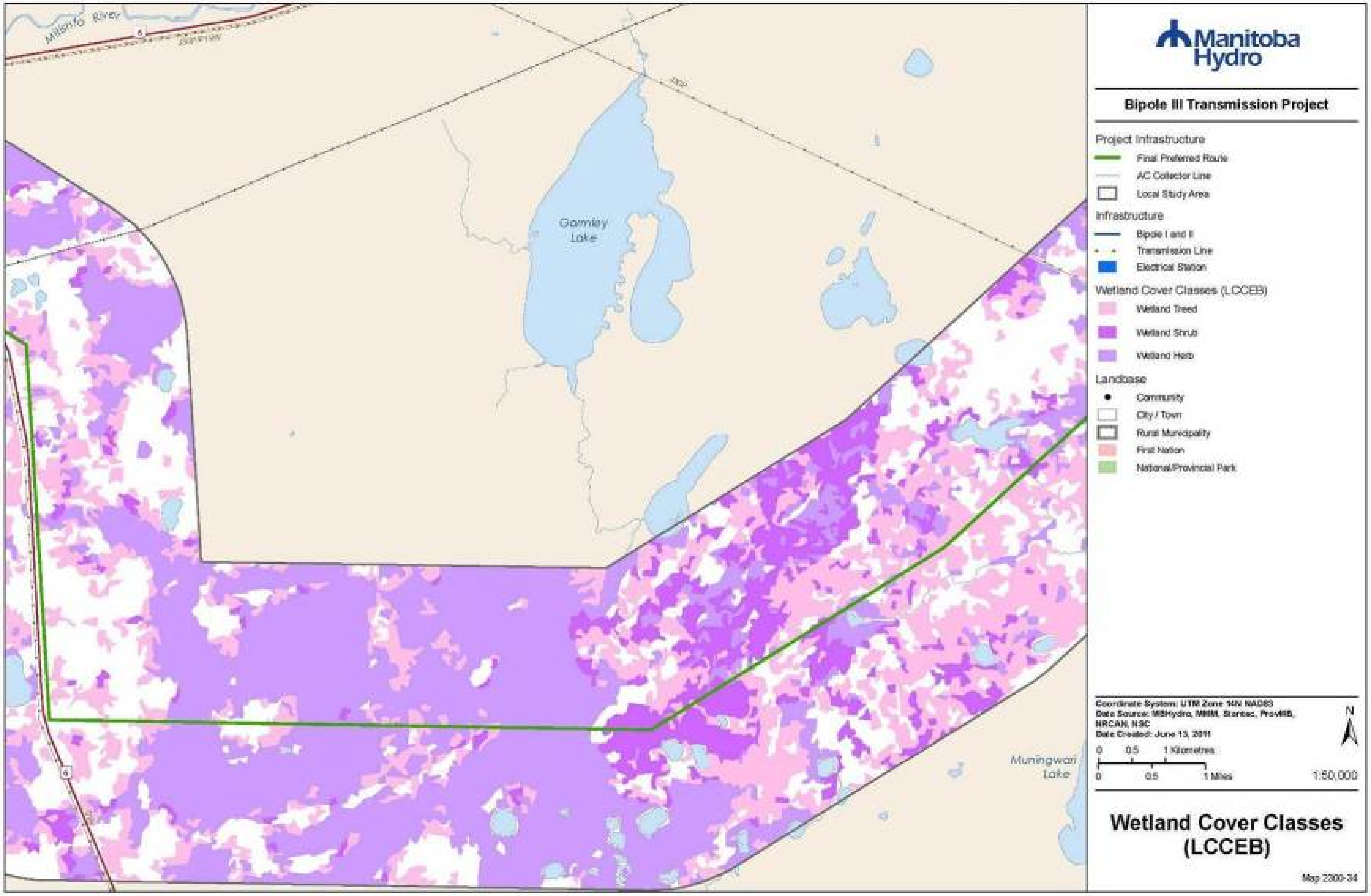
Map Series 2300-31. Distribution of wetland habitat within the Bipole III Project Study Area.



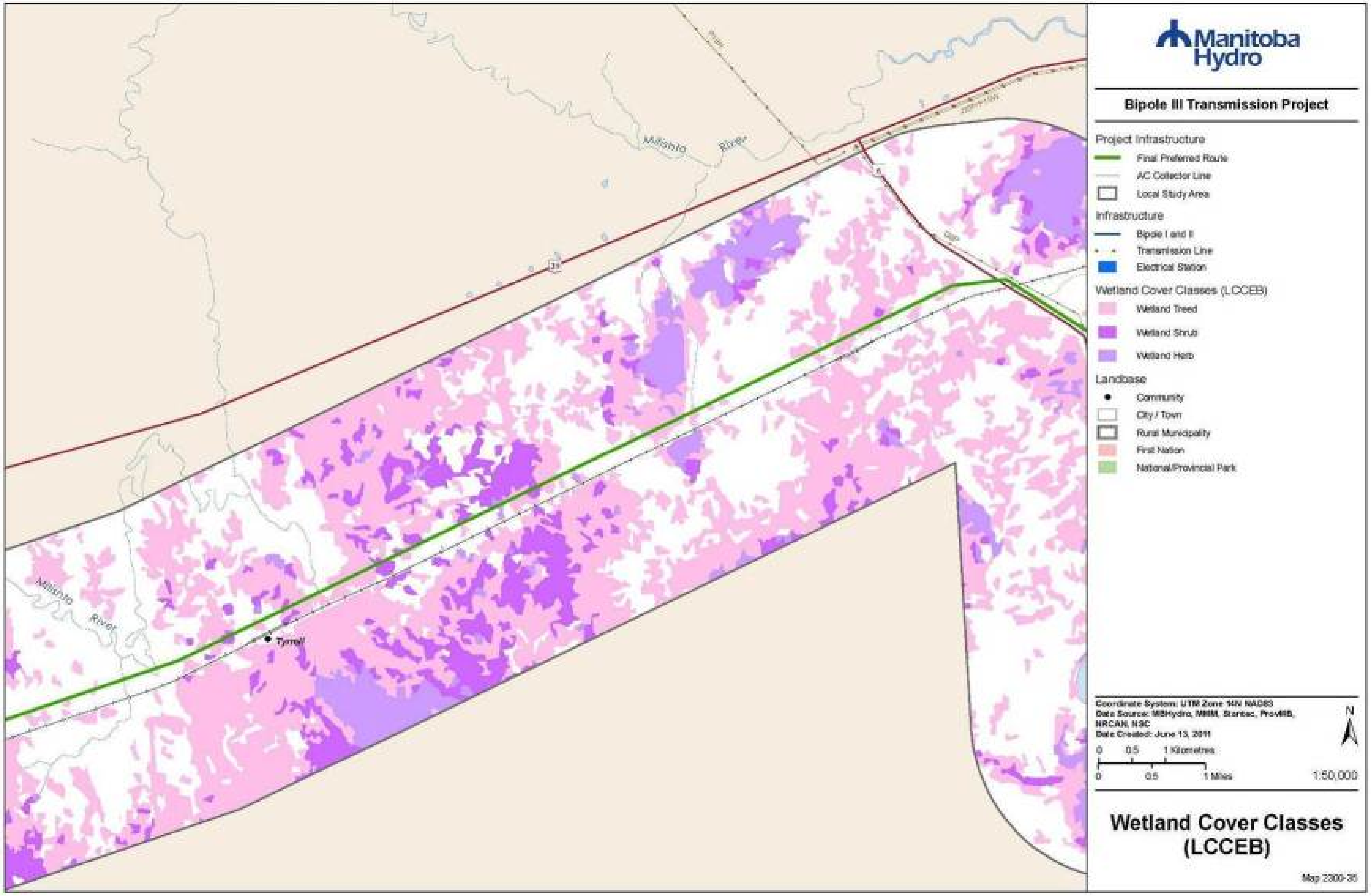
Map Series 2300-32. Distribution of wetland habitat within the Bipole III Project Study Area.



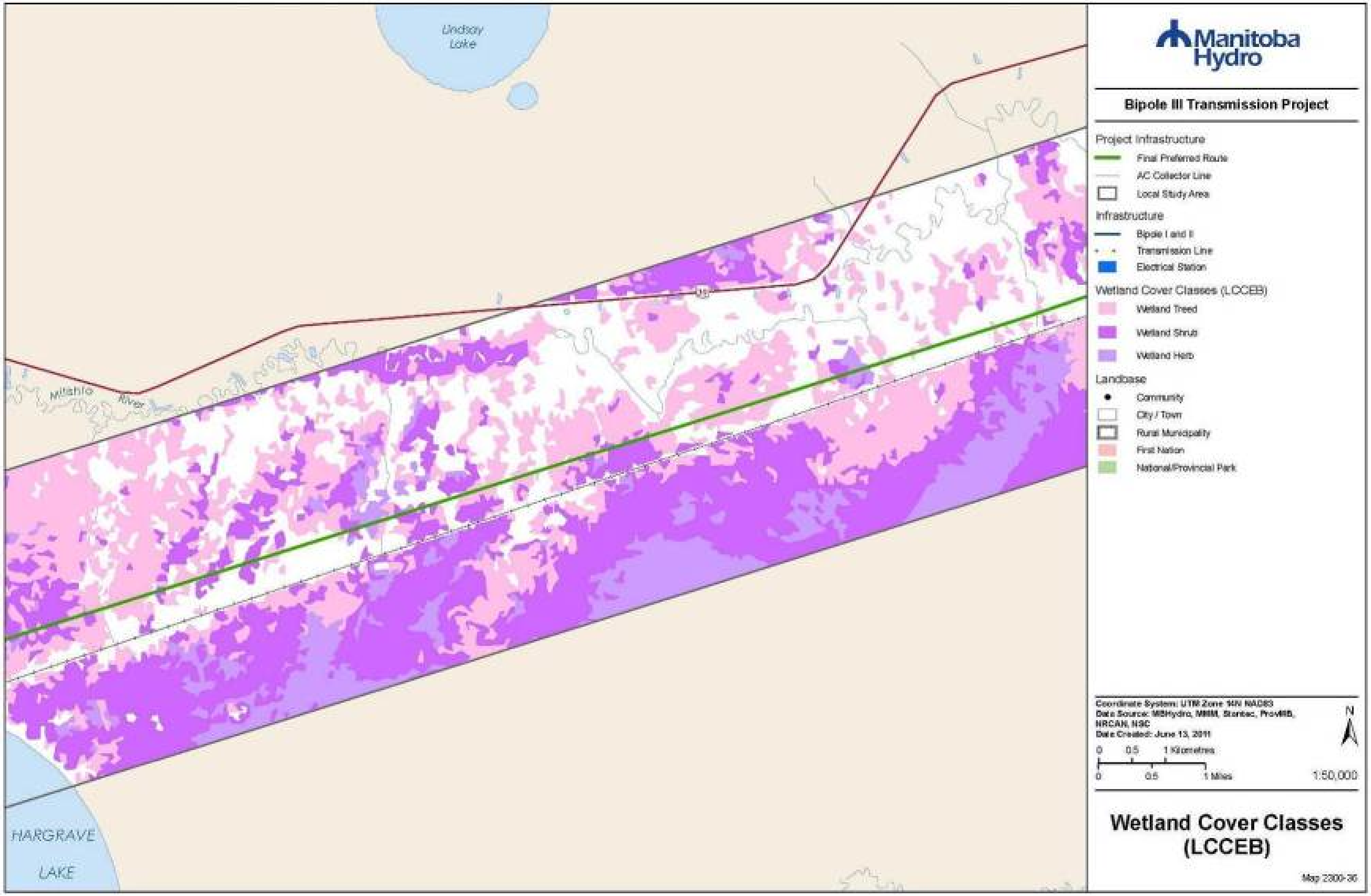
Map Series 2300-33. Distribution of wetland habitat within the Bipole III Project Study Area.



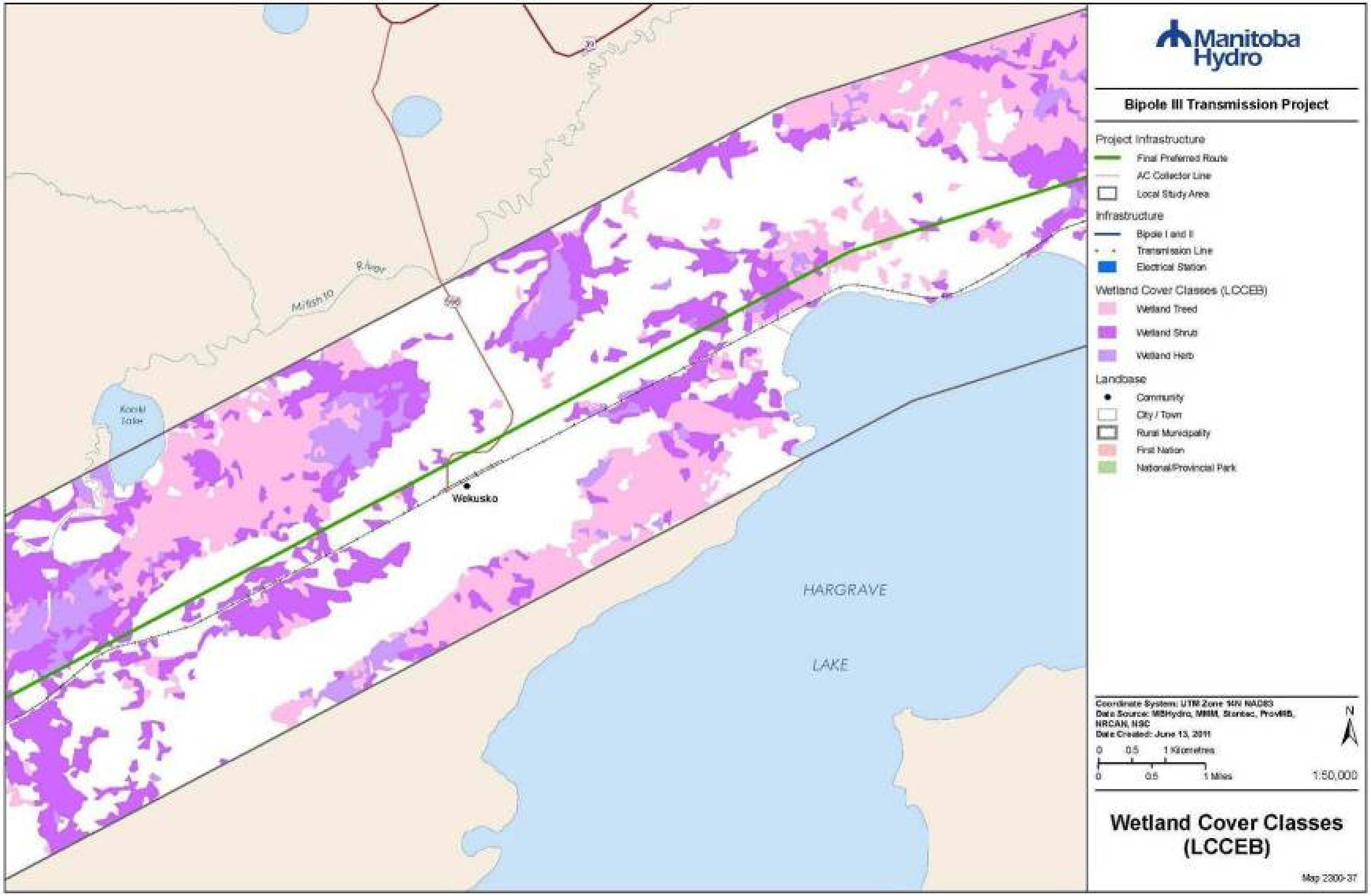
Map Series 2300-34. Distribution of wetland habitat within the Bipole III Project Study Area.



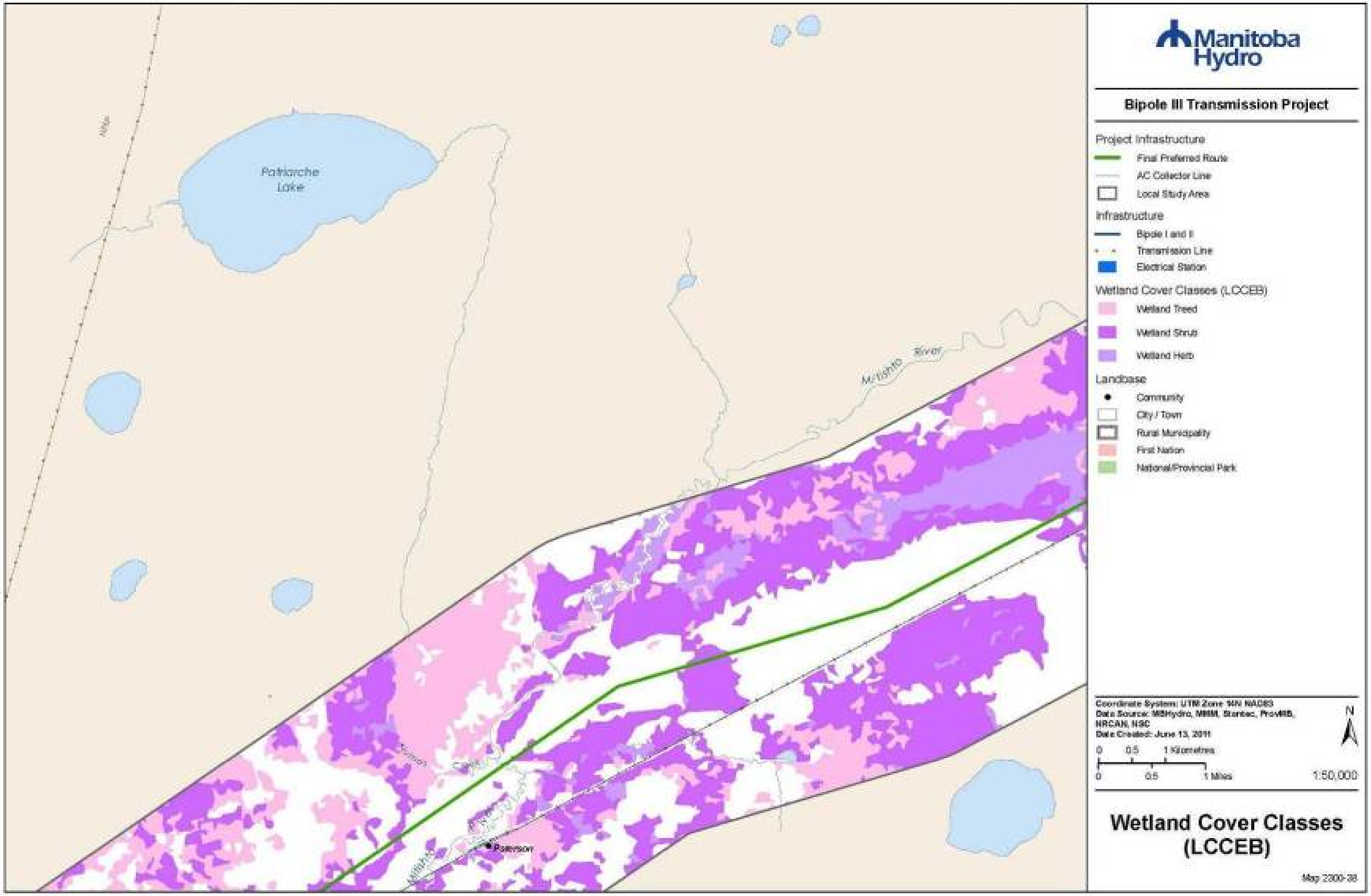
Map Series 2300-35. Distribution of wetland habitat within the Bipole III Project Study Area.



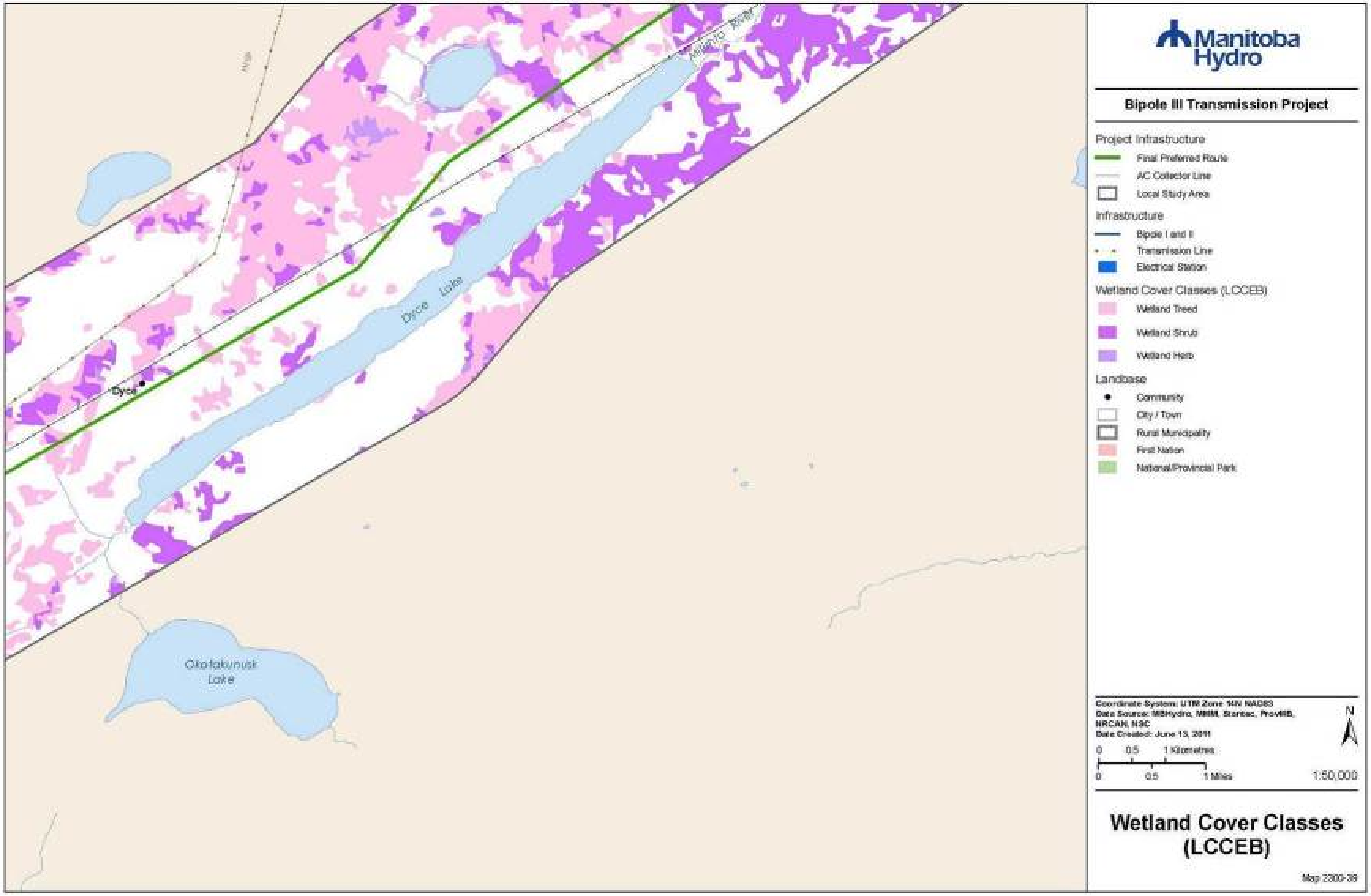
Map Series 2300-36. Distribution of wetland habitat within the Bipole III Project Study Area.



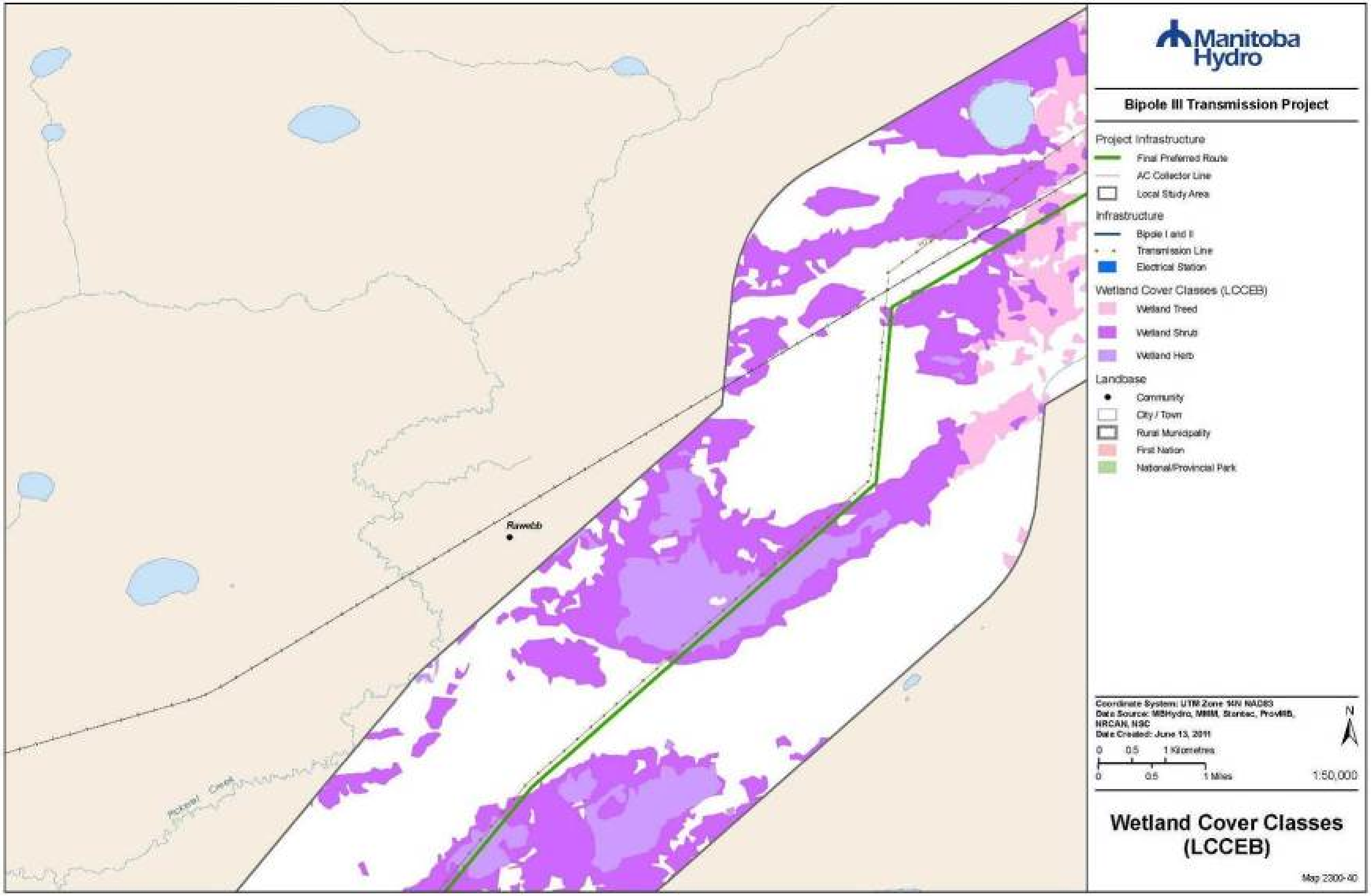
Map Series 2300-37. Distribution of wetland habitat within the Bipole III Project Study Area.



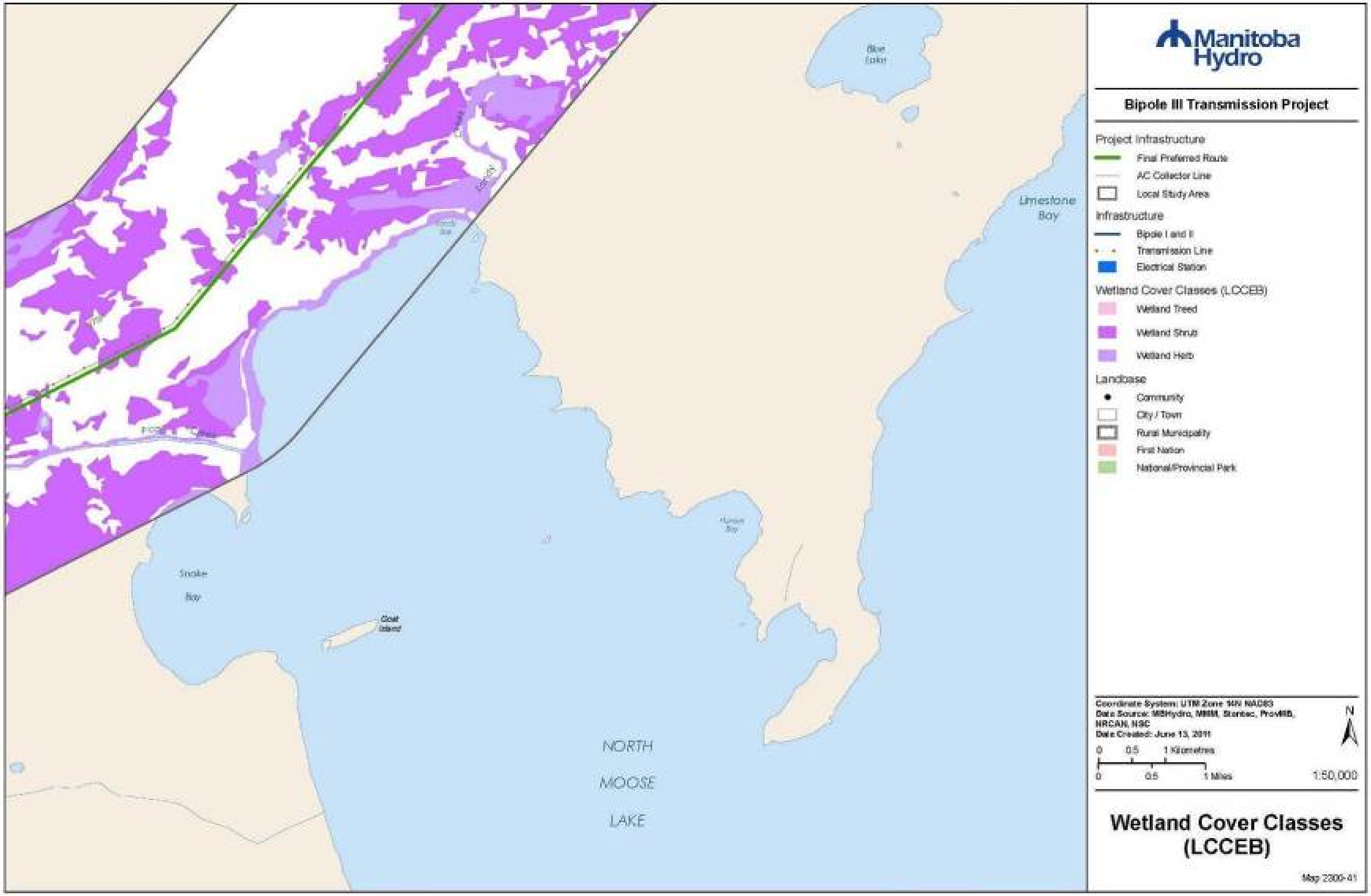
Map Series 2300-38. Distribution of wetland habitat within the Bipole III Project Study Area.



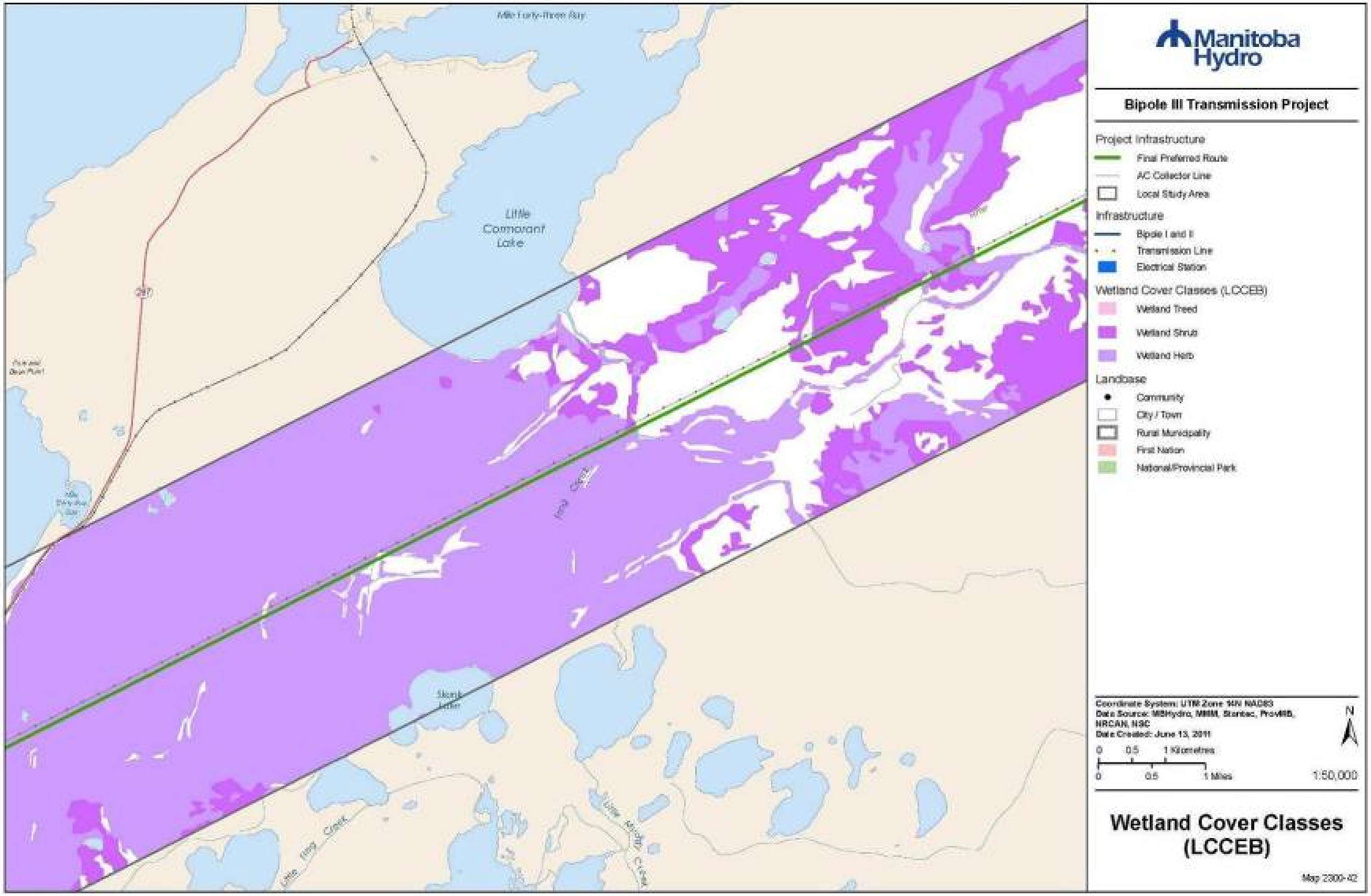
Map Series 2300-39. Distribution of wetland habitat within the Bipole III Project Study Area.



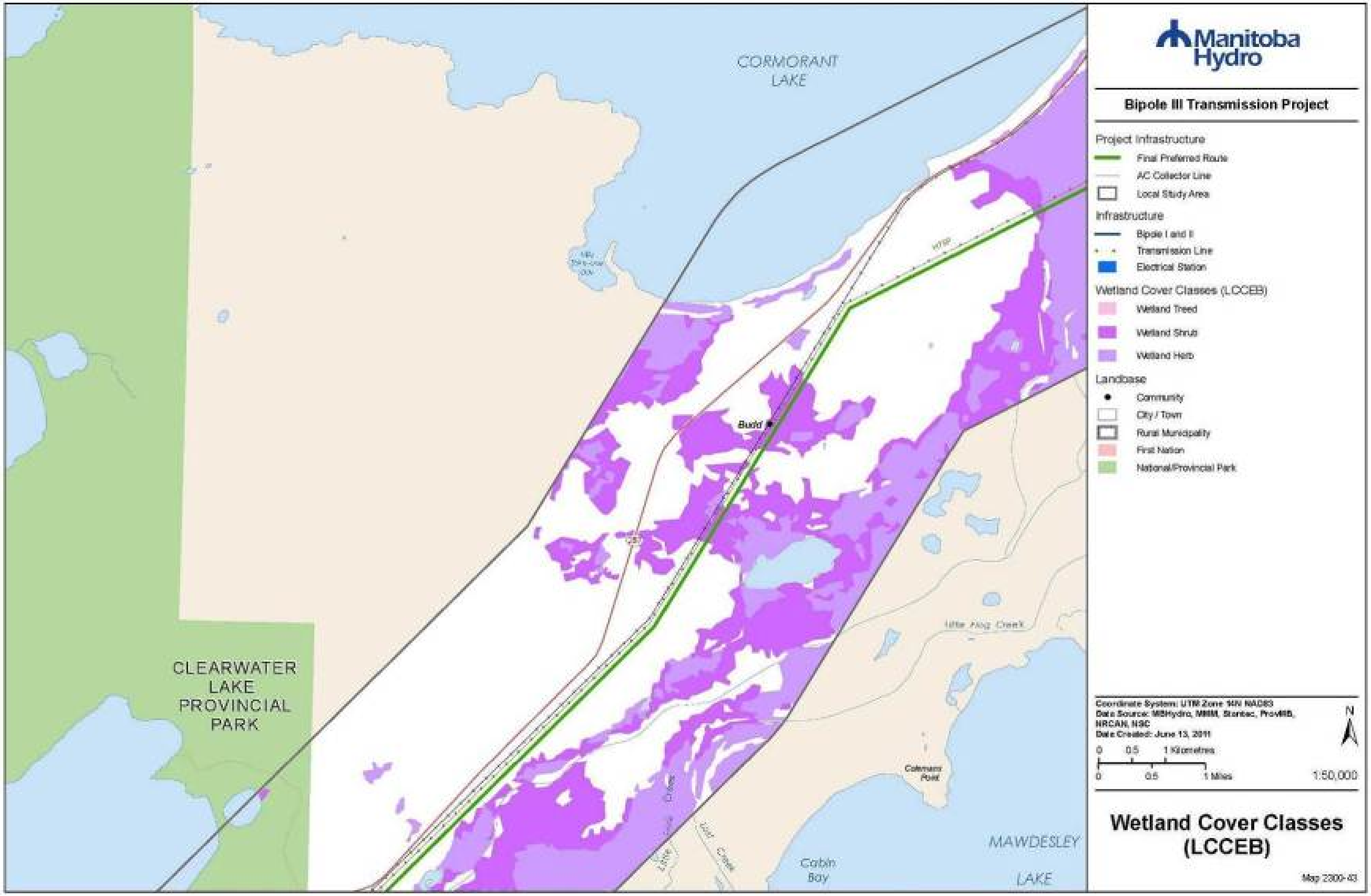
Map Series 2300-40. Distribution of wetland habitat within the Bipole III Project Study Area.



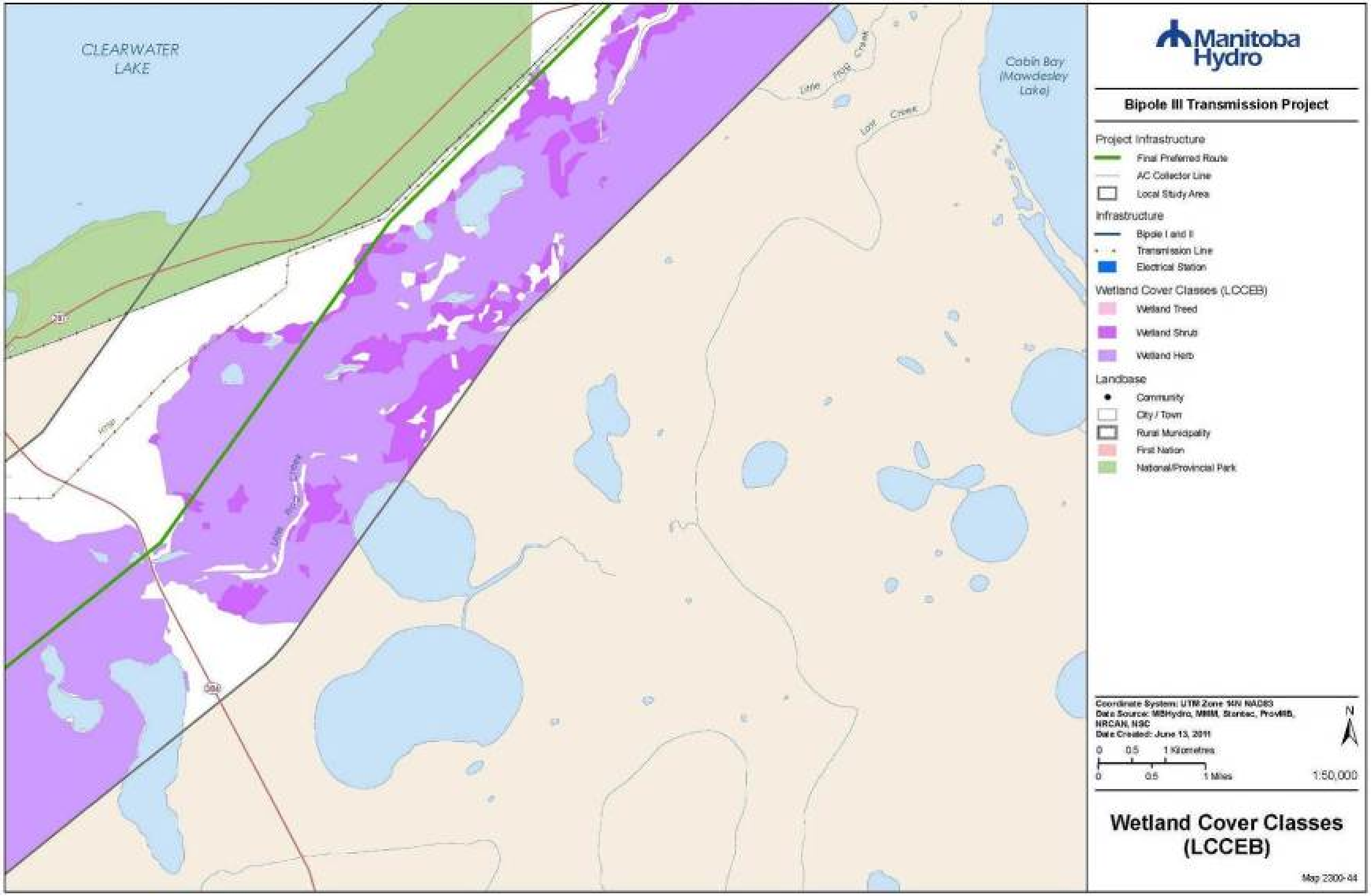
Map Series 2300-41. Distribution of wetland habitat within the Bipole III Project Study Area.



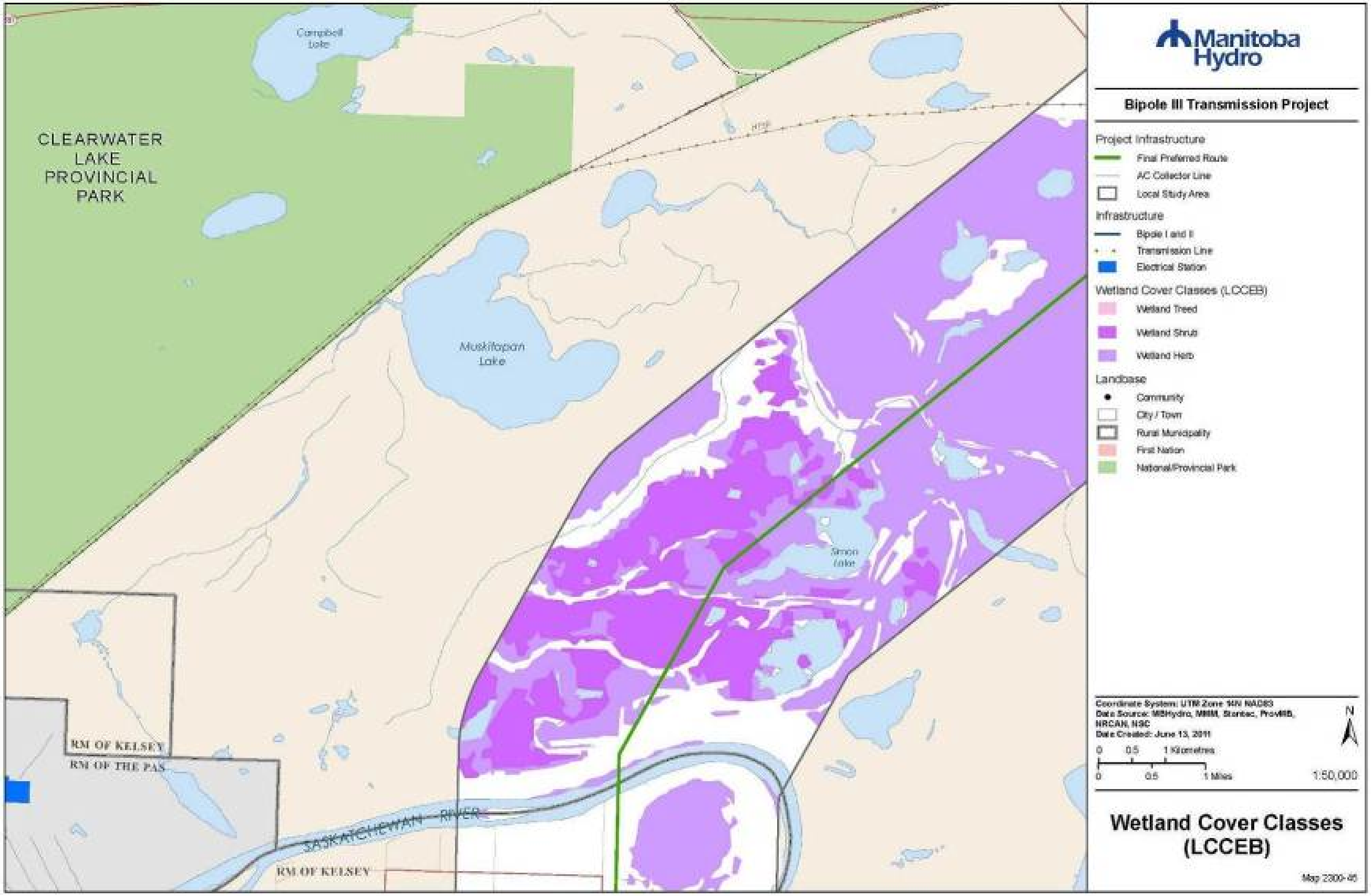
Map Series 2300-42. Distribution of wetland habitat within the Bipole III Project Study Area.



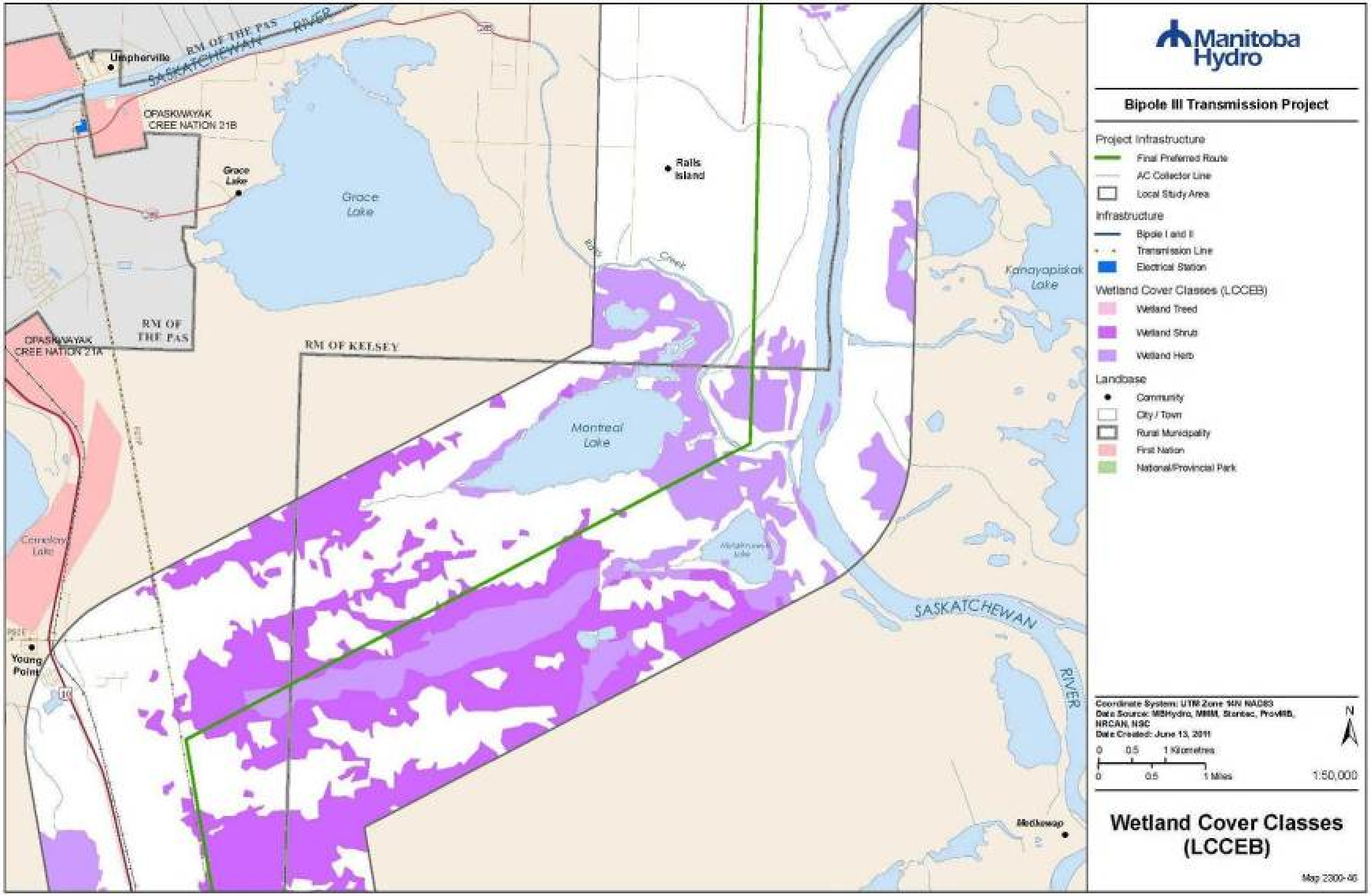
Map Series 2300-43. Distribution of wetland habitat within the Bipole III Project Study Area.



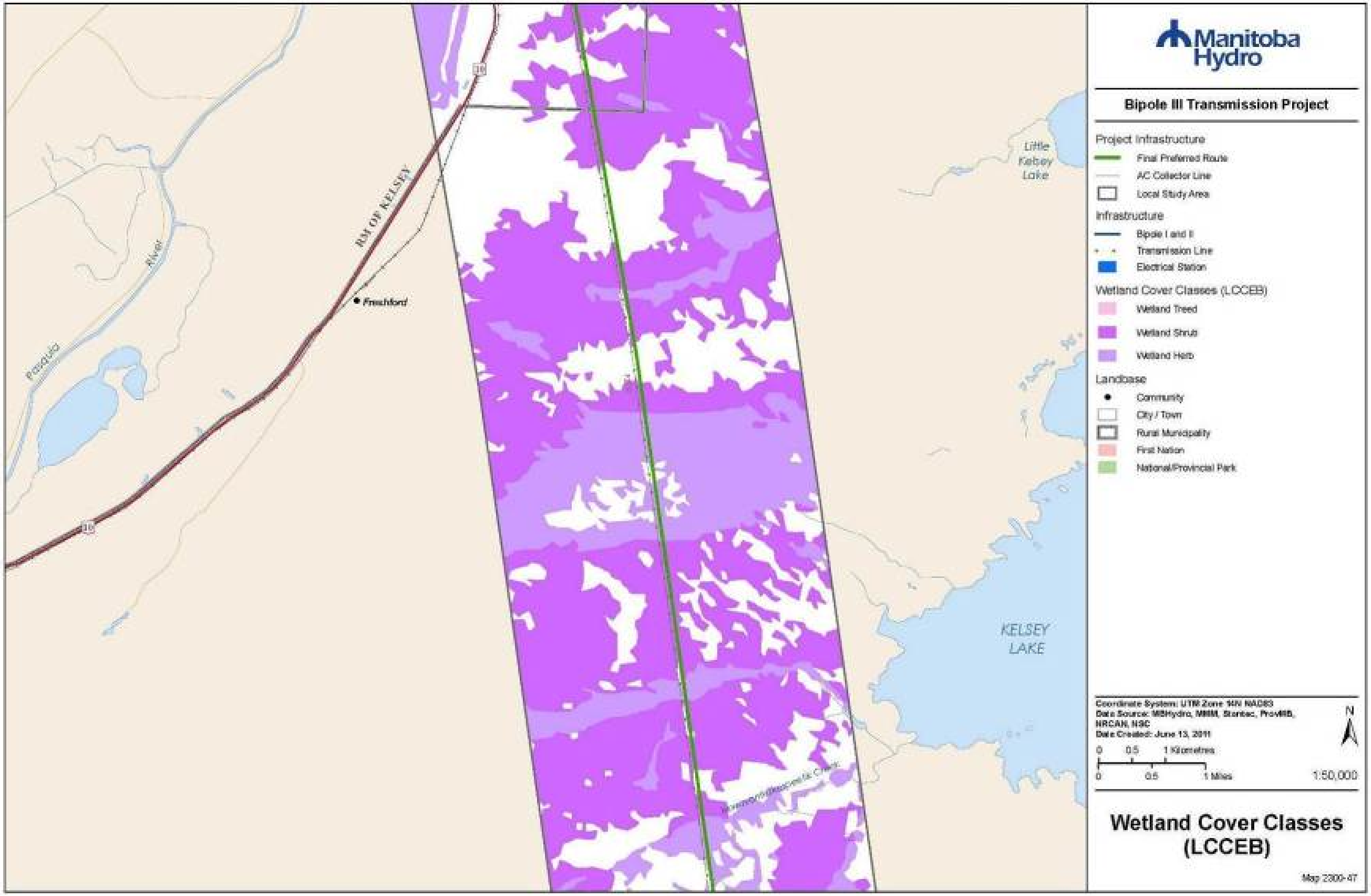
Map Series 2300-44. Distribution of wetland habitat within the Bipole III Project Study Area.



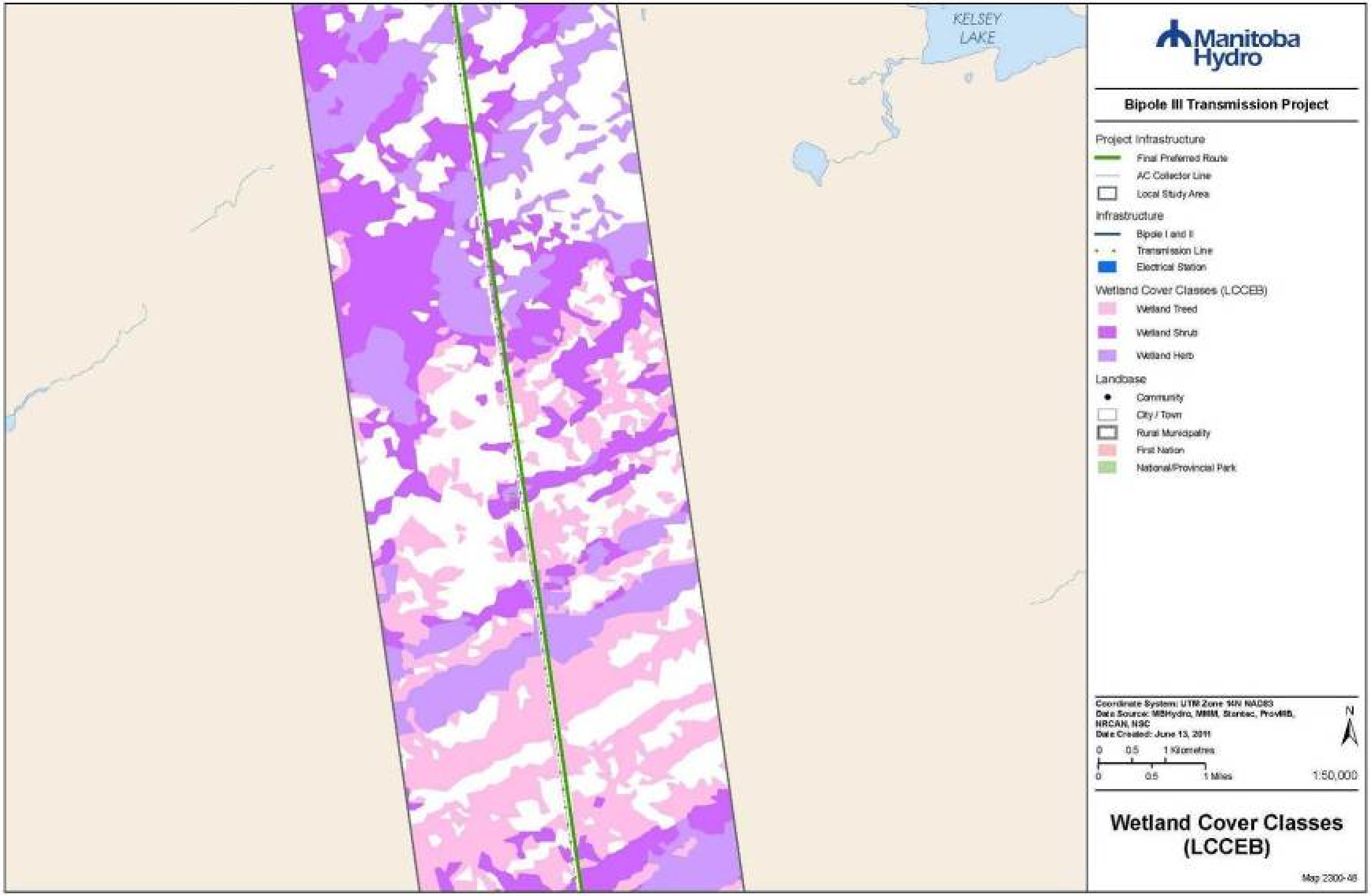
Map Series 2300-45. Distribution of wetland habitat within the Bipole III Project Study Area.



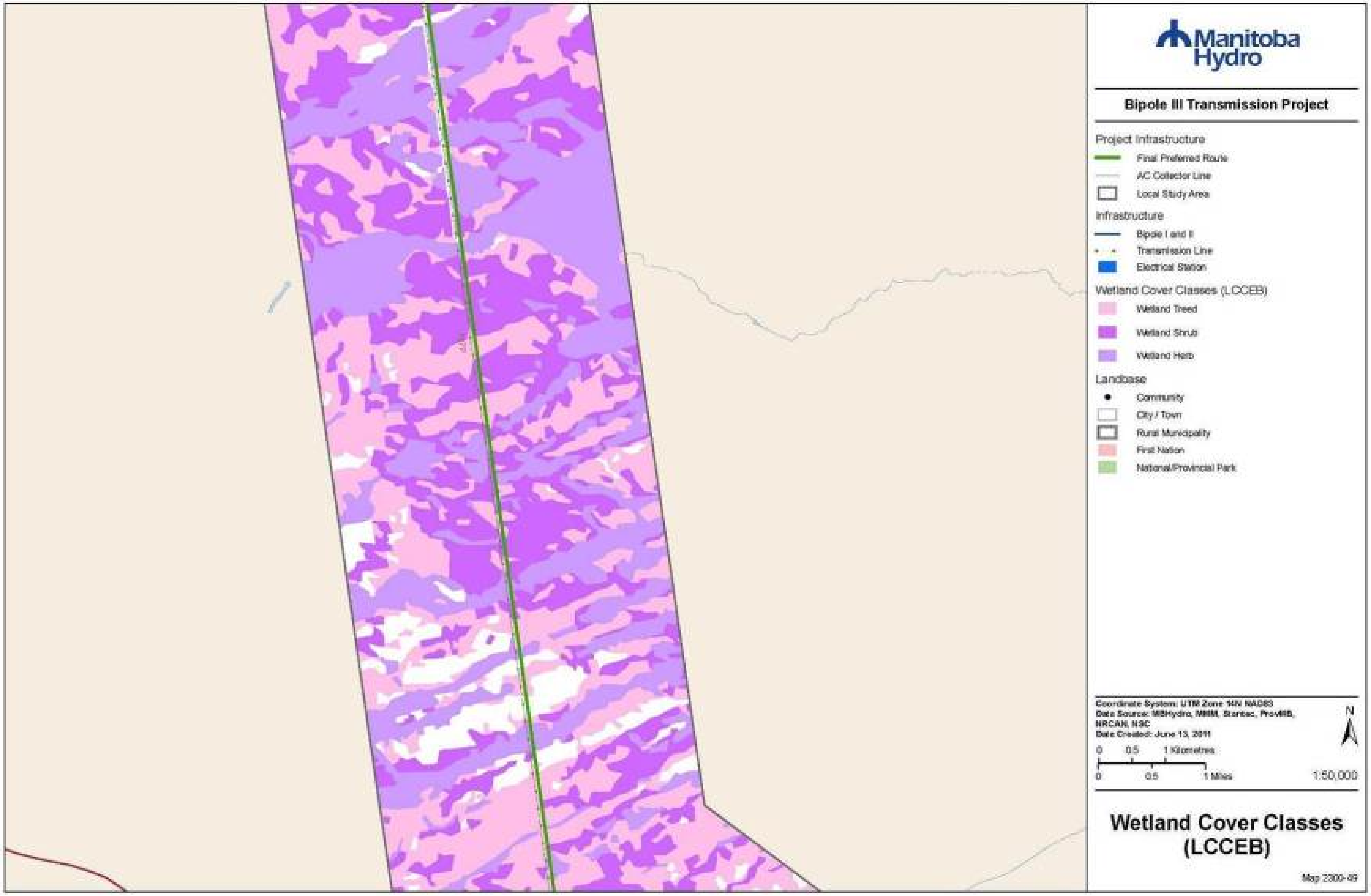
Map Series 2300-46. Distribution of wetland habitat within the Bipole III Project Study Area.



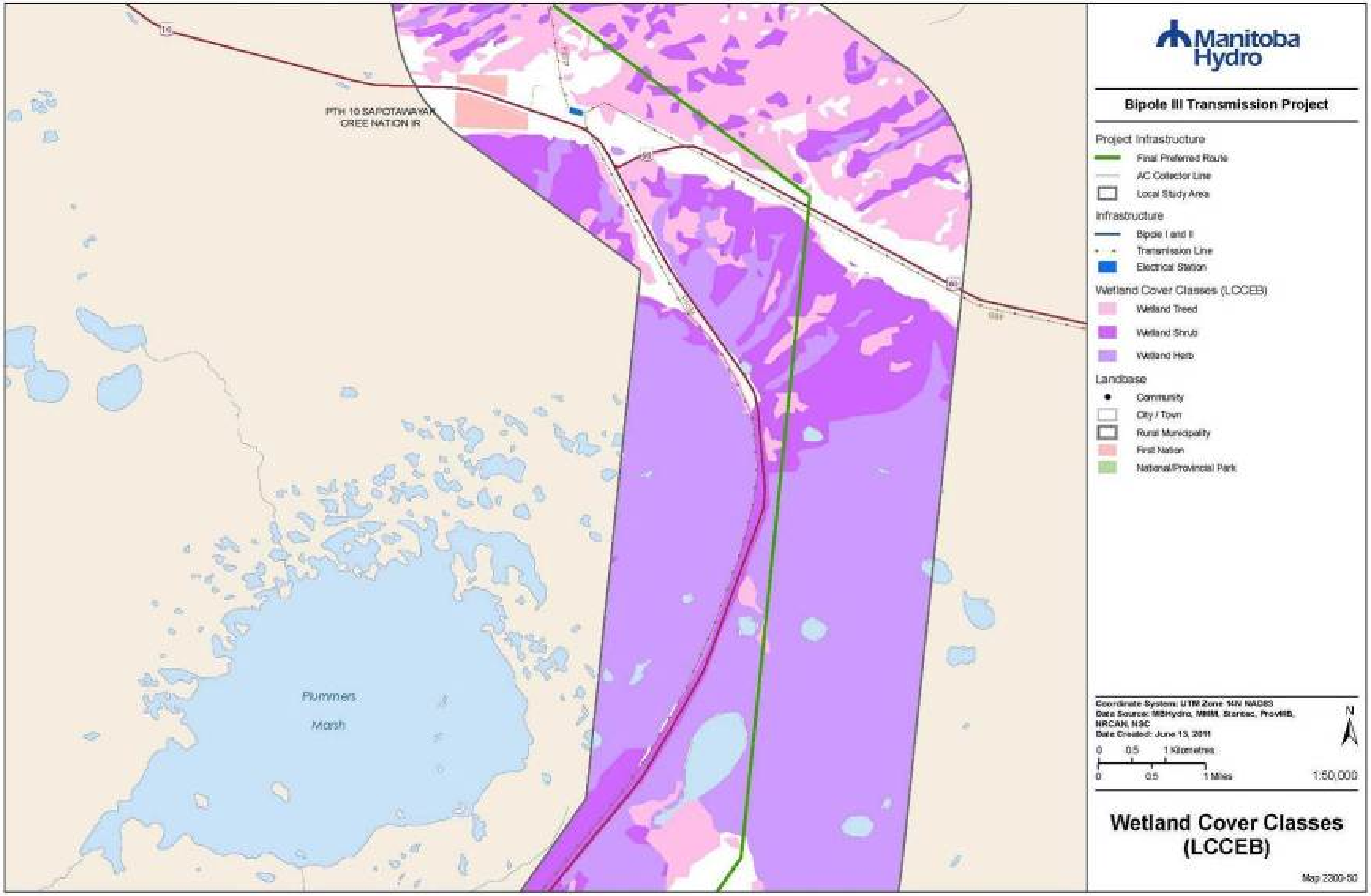
Map Series 2300-47. Distribution of wetland habitat within the Bipole III Project Study Area.



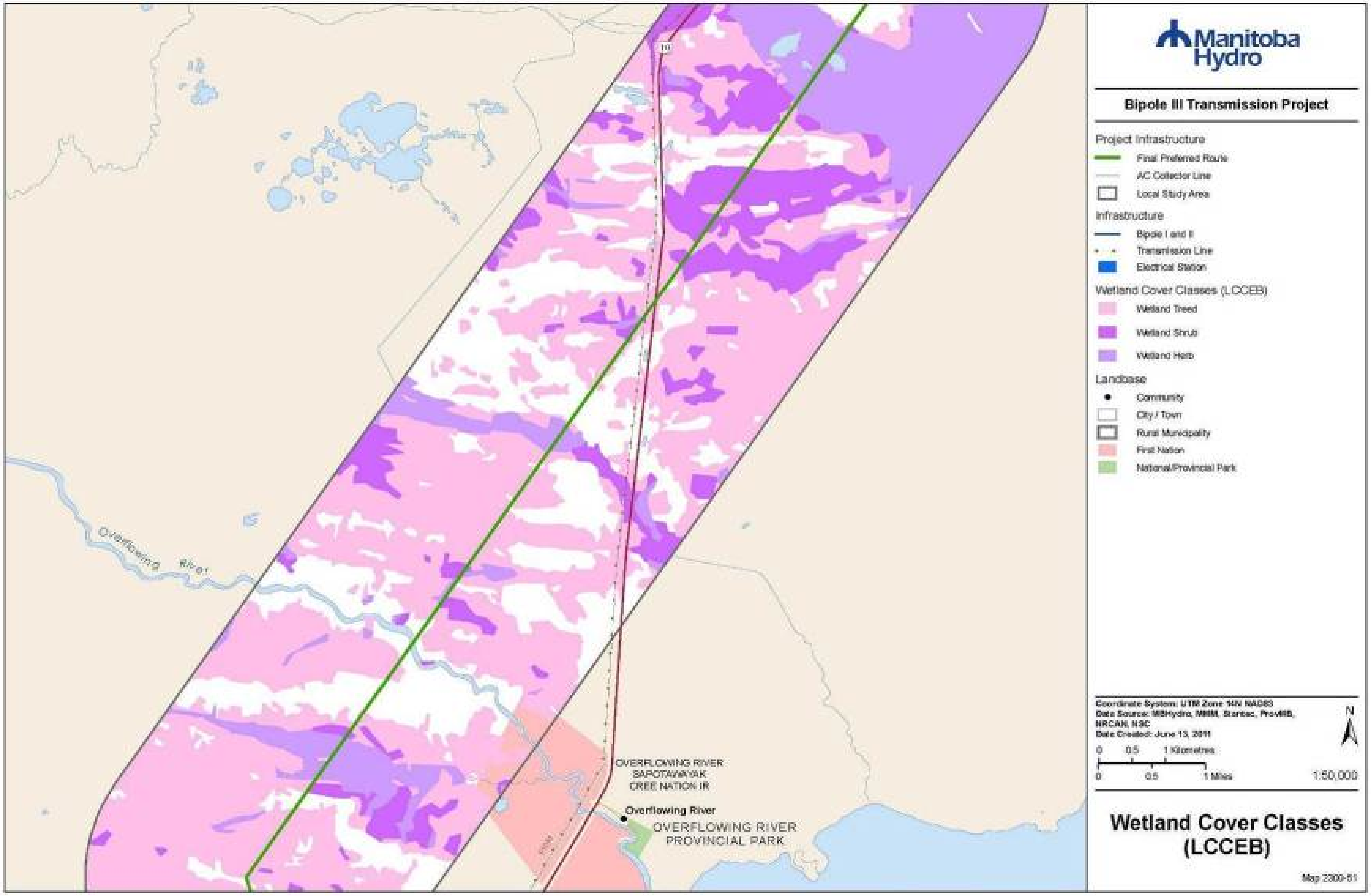
Map Series 2300-48. Distribution of wetland habitat within the Bipole III Project Study Area.



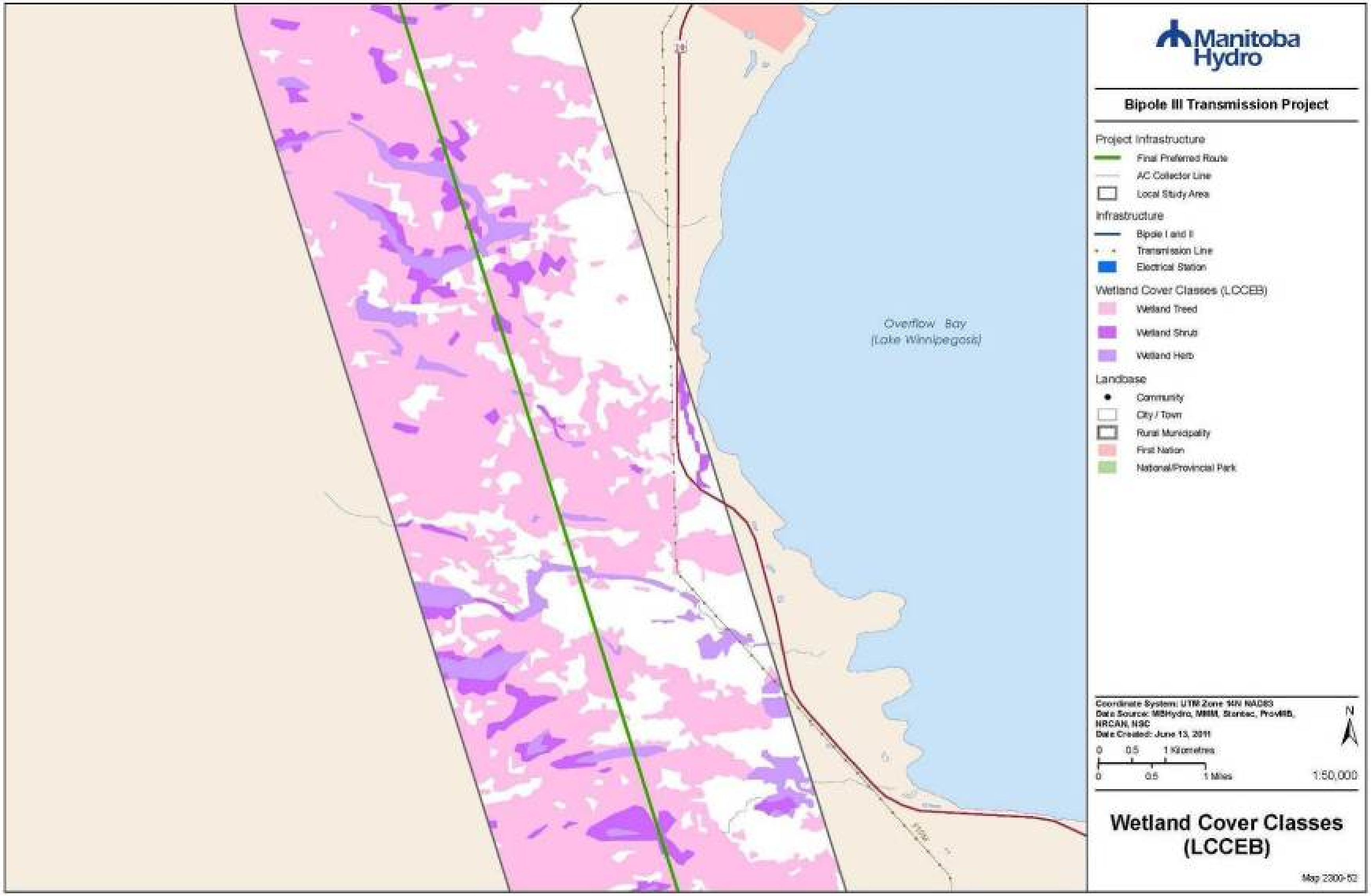
Map Series 2300-49. Distribution of wetland habitat within the Bipole III Project Study Area.



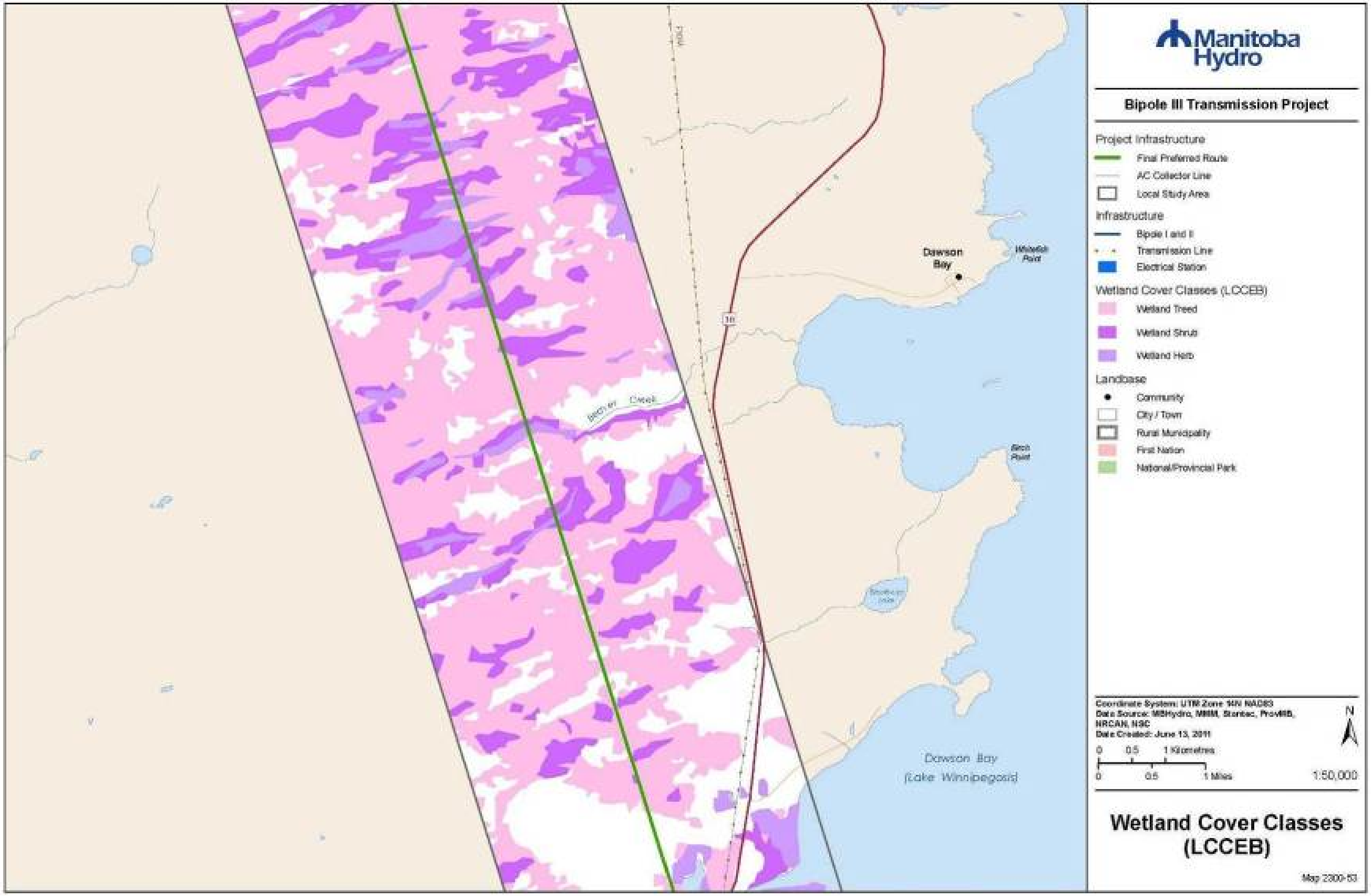
Map Series 2300-50. Distribution of wetland habitat within the Bipole III Project Study Area.



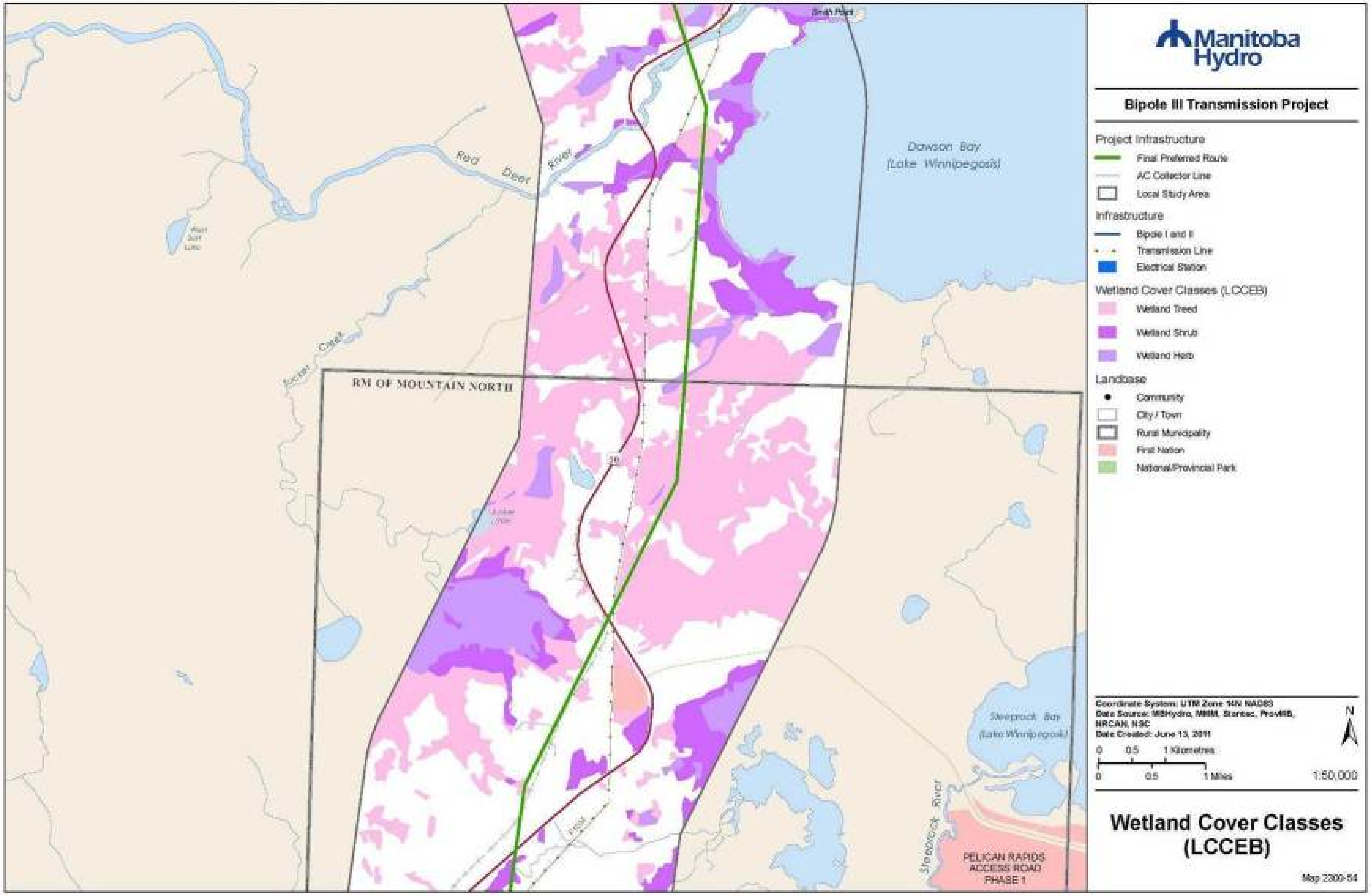
Map Series 2300-51. Distribution of wetland habitat within the Bipole III Project Study Area.



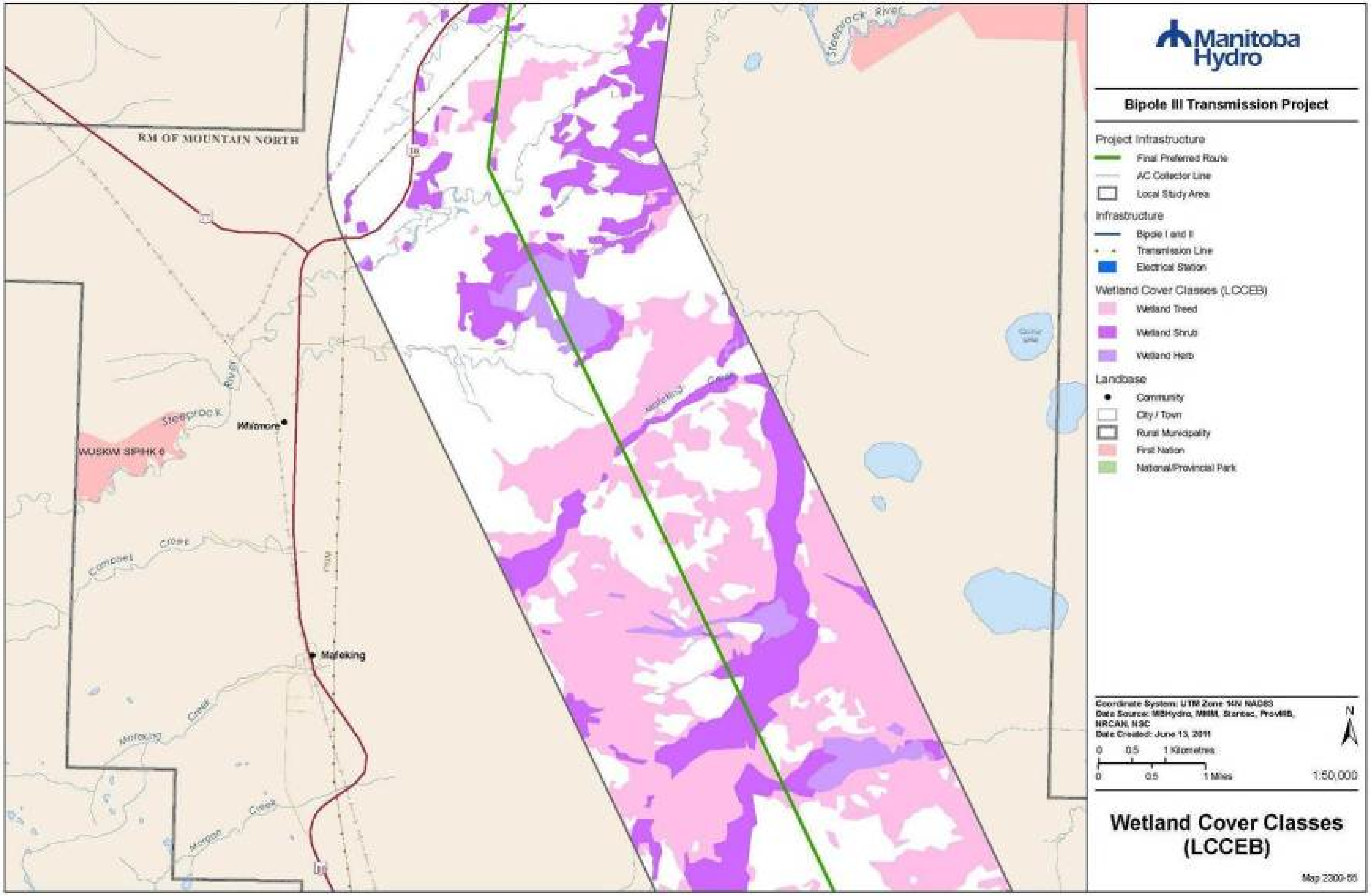
Map Series 2300-52. Distribution of wetland habitat within the Bipole III Project Study Area.



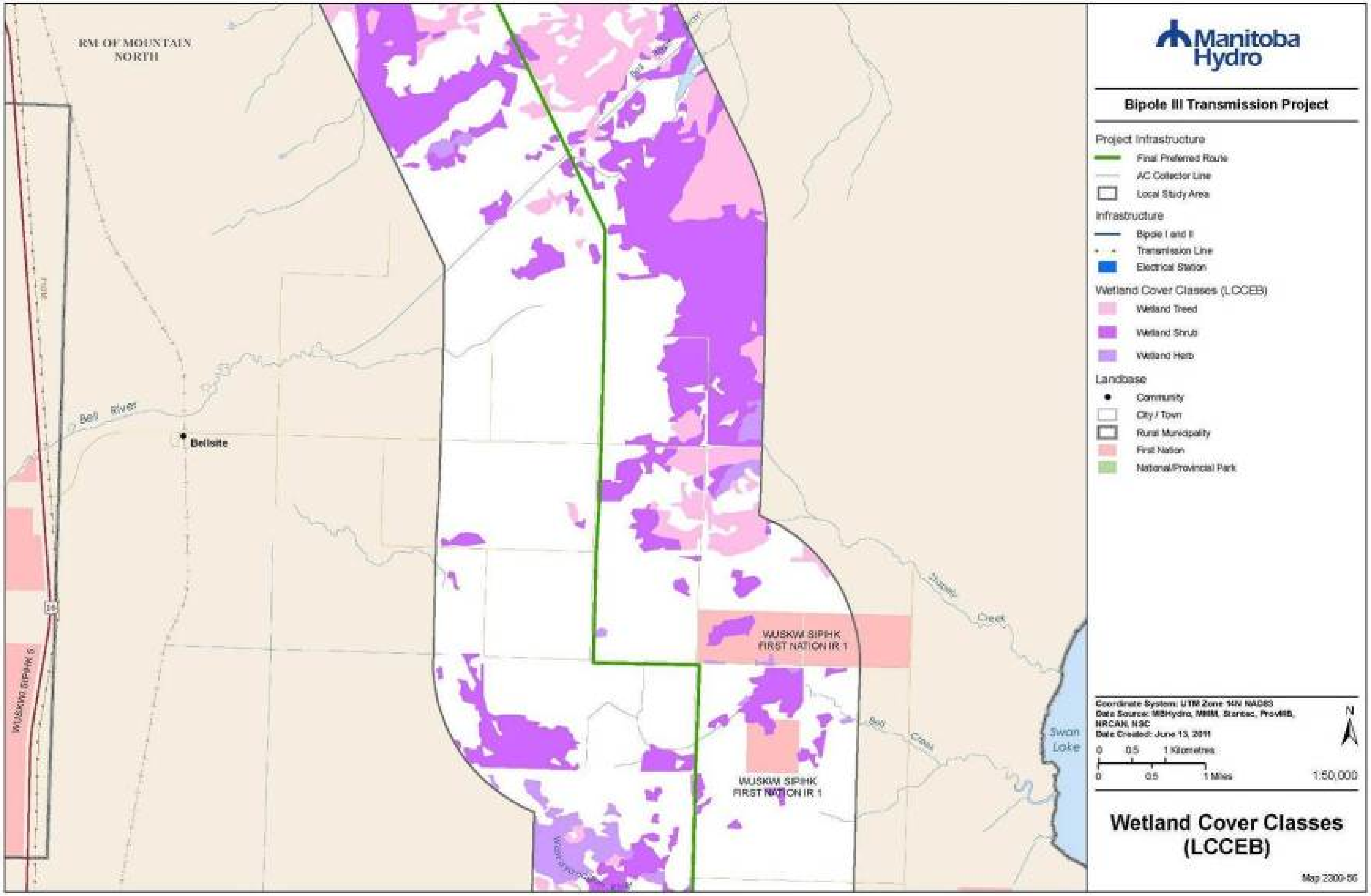
Map Series 2300-53. Distribution of wetland habitat within the Bipole III Project Study Area.



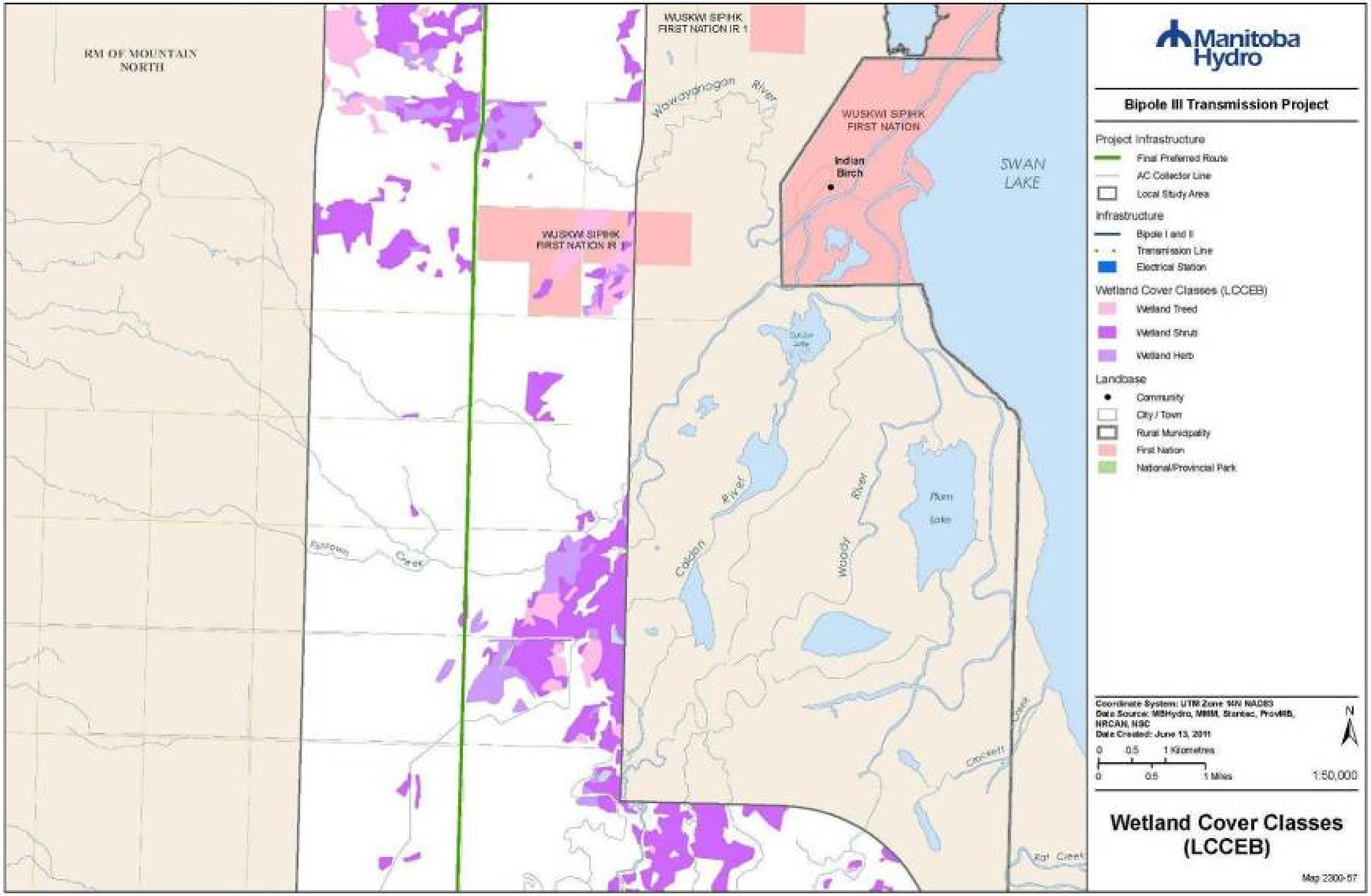
Map Series 2300-54. Distribution of wetland habitat within the Bipole III Project Study Area.



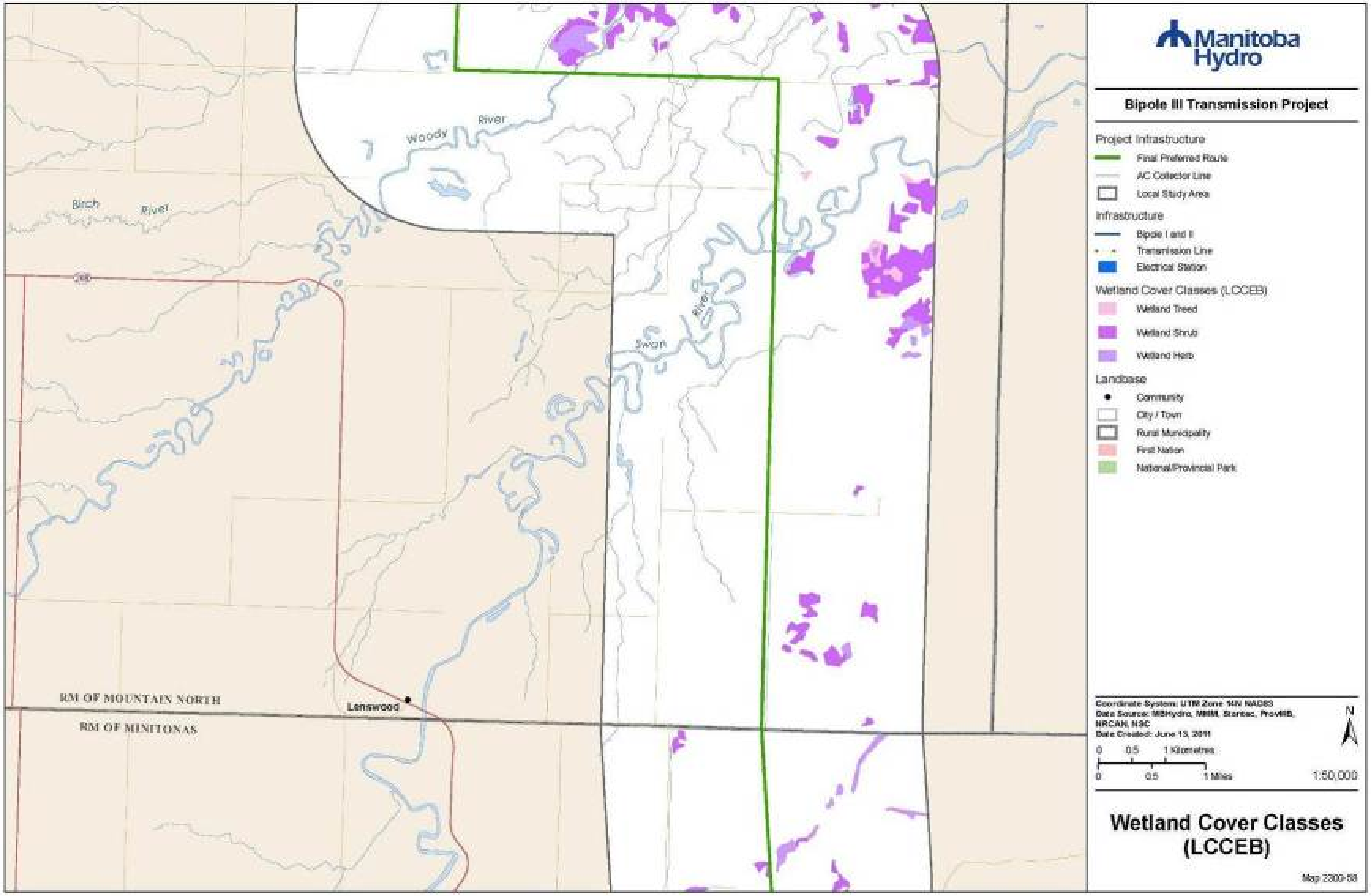
Map Series 2300-55. Distribution of wetland habitat within the Bipole III Project Study Area.



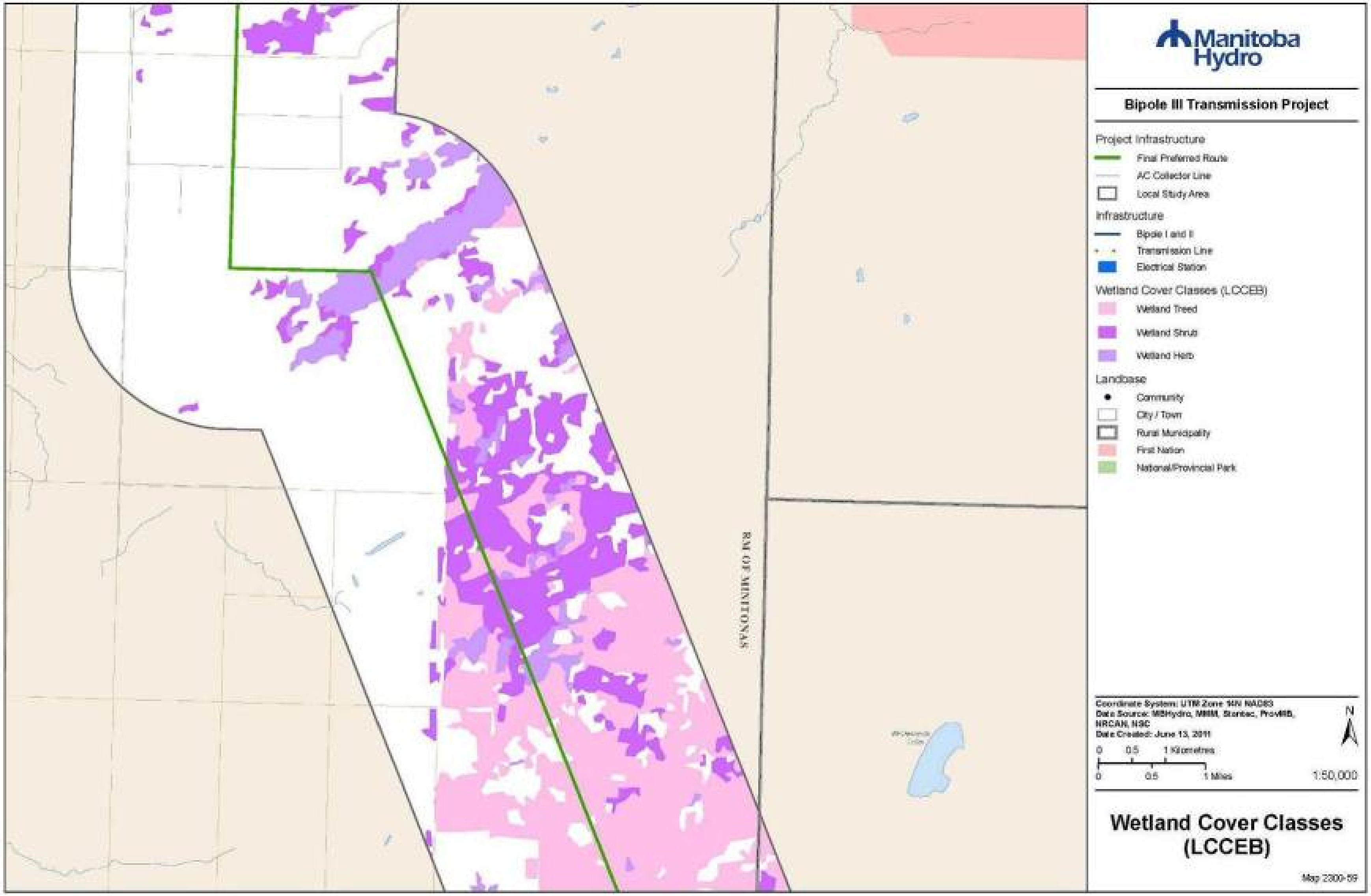
Map Series 2300-56. Distribution of wetland habitat within the Bipole III Project Study Area.



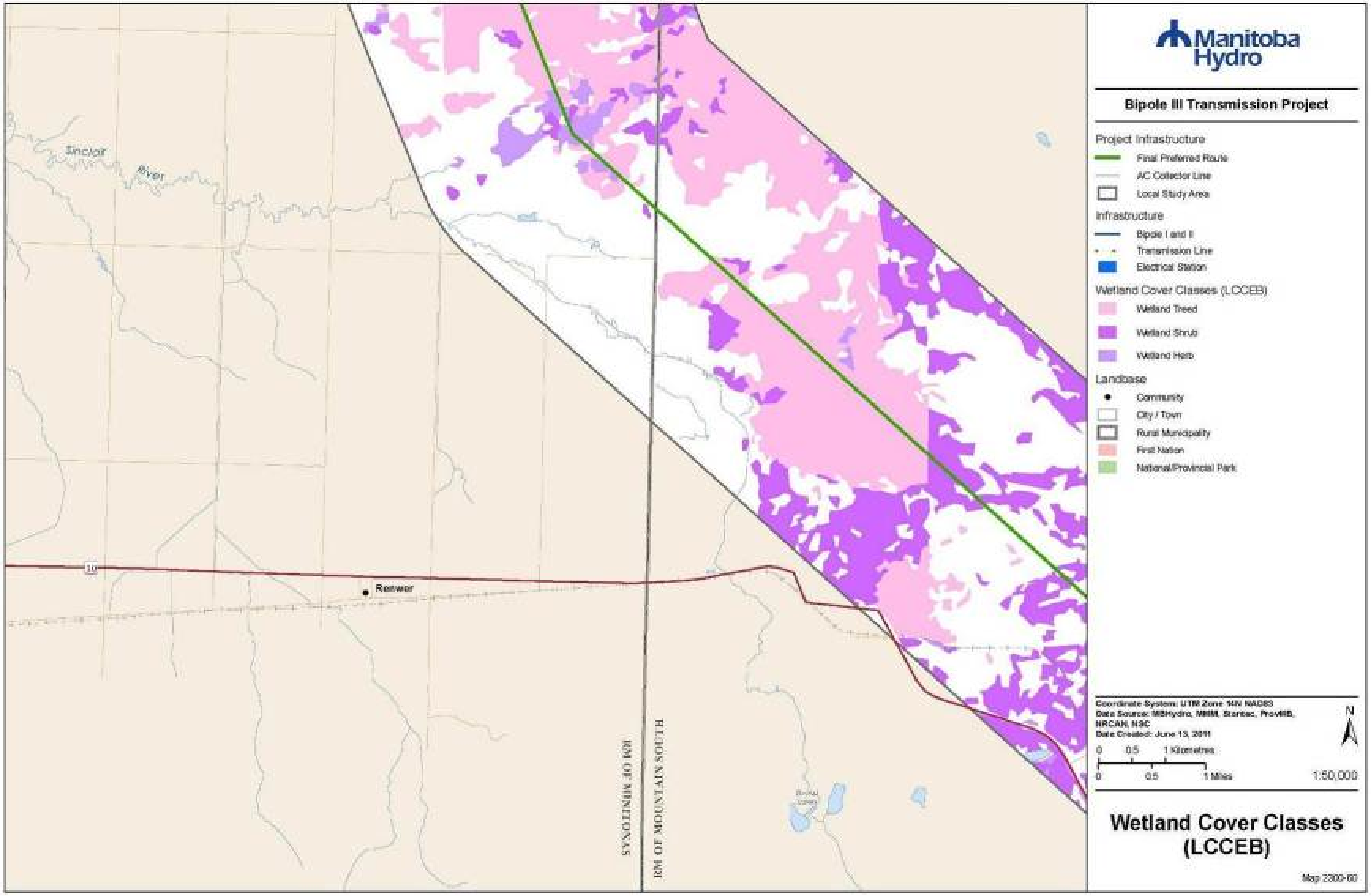
Map Series 2300-57. Distribution of wetland habitat within the Bipole III Project Study Area.



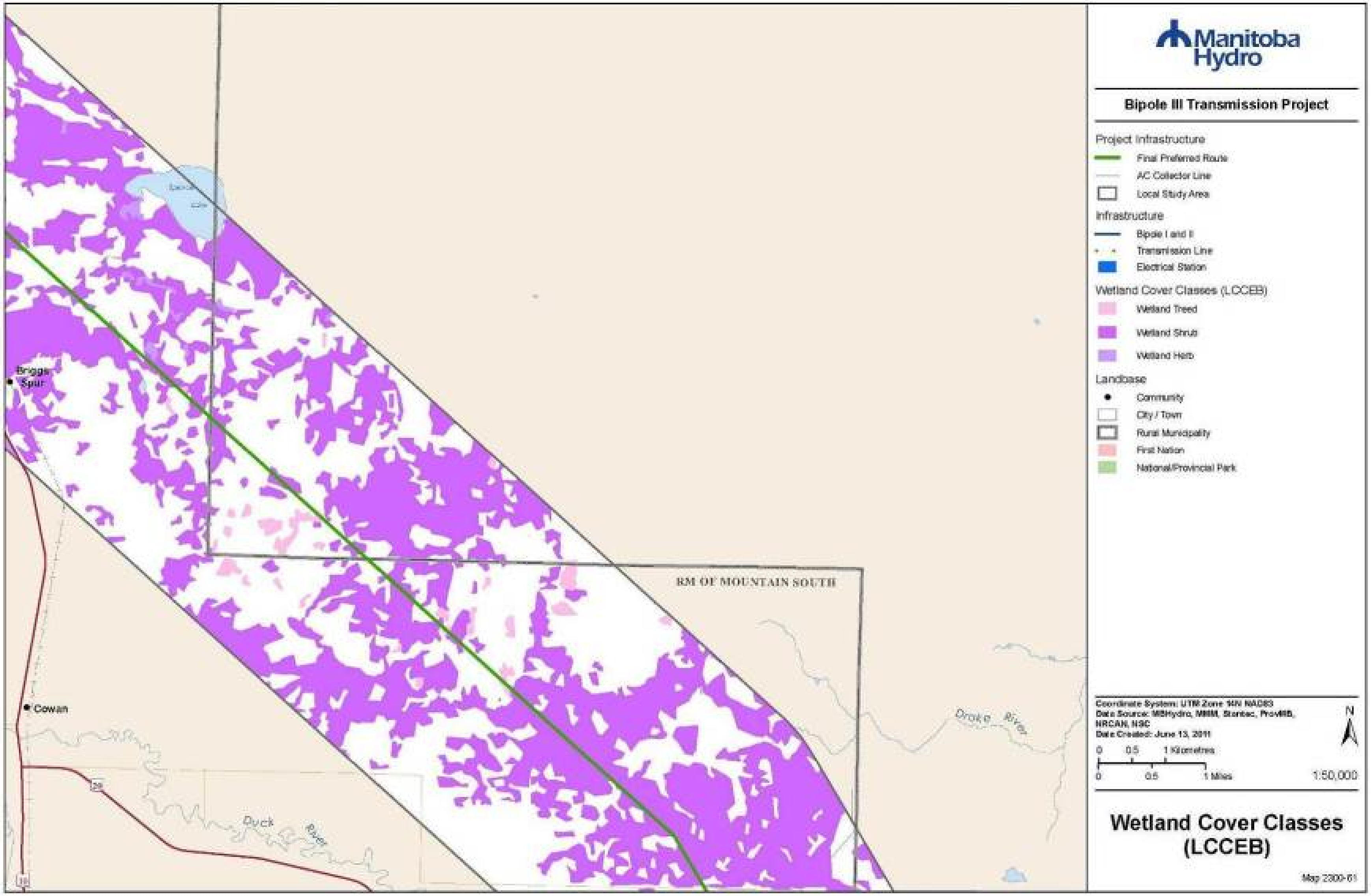
Map Series 2300-58. Distribution of wetland habitat within the Bipole III Project Study Area.



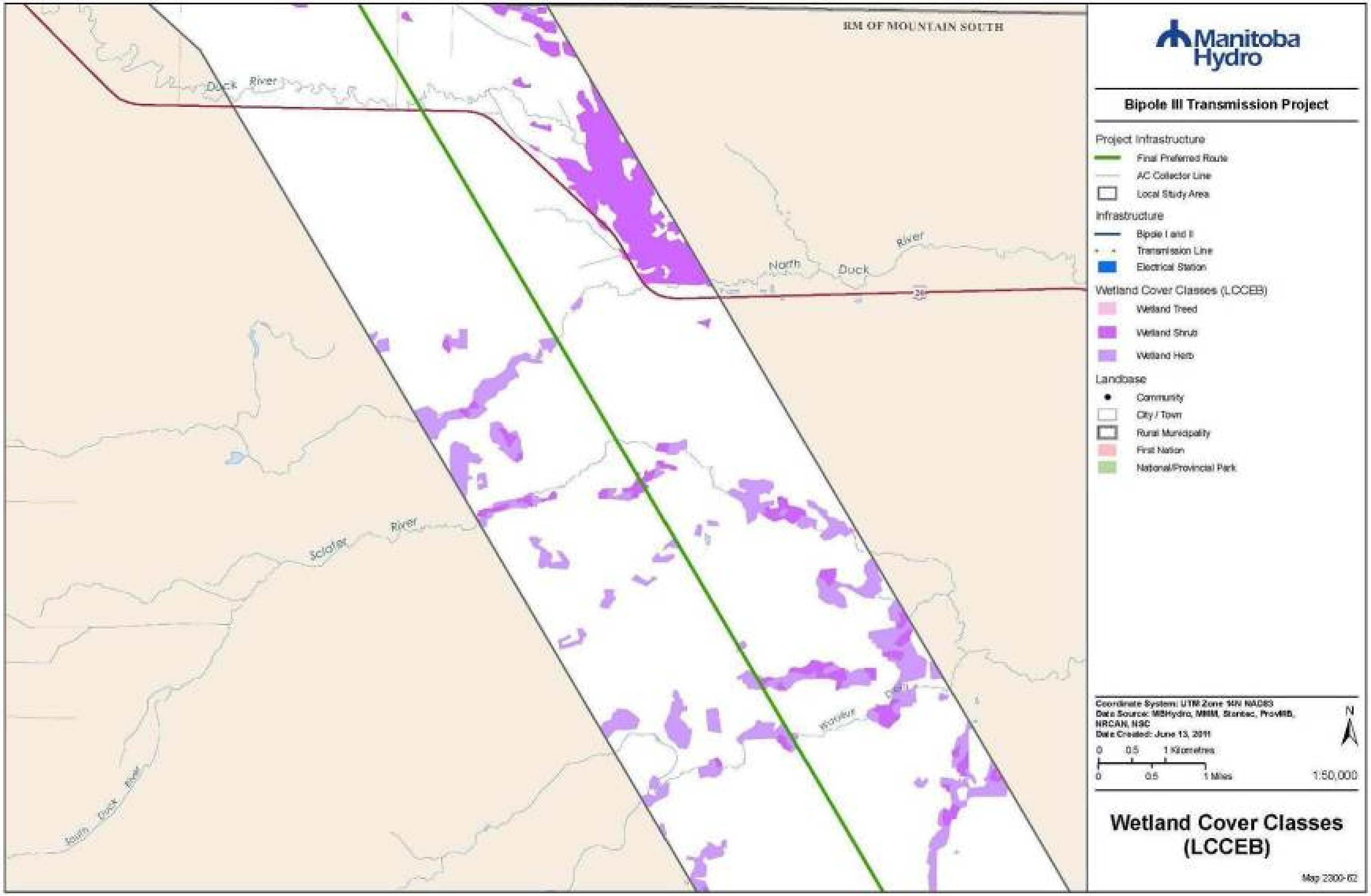
Map Series 2300-59. Distribution of wetland habitat within the Bipole III Project Study Area.



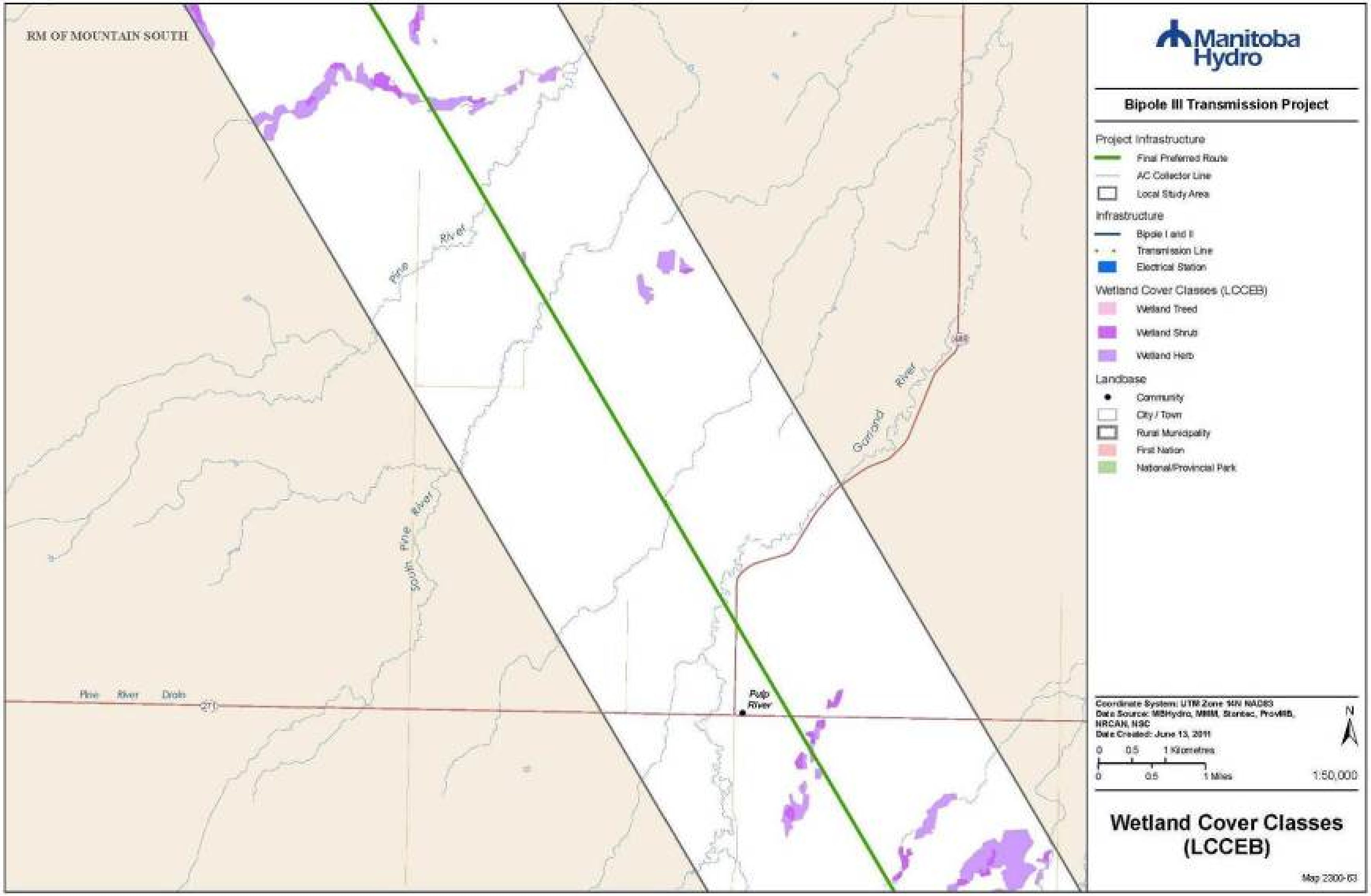
Map Series 2300-60. Distribution of wetland habitat within the Bipole III Project Study Area.



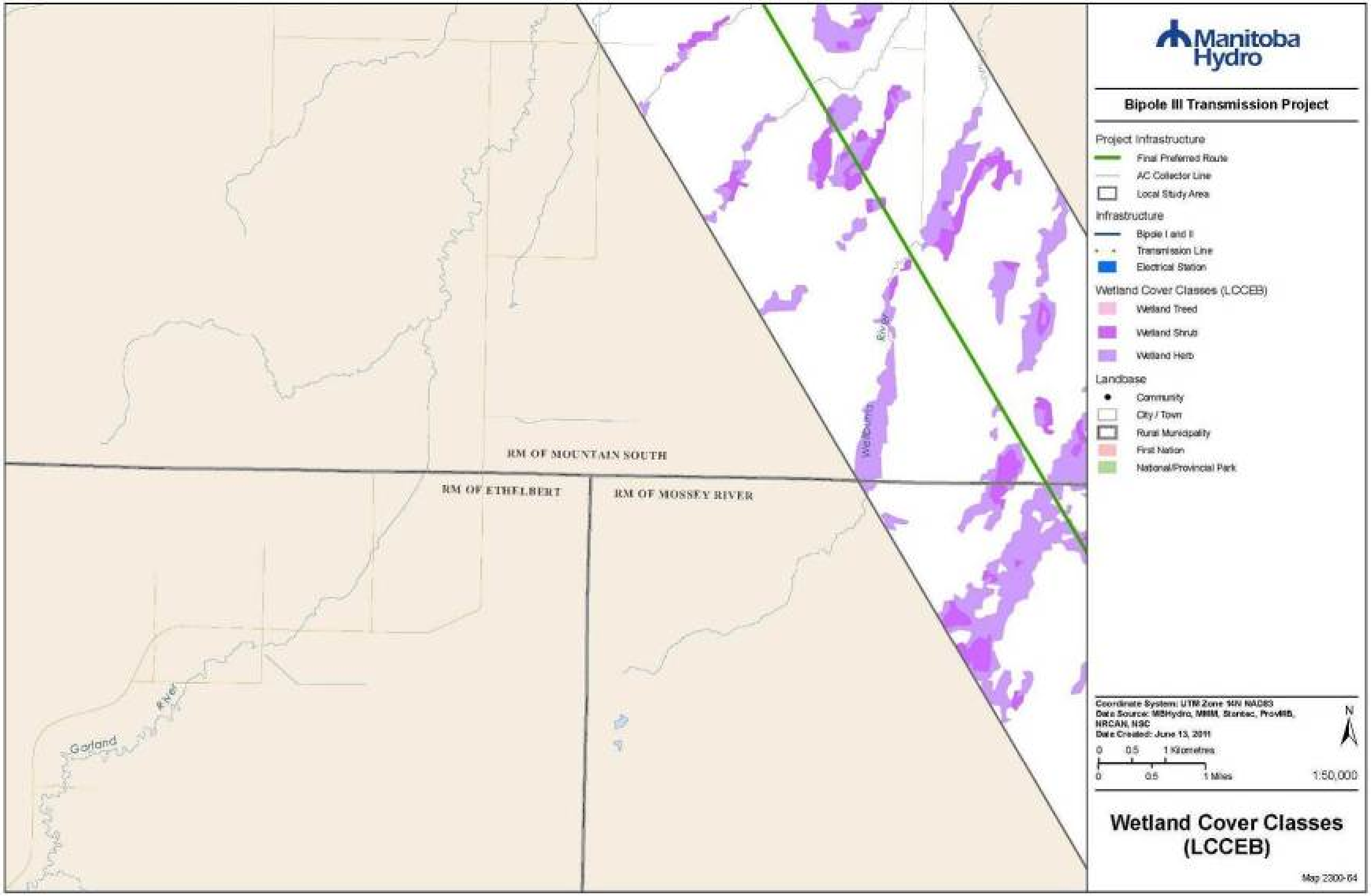
Map Series 2300-61. Distribution of wetland habitat within the Bipole III Project Study Area.



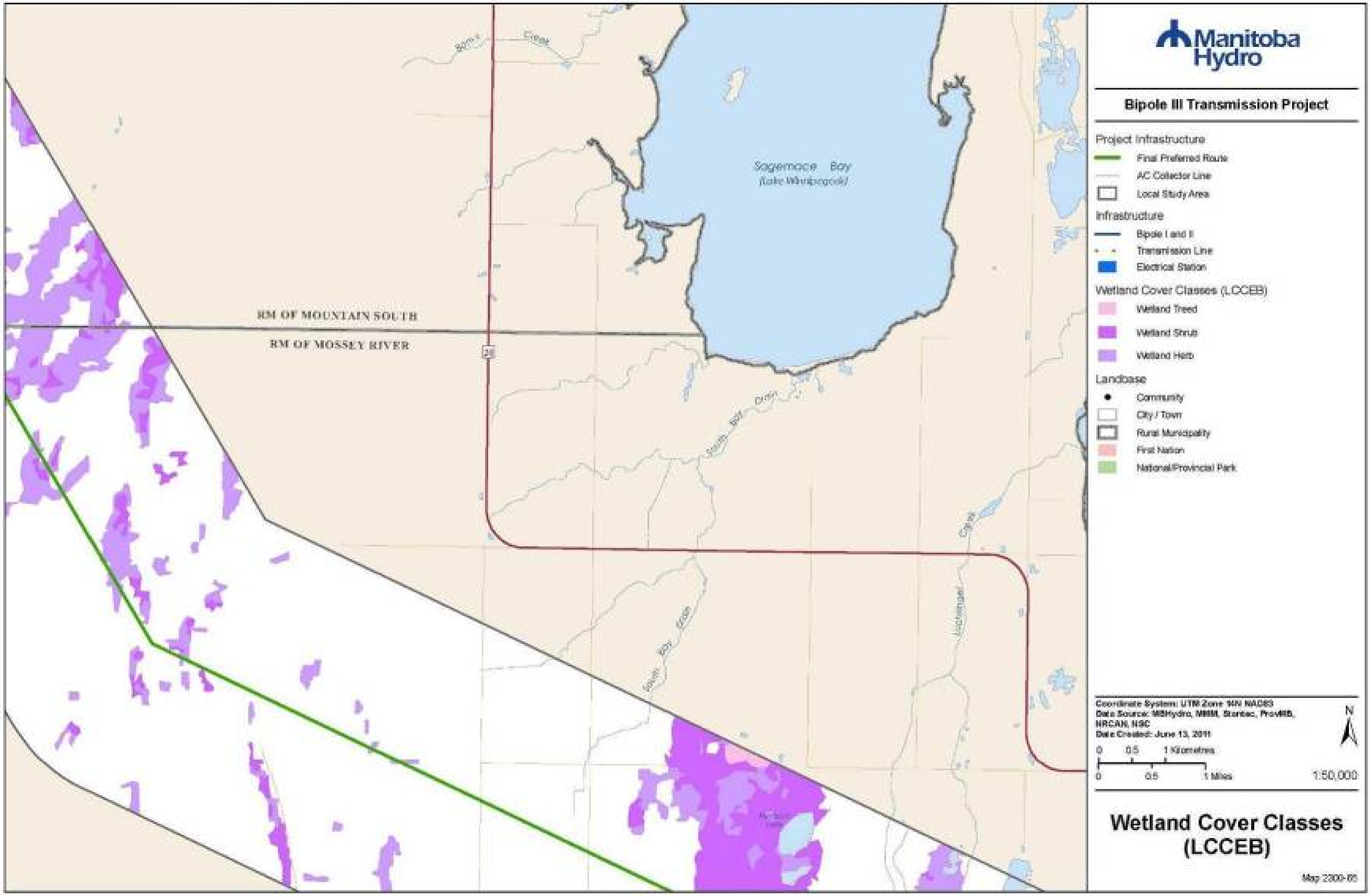
Map Series 2300-62. Distribution of wetland habitat within the Bipole III Project Study Area.



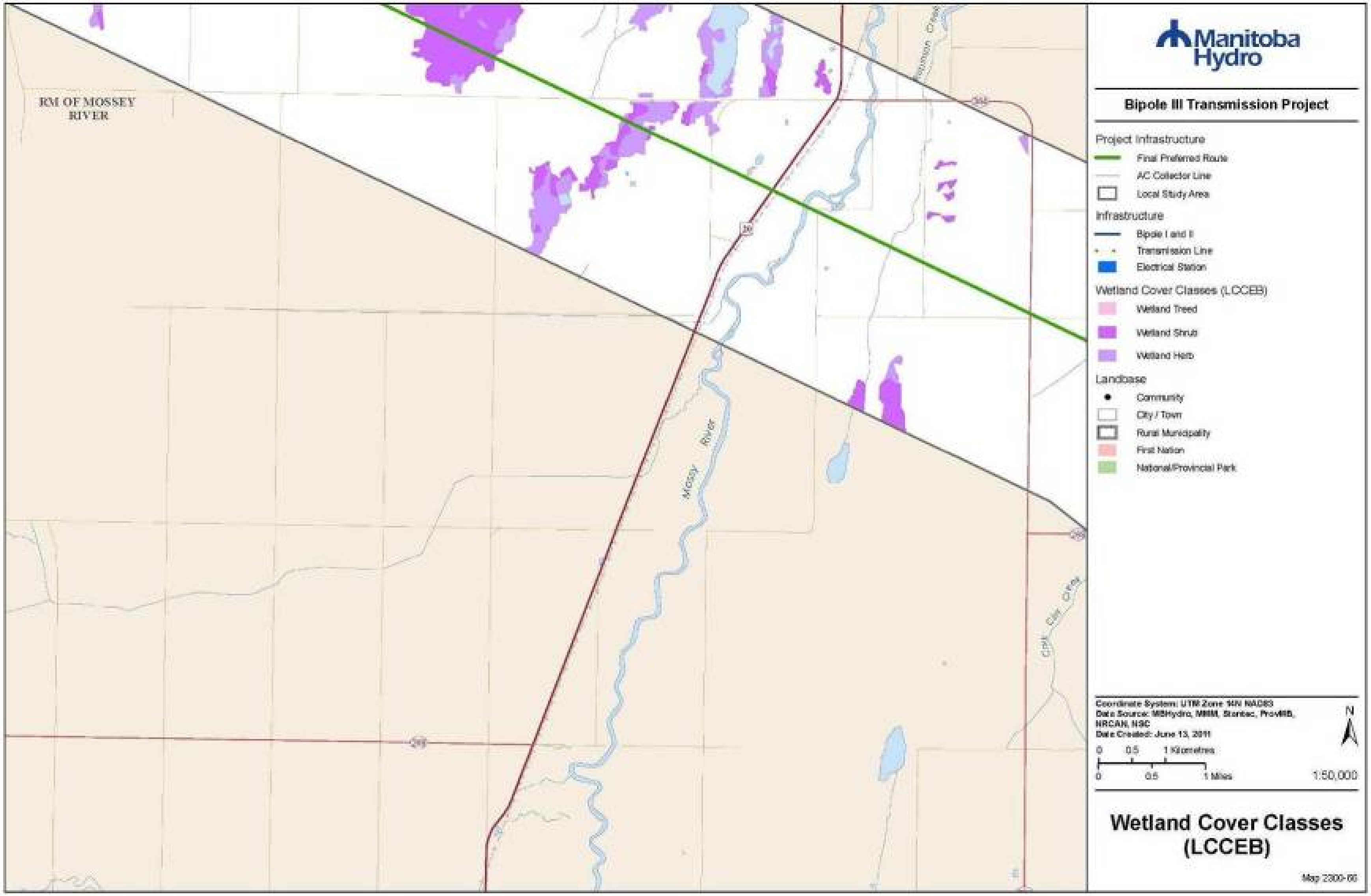
Map Series 2300-63. Distribution of wetland habitat within the Bipole III Project Study Area.



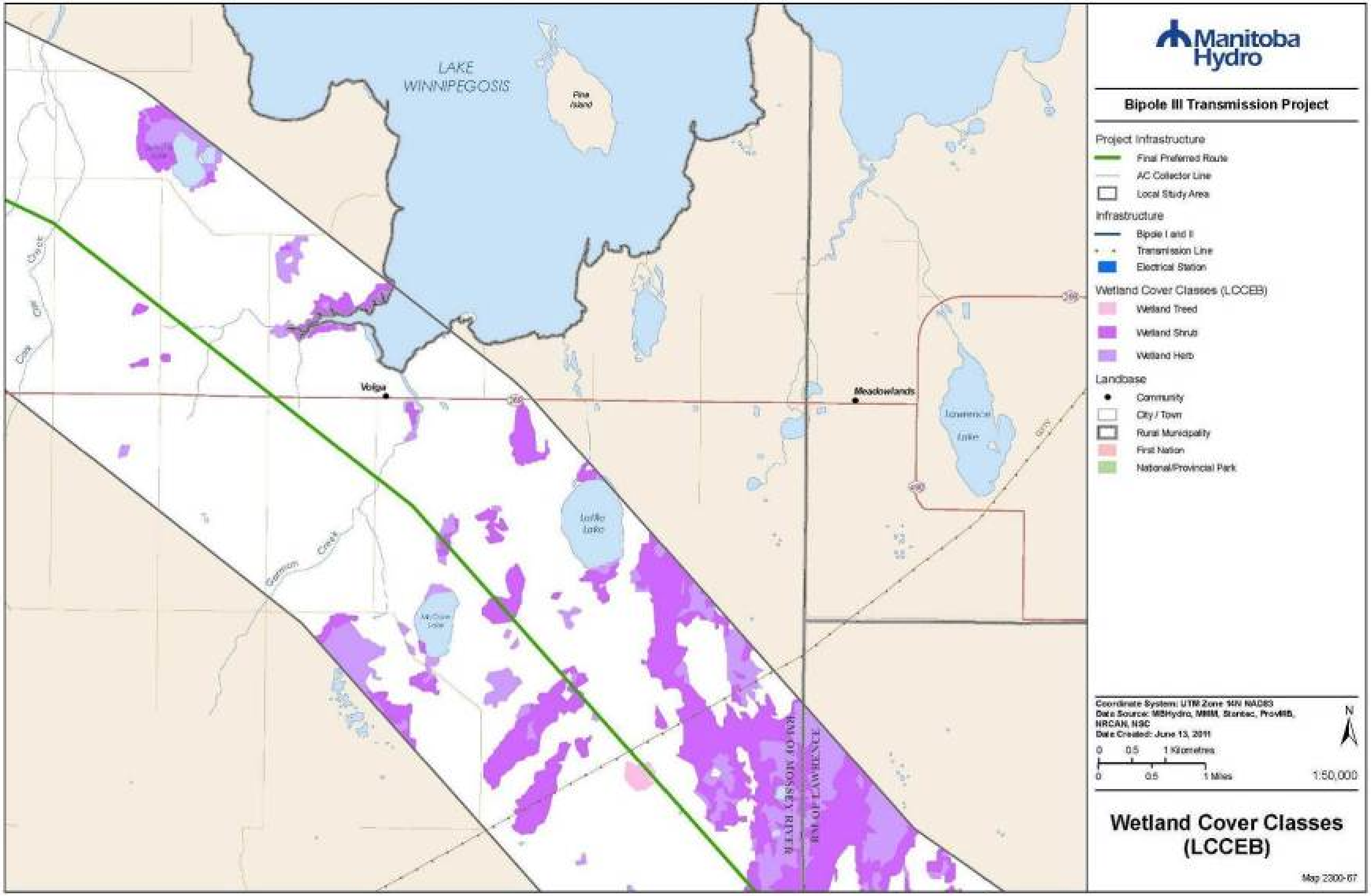
Map Series 2300-64. Distribution of wetland habitat within the Bipole III Project Study Area.



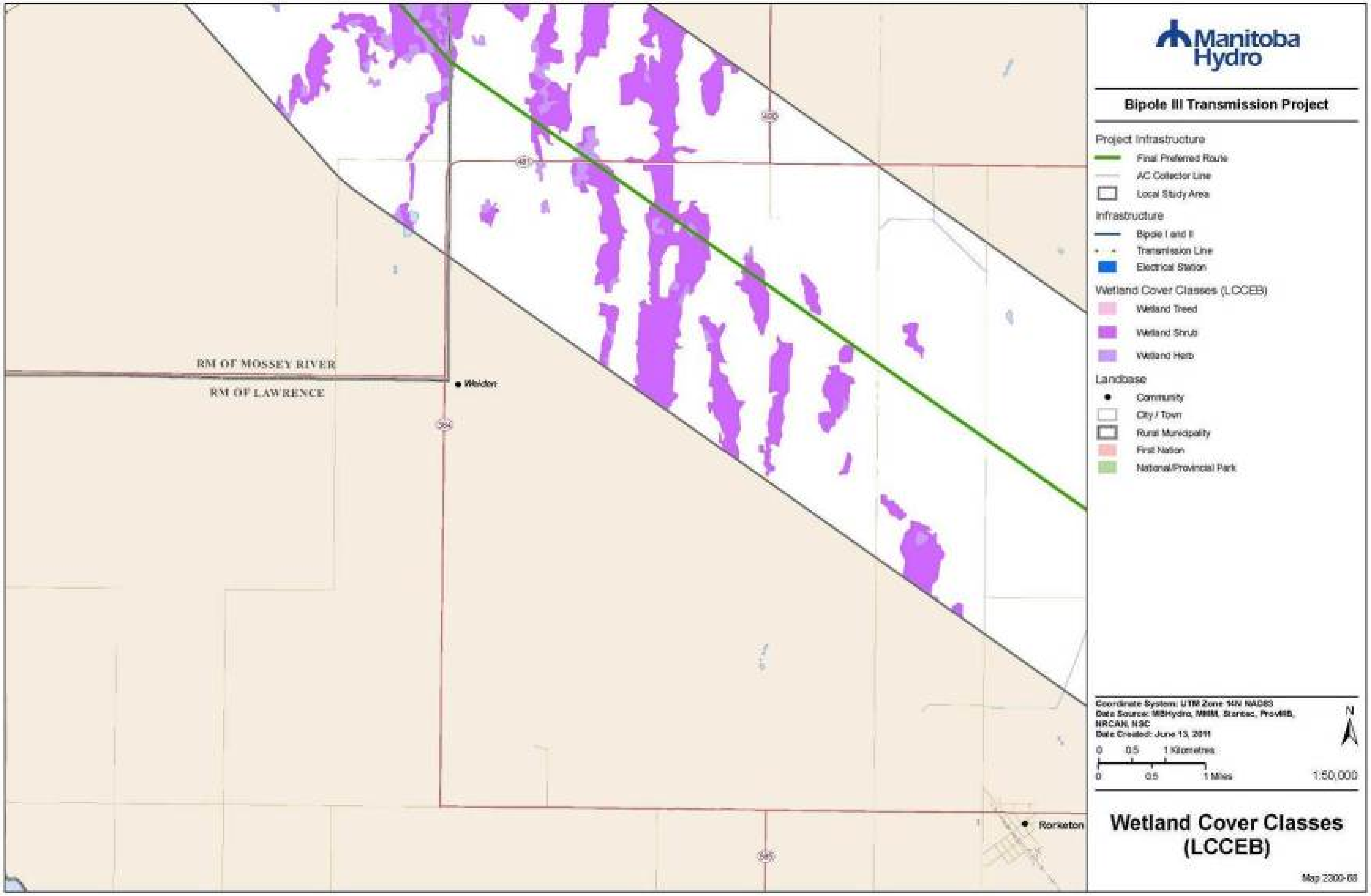
Map Series 2300-65. Distribution of wetland habitat within the Bipole III Project Study Area.



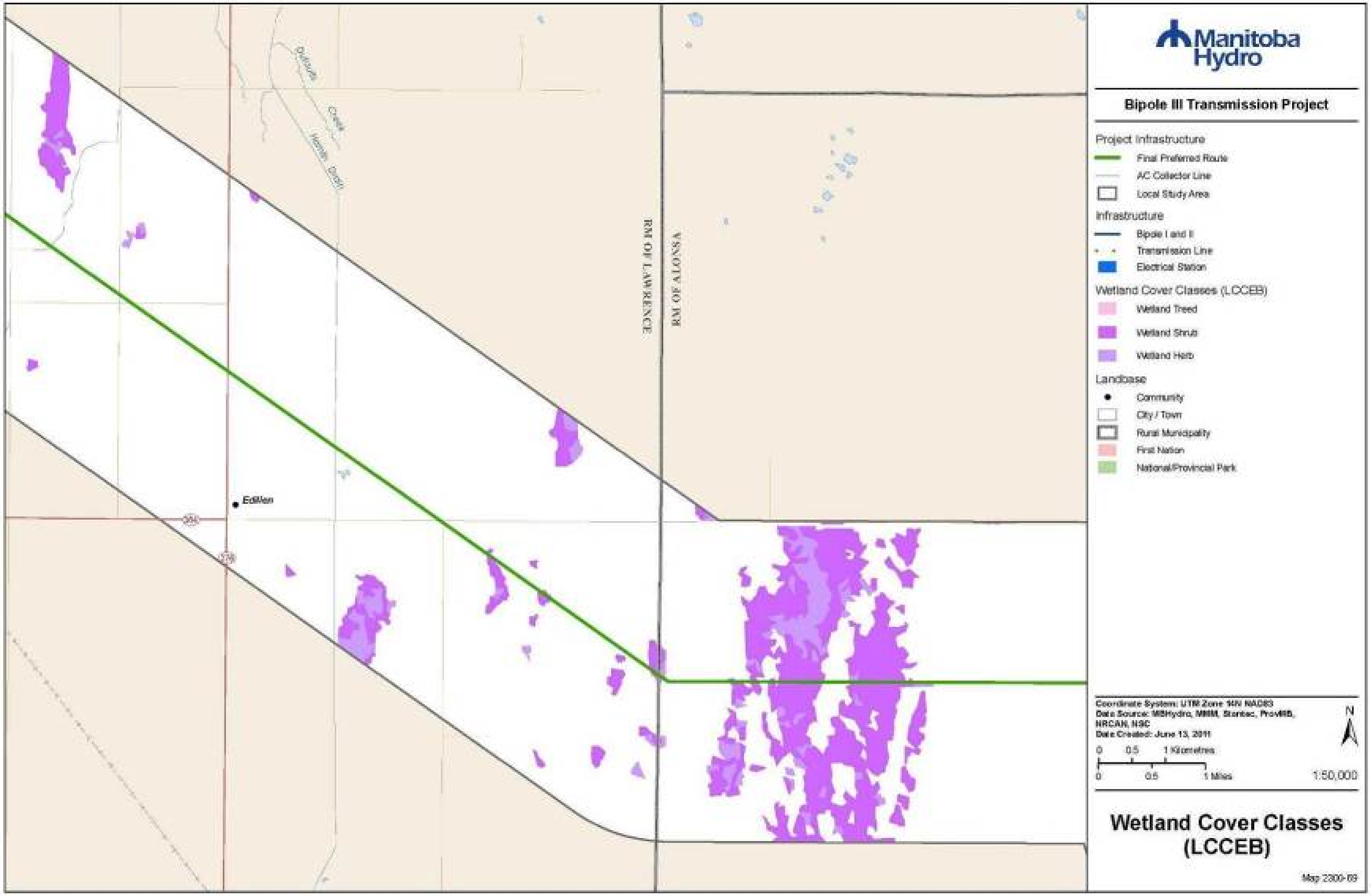
Map Series 2300-66. Distribution of wetland habitat within the Bipole III Project Study Area.



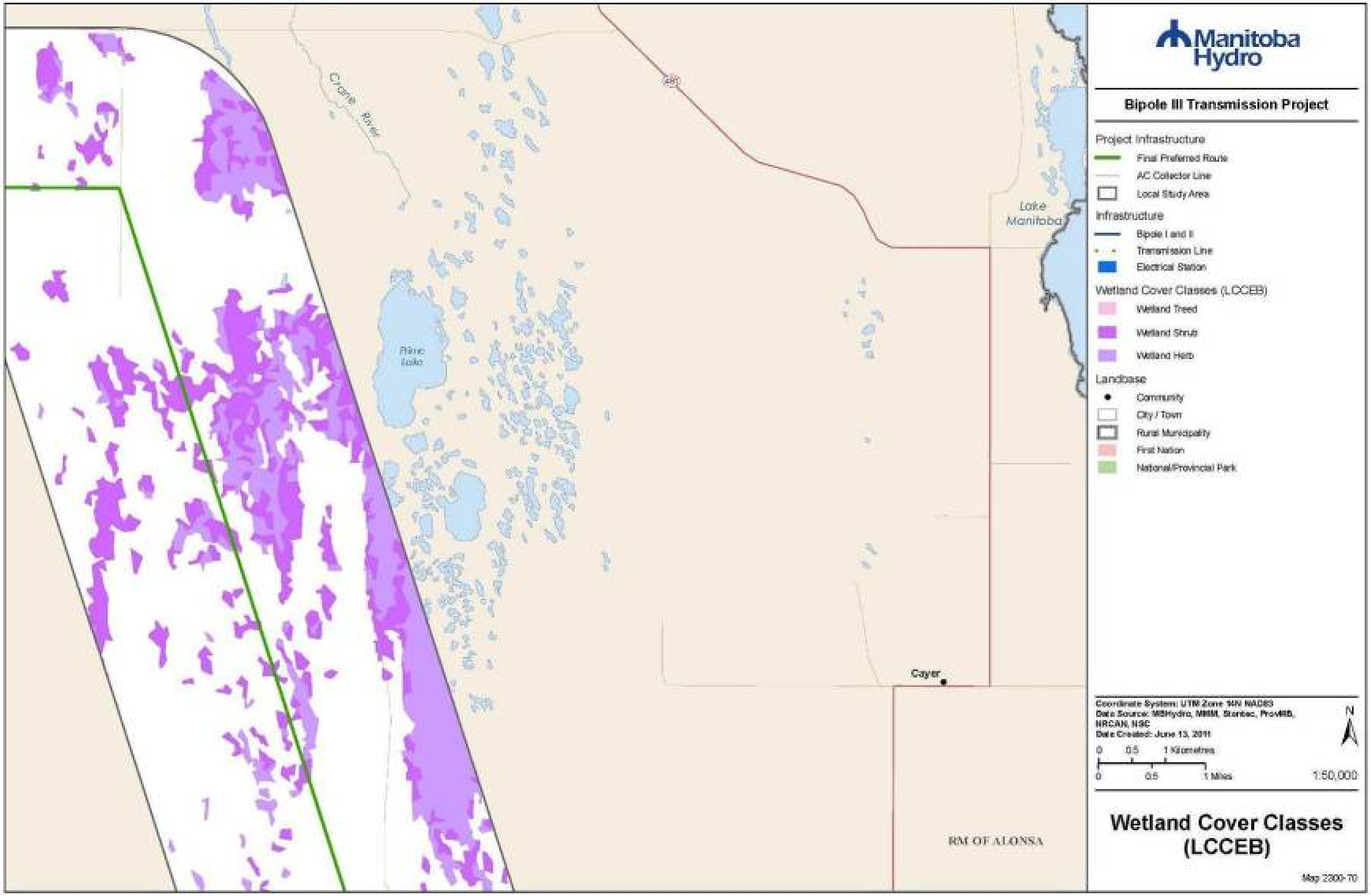
Map Series 2300-67. Distribution of wetland habitat within the Bipole III Project Study Area.



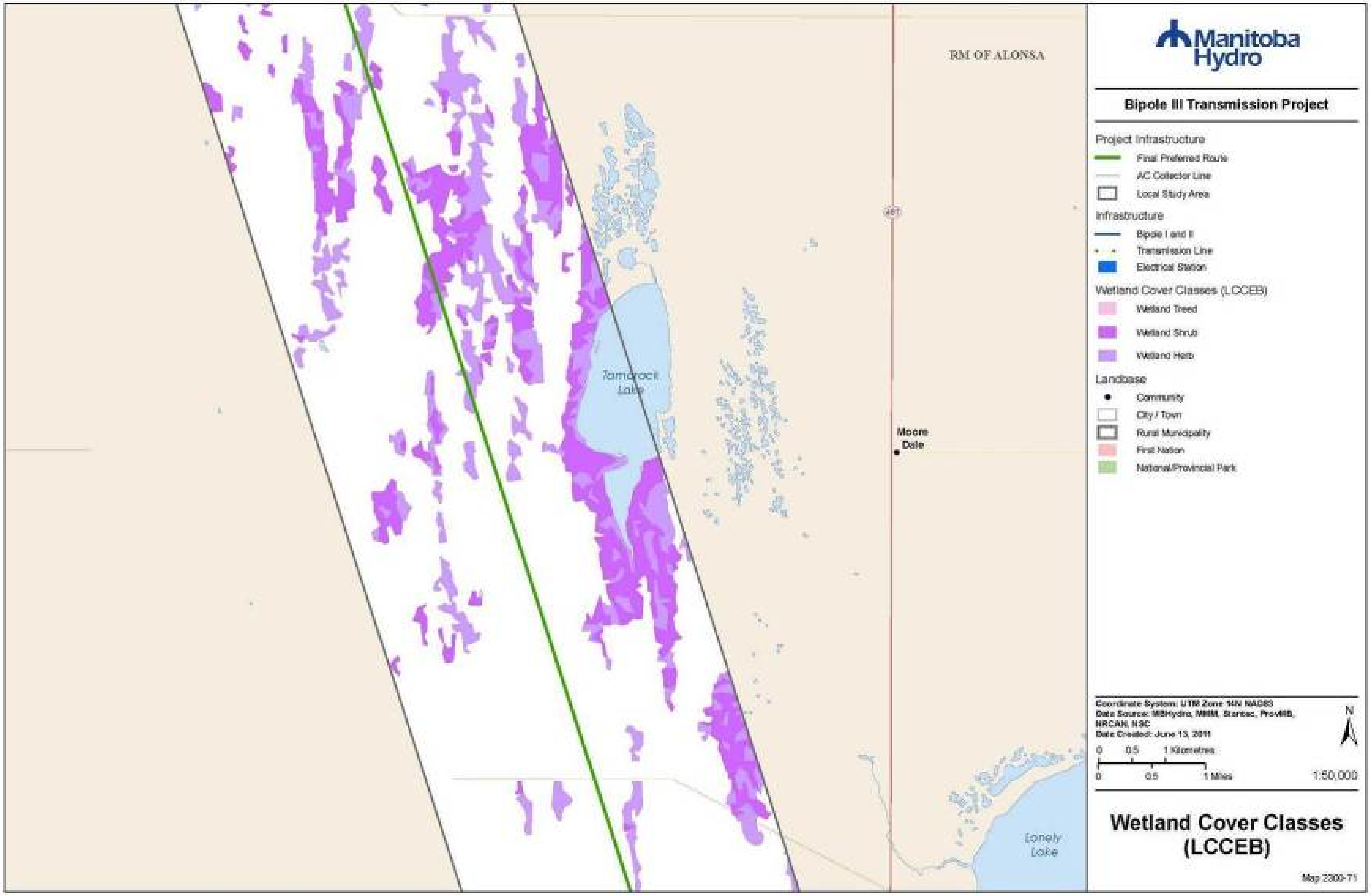
Map Series 2300-68. Distribution of wetland habitat within the Bipole III Project Study Area.



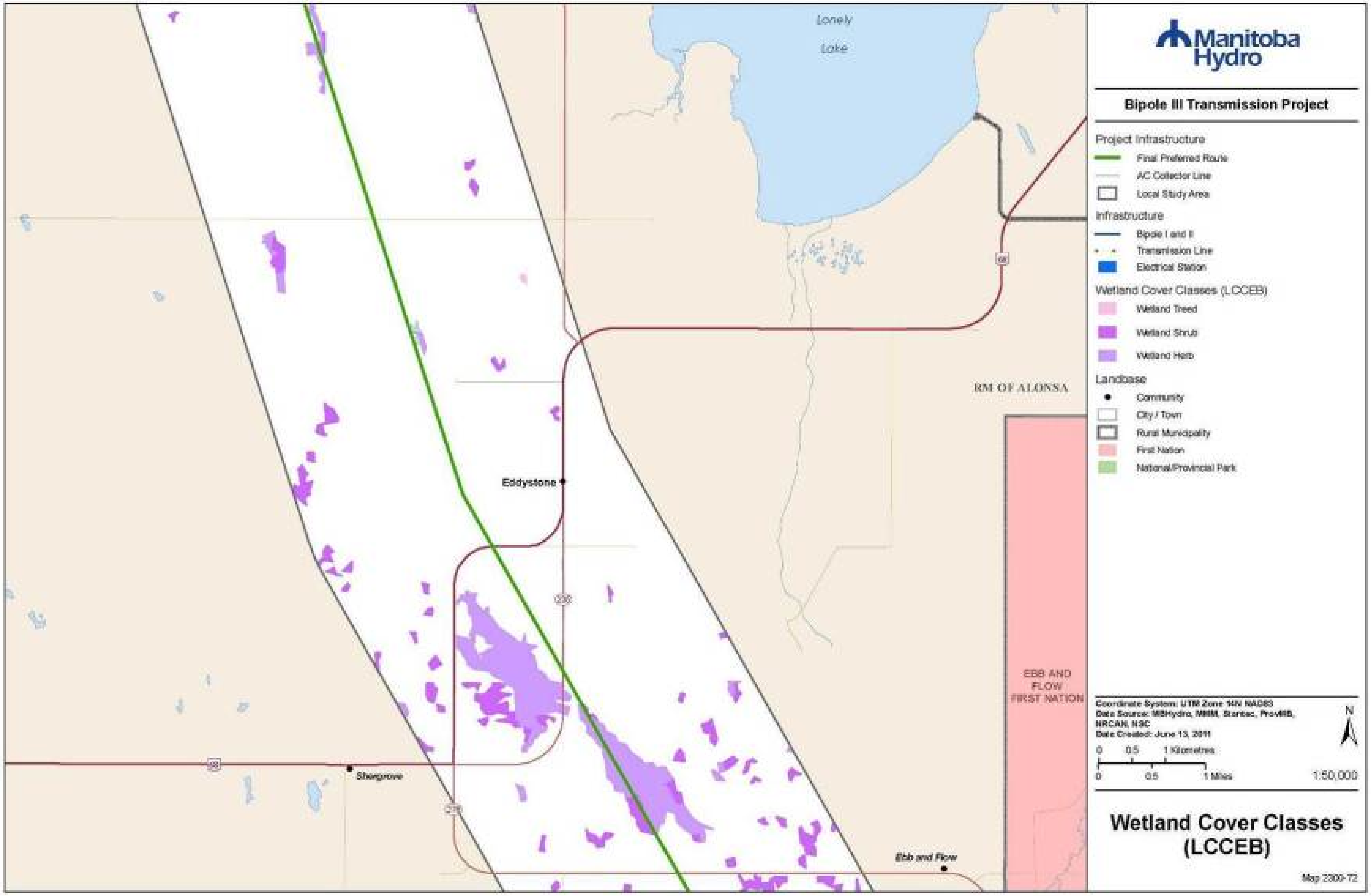
Map Series 2300-69. Distribution of wetland habitat within the Bipole III Project Study Area.



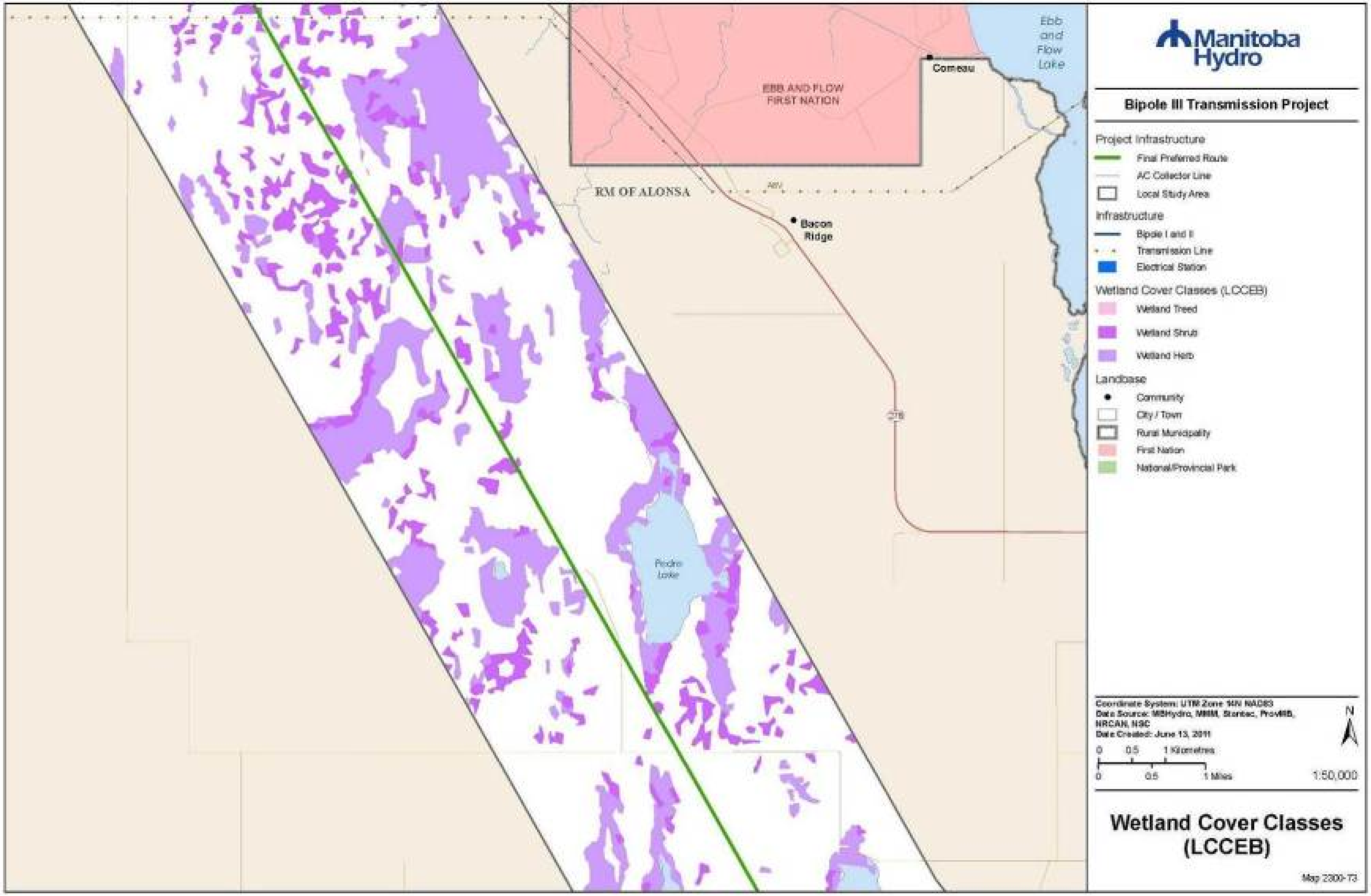
Map Series 2300-70. Distribution of wetland habitat within the Bipole III Project Study Area.



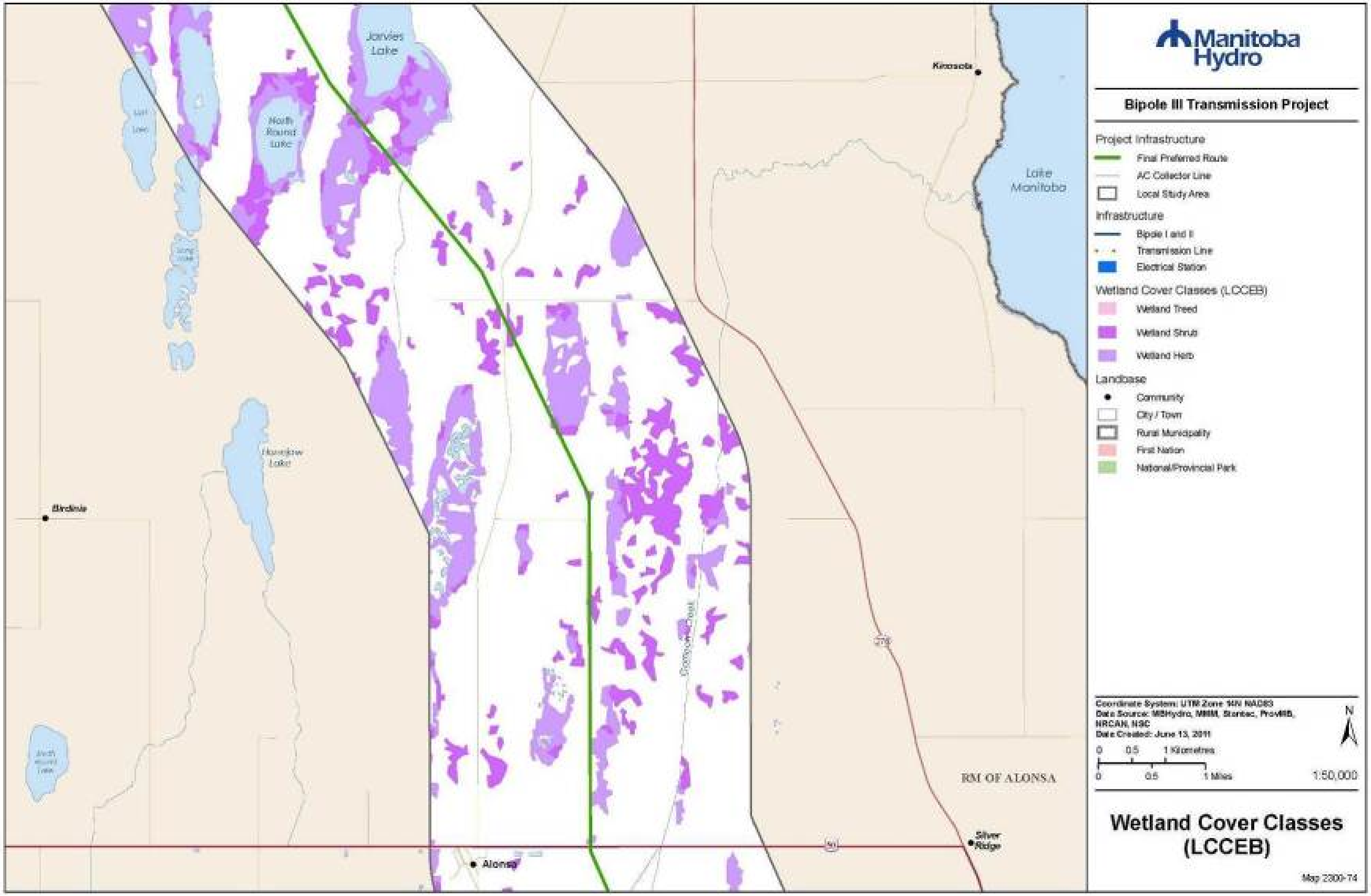
Map Series 2300-71. Distribution of wetland habitat within the Bipole III Project Study Area.



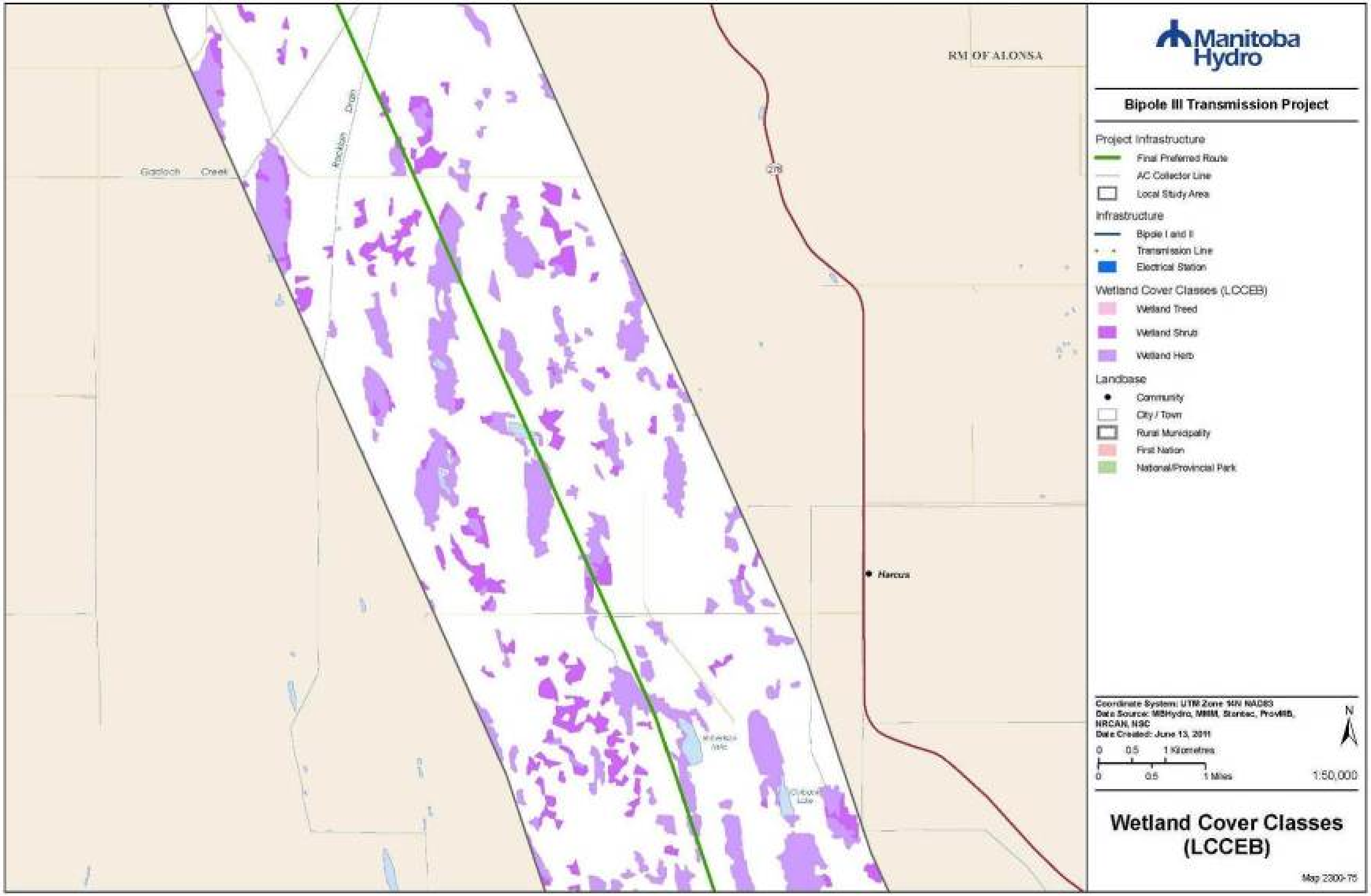
Map Series 2300-72. Distribution of wetland habitat within the Bipole III Project Study Area.



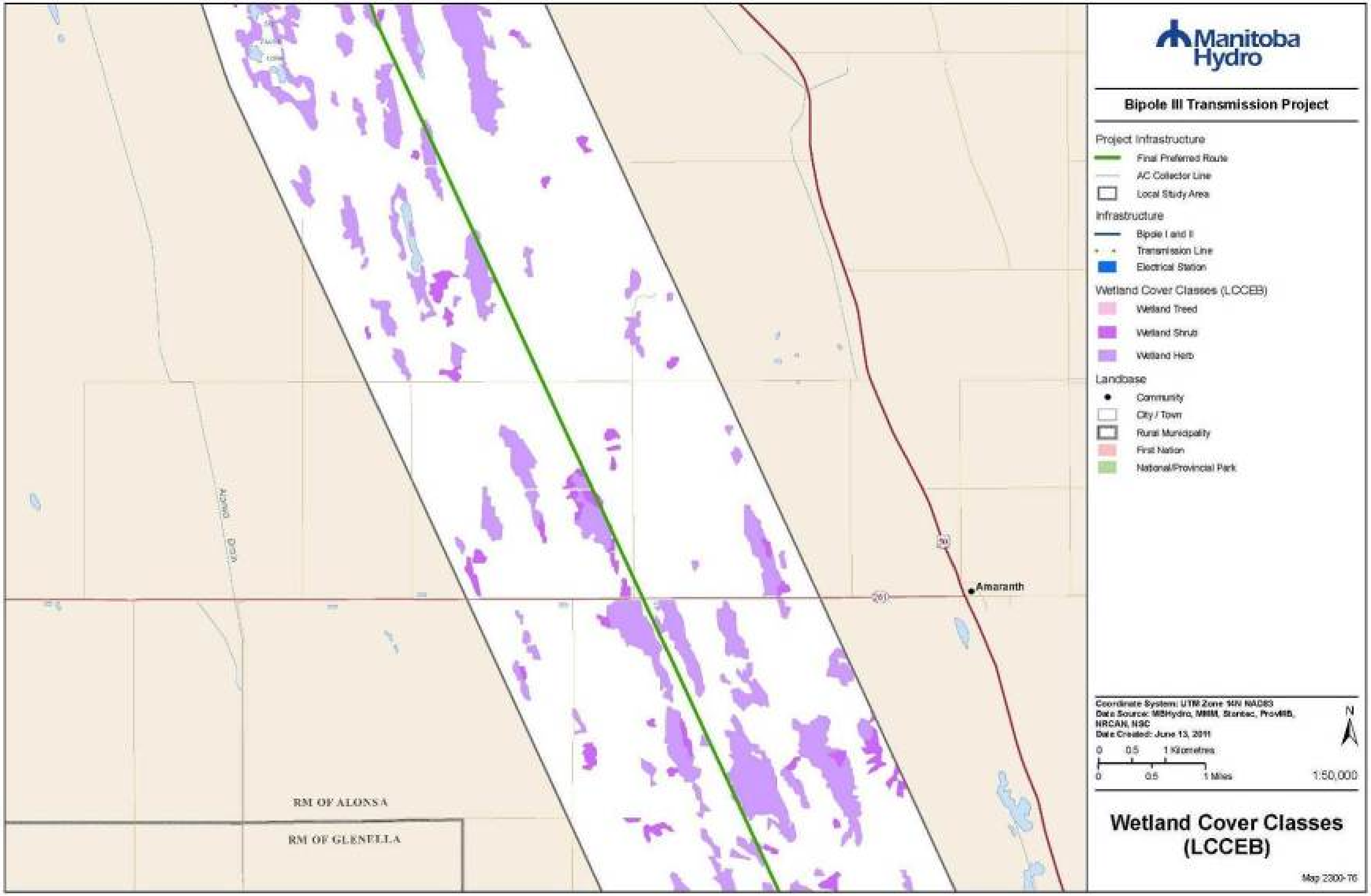
Map Series 2300-73. Distribution of wetland habitat within the Bipole III Project Study Area.



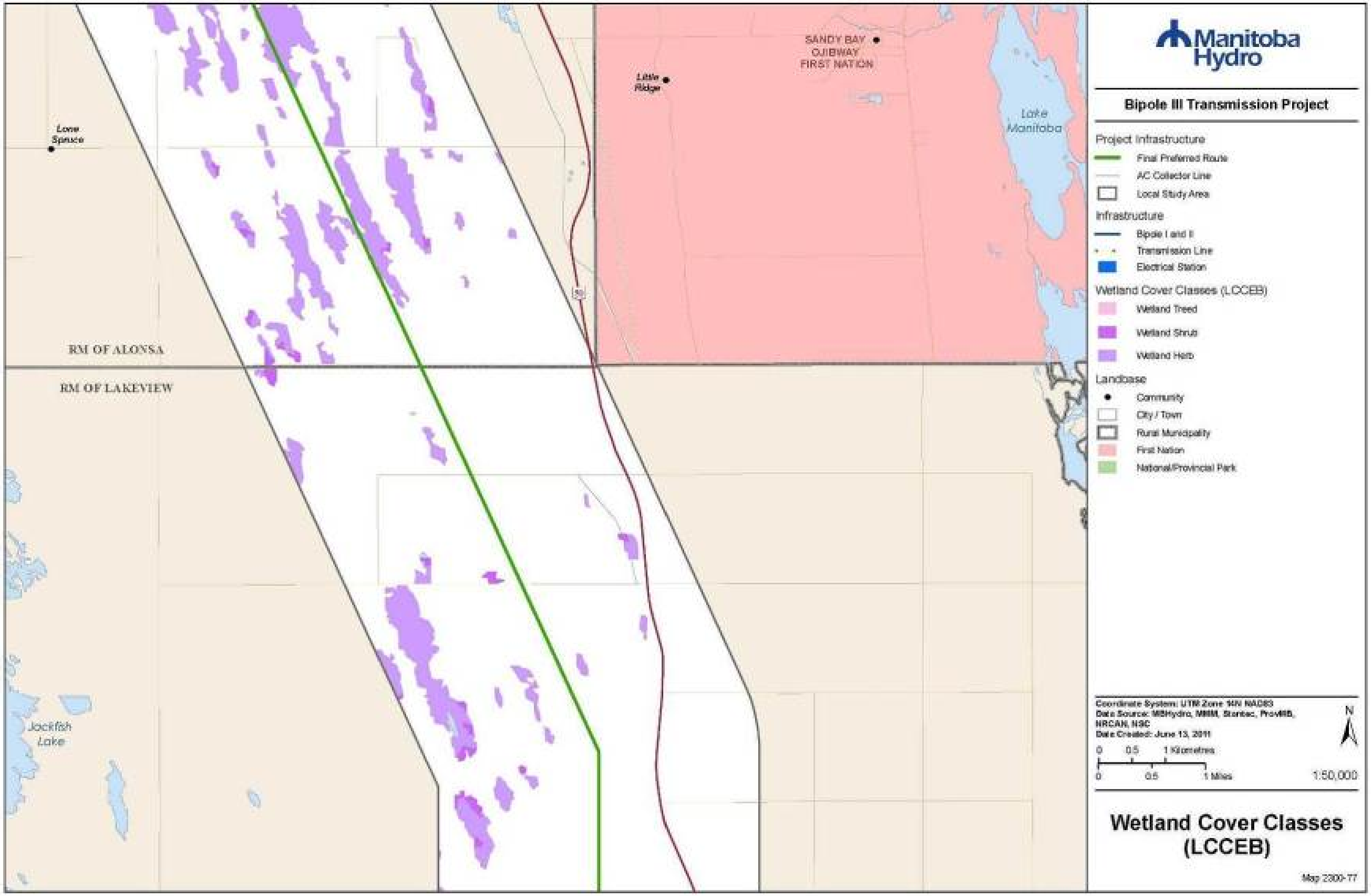
Map Series 2300-74. Distribution of wetland habitat within the Bipole III Project Study Area.



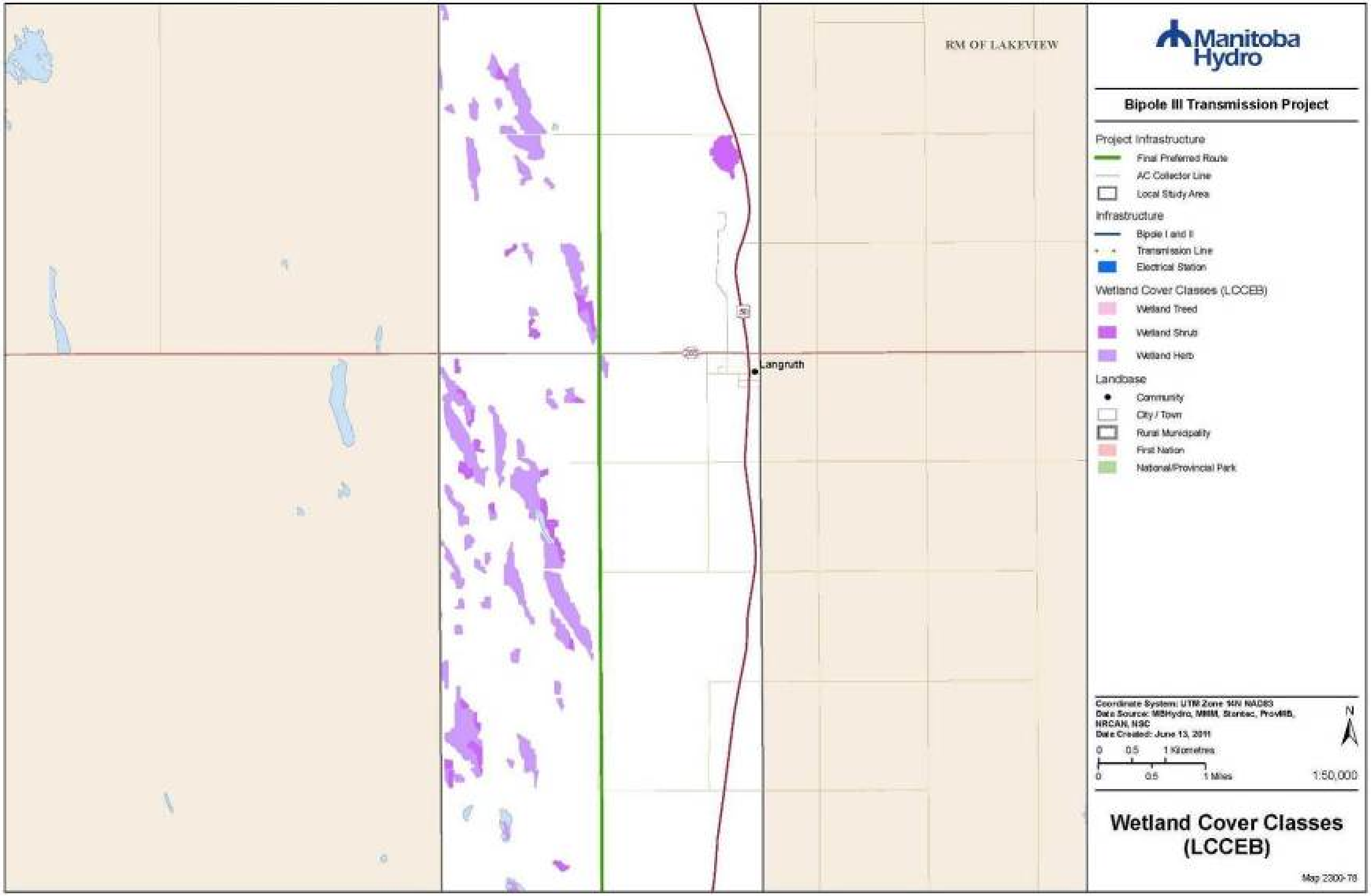
Map Series 2300-75. Distribution of wetland habitat within the Bipole III Project Study Area.



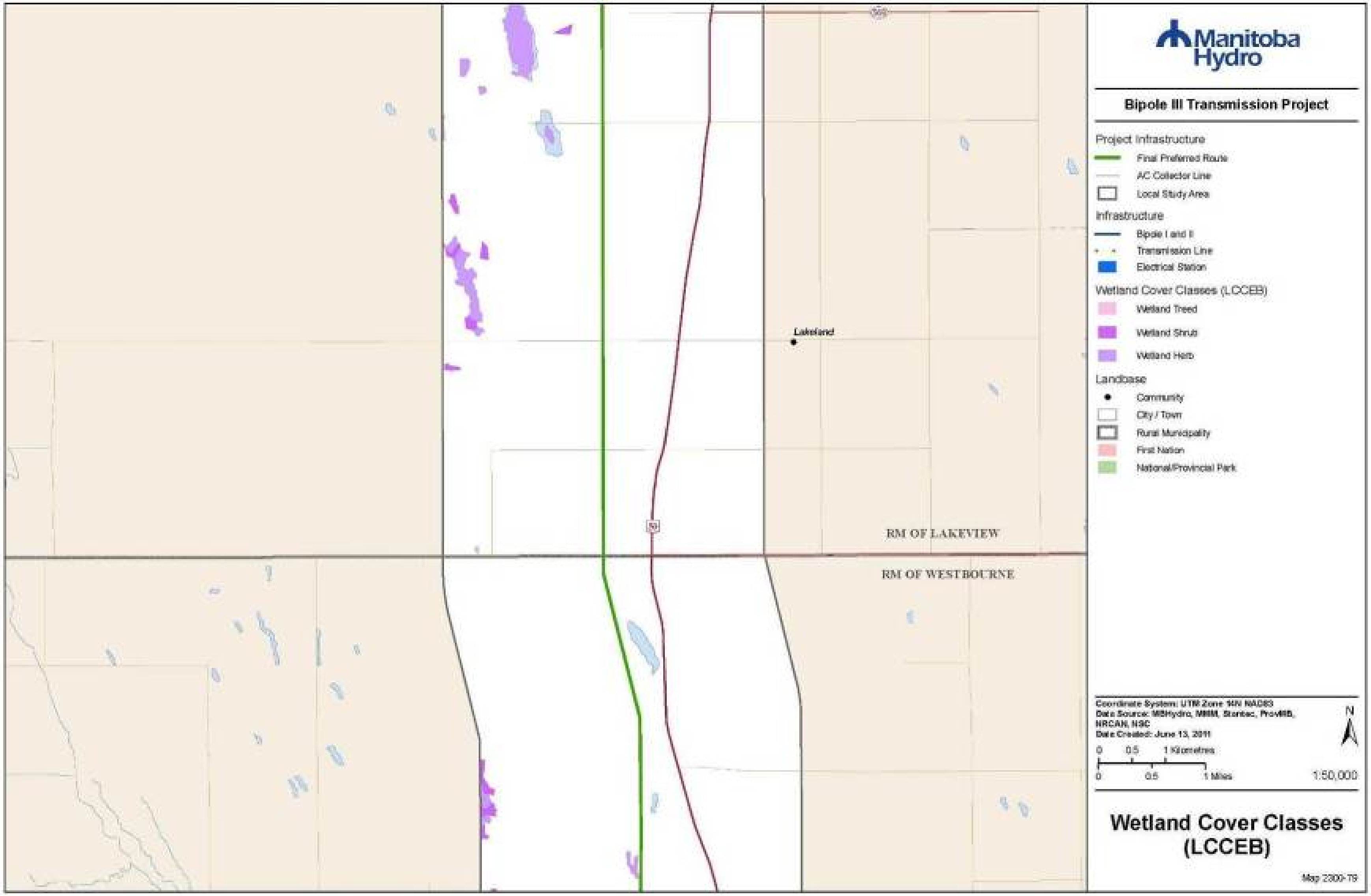
Map Series 2300-76. Distribution of wetland habitat within the Bipole III Project Study Area.



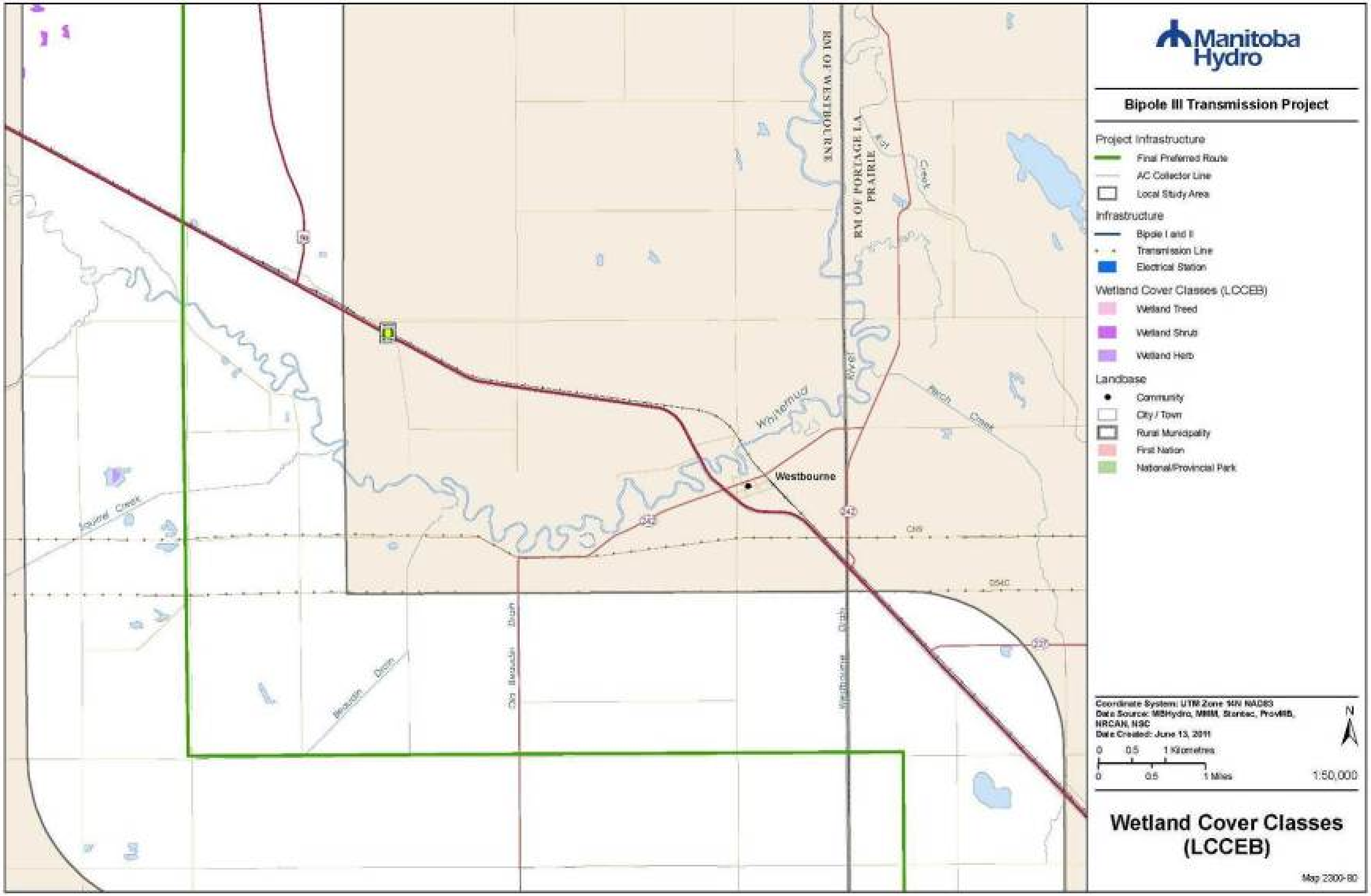
Map Series 2300-77. Distribution of wetland habitat within the Bipole III Project Study Area.



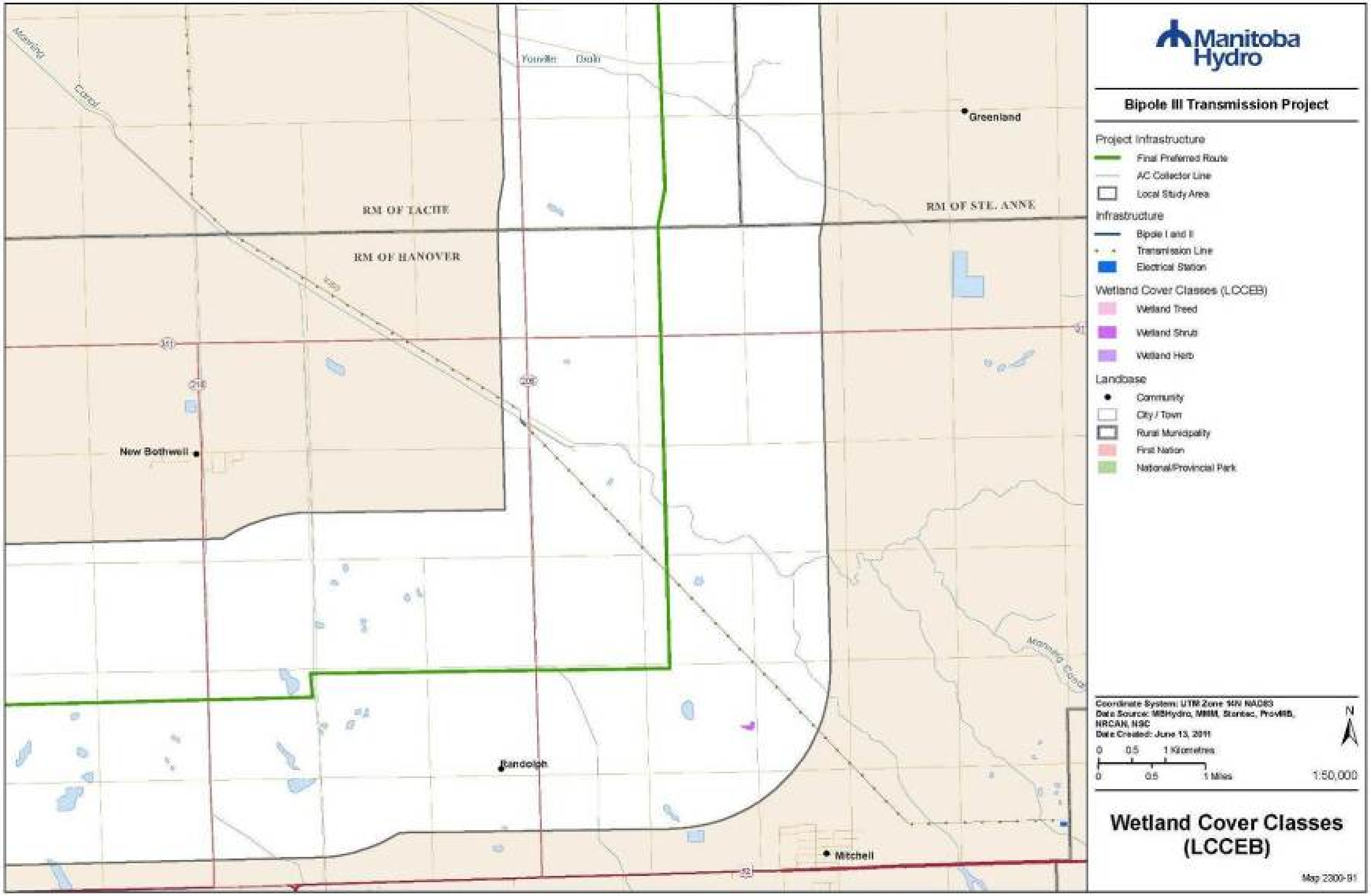
Map Series 2300-78. Distribution of wetland habitat within the Bipole III Project Study Area.



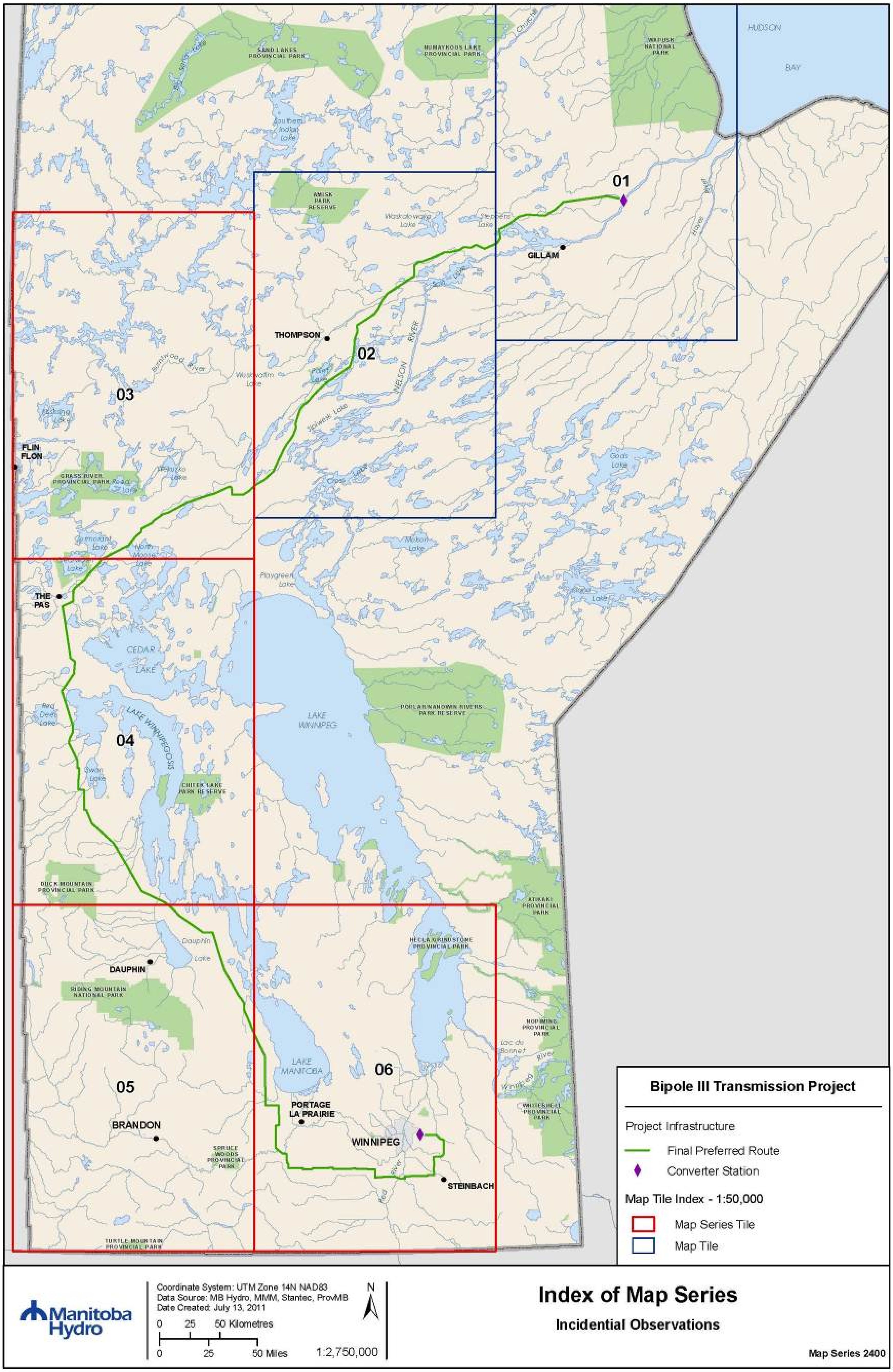
Map Series 2300-79. Distribution of wetland habitat within the Bipole III Project Study Area.



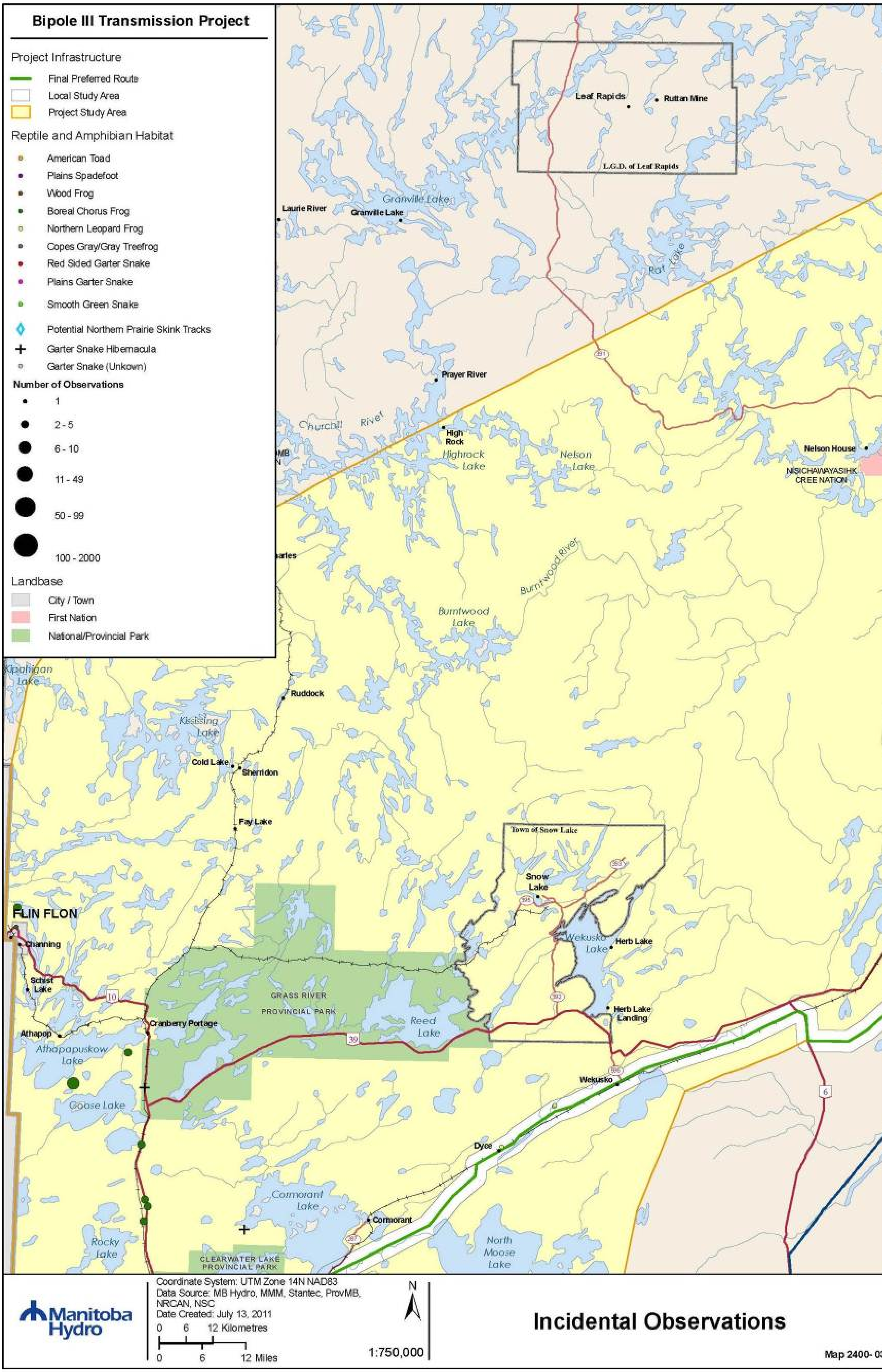
Map Series 2300-80. Distribution of wetland habitat within the Bipole III Project Study Area.



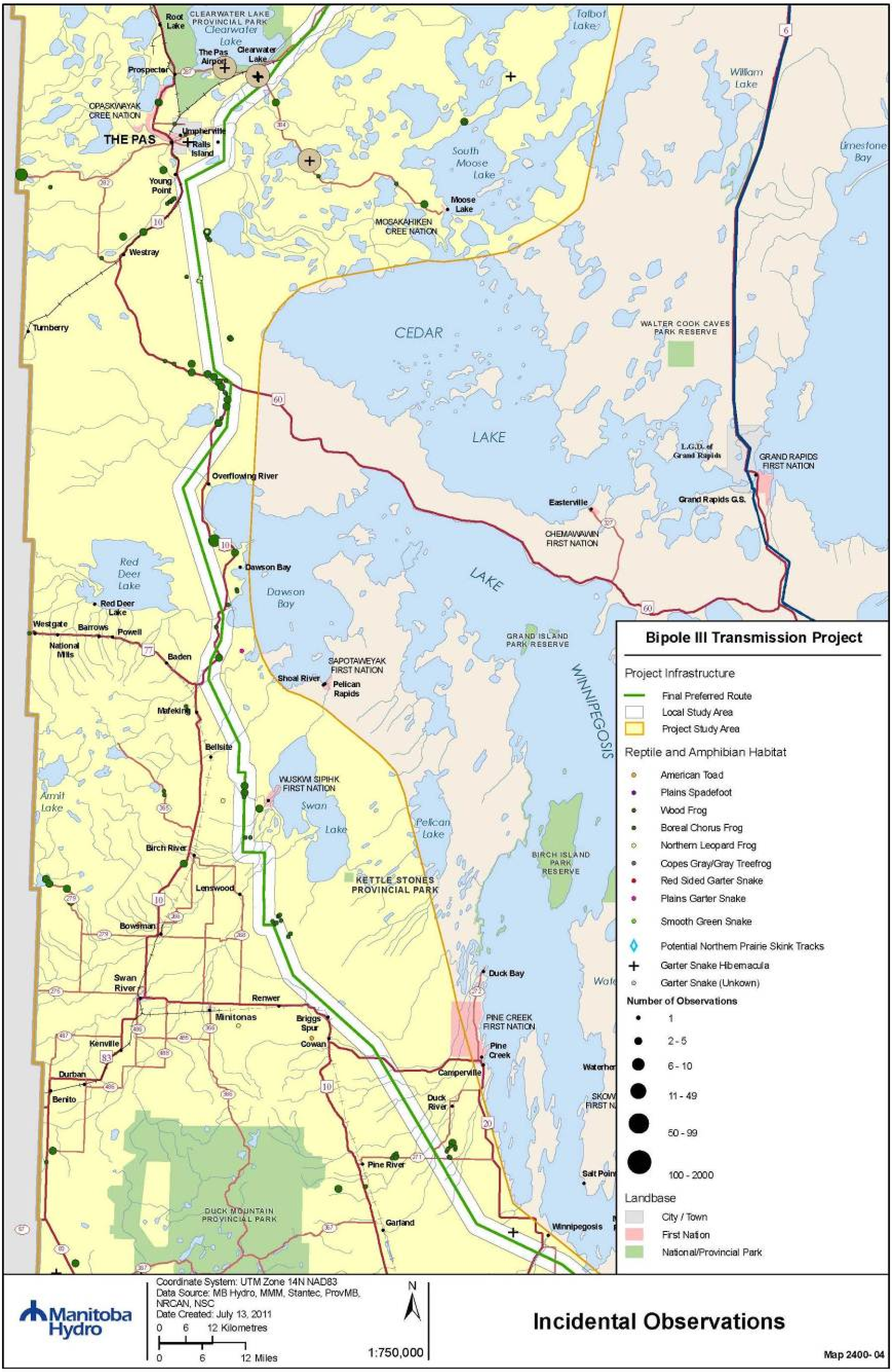
Map Series 2300-91. Distribution of wetland habitat within the Bipole III Project Study Area.



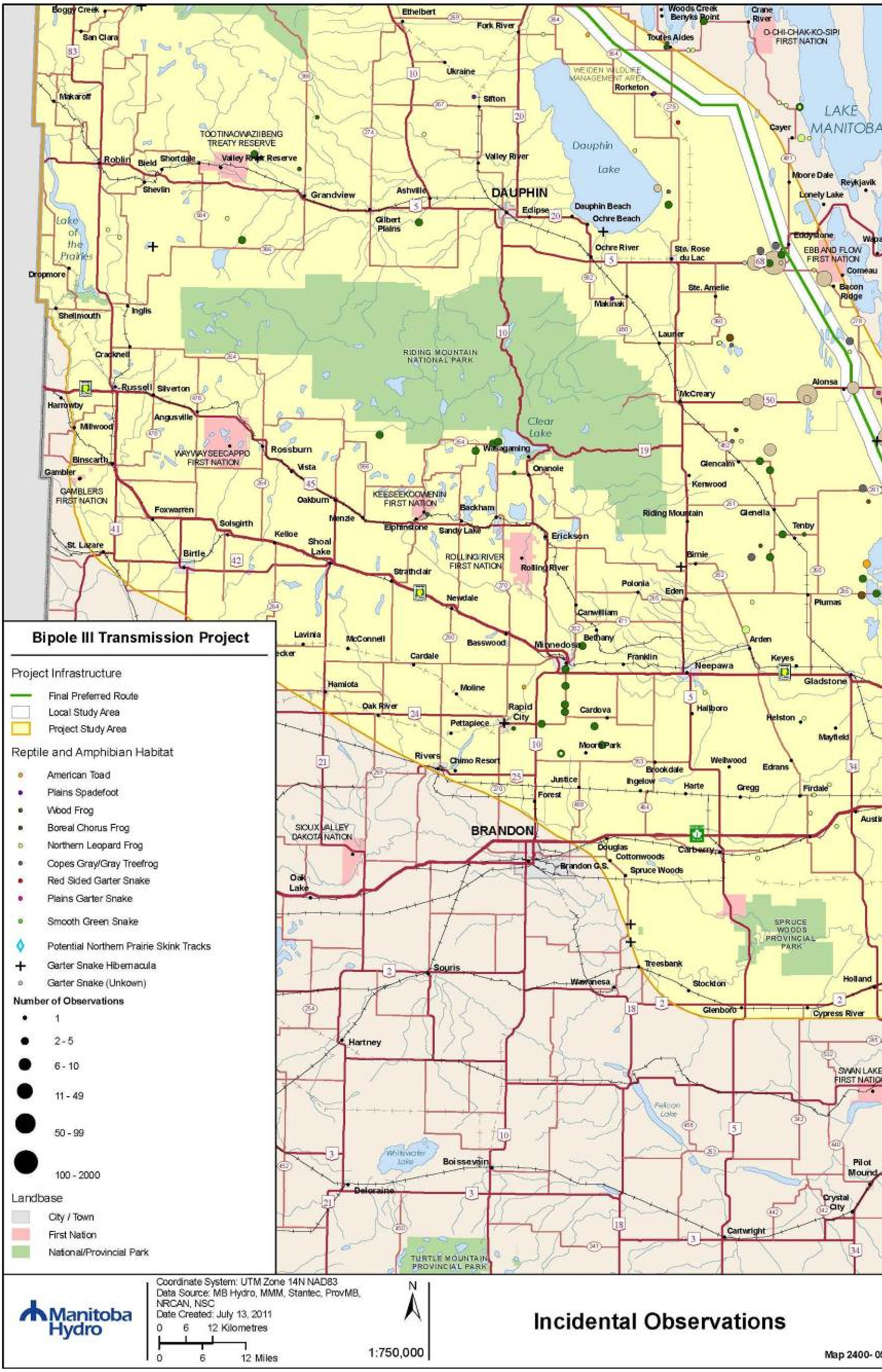
Map Series 2400. Index map for incidental observations of amphibians and reptiles within the Bipole III Project Study Area.



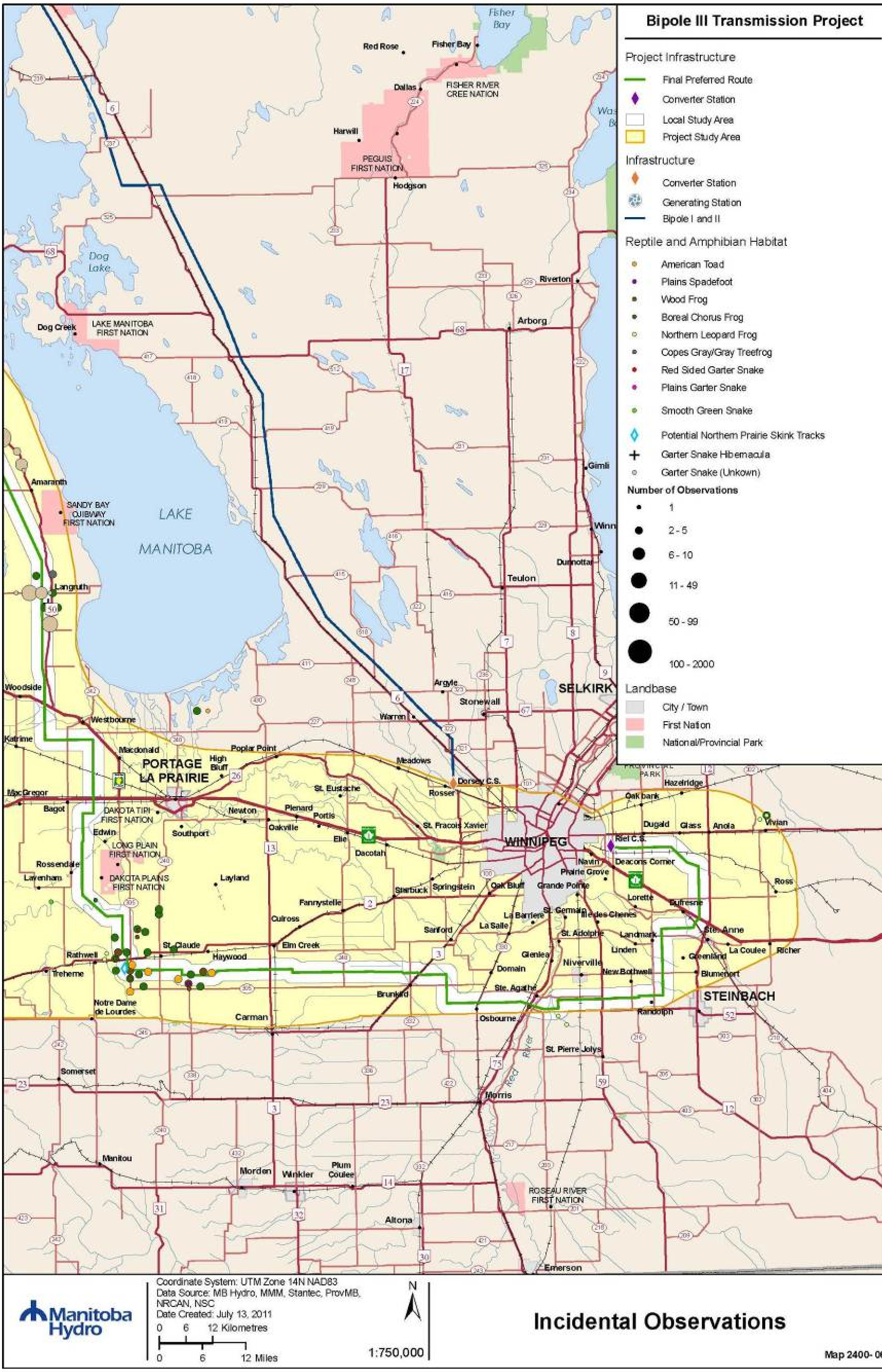
Map Series 2400-1. Incidental observations of amphibians and reptiles within the Bipole III Project Study Area.



Map Series 2400-2. Incidental observations of amphibians and reptiles within the Bipole III Project Study Area.



Map Series 2400-3. Incidental observations of amphibians and reptiles within the Bipole III Project Study Area.



Map Series 2400-4. Incidental observations of amphibians and reptiles within the Bipole III Project Study Area.

12.0 References

12.1 Citations

Ainslie, B.J., J.R. Post, and A.J. Paul. 1998. Effects of pulsed and continuous DC electrofishing on juvenile rainbow trout. North American Journal of Fisheries Management. 18:905-918.

Aitchison, C.W., and C.D. Dondale. Accessed 2007. A checklist of Manitoba spiders (Araneae). USGS, Northern Prairie Wildlife Research Center. (http://www.npwrc.usgs.gov/resource/insects/spiders/index.htm).

Alberta Environment. 2008. Guidelines for wetland establishment on reclaimed oil sands leases (2nd edition). Prepared by Harris, M.L. of Lorax Environmental for the Wetlands and Aquatics Subgroup of the Reclamation Working Group of the Cumulative Environmental Management Association, Fort McMurray, AB. December 2007. 103 pp + Appendices.

Anderson, D.R., W.A. Link, D.H. Johnson and K.P. Burnham. 2001. Suggestions for presenting the results of data analyses. Journal of Wildlife Management. 65: 373-378.

Aresco, M. 2005. Mitigation measures to reduce highway mortality of turtles and other herpetofauna at a north Florida lake. Journal of Wildlife Management. 69(2):549-560.

Ashley E.P., and J.T. Robinson. 1996. Road mortality of amphibians, reptile and other wildlife on the Long Point Causeway, Lake Erie, Ontario. Canadian Field Naturalist. 110(3):403-412.

Baker, L., J.J.H. Ciborowski, and M.D. MacKinnon. 2007. Assessment of the effects of petroleum coke amendments in constructed oil sands wetlands. Department of Biological Sciences, University of Windsor, Windsor, ON. Syncrude Canada Ltd. *In*: Munson, B.A., Froese, J.M.W., Ferone, J-M., and Burridge, L.E. (Editors). 2007 Proceedings of the 33rd Annual Aquatic Toxicity Workshop: October 1 to 4, 2006, Jasper, Alberta. Canadian Technical Report of Fisheries and Aquatic Sciences. 2746: xiv + 114 pp.

Baker, L., J.J.H. Ciborowski, and M.D. MacKinnon. 2008. The effects of petroleum coke amendments in constructed oil sands wetlands: Trace metal concentrations in pore waters, macrophyte and invertebrate tissues [abstract]. *In:* Kidd, K.A., Allen Jarvis, R., Haya, K., Doe, K., and Burridge, L.E. (Editors). 2008. Proceedings of the 34th Annual Aquatic Toxicity Workshop: September 30 to October 3, 2007, Halifax, Nova Scotia. Canadian Technical Report of Fisheries and Aquatic Sciences. 2793: xviii + 273 pp.

Barrass, A.N. 1985. The effects of highway traffic noise on the phonotactic and associated reproductive behavior of selected anurans. Ph.D. Thesis, Vanderbilt University, Nashville, Tennessee.

Barinaga, M. 1990. Where have all the froggies gone? Science. 247:1033-1034.

Barnes, R.D. 1980. Invertebrate Zoology. Fourth Edition. Saunder College, Philadelphia, Pennsylvania. 1089 pp.

Baxter, G.T. and M.D. Stone. 1980. Amphibians and reptiles of Wyoming. Wyoming Game and Fish Dept., Cheyenne., WY. 137 pp.

Bélisle, F., G.J. Doucet, and Y. Garnet.2002. Wildlife use if riparian vegetation buffer zones in high voltage powerline rights-of-way in the Quebec Boreal Forest. Proceedings from the Environmental Concerns in Rights-of-Way Management: Seventh International Symposium. J.W. Goodrich-Mahoney, D.F. Mutrie, and C.A. Guild (Eds.). Pp 309-318.

Biological Survey of Canada. 1988. Insects of Canada. A synopsis prepared for delegates to the XVIIIth International Congress of Entomology. Accessed November 2009. (http://www.biology.ualberta.ca/ bsc/briefs/brinsectsofcane.htm).

Blaustein, A. R., and D. B. Wake. 1990. Declining amphibian populations: a global phenomenon? Trends in Ecology and Evolution. 5:203-204.

Blymyer, M.J. and B.S. McGinnes. 1977. Observations on possible detrimental effects of clearcutting on terrestrial amphibians. Bulletin of the Maryland Herpetological Society. 13:79–83.

Bramble, W.C., R.H. Yahner, and W.R. Byrnes. 1997. Effects of herbicides on butterfly populations of an electric transmission right-of-way. Journal of Arboriculture. 23(5): 196-206.

Bramble, W.C., R.H. Yahner, and W.R. Byrnes. 1999. Effect of herbicide maintenance of an electric transmission line right-of-way on butterfly populations. Journal of Arboriculture. 26(6):302-310.

Breckenridge, W.J. 1943. The life history of the black-banded skink *Eumeces septentrionalis septentrionalis* (Baird). American Midland Naturalist 29:591-606.

Bredin, E.J. 1981. Distribution of the northern prairie skink in Manitoba. Manitoba Department of Natural Resources, Biological Services MS Rep.81-17.

Brouard, D., C. Harvey, D. Goulet, T. Nguyen, R. Champagne, and P. Dubė. 1996. Technical notes: evaluation of potential effects of stray voltage generated by alternating current on hatchery-raised rainbow trout. The Progressive Fish-Culturist. 58:47-51.

Buchanan, B.W. 1993. Effects of enhanced lighting on the behaviour of nocturnal frogs. Animal Behaviour. 45: 893-899.

Burnham, K.P. and D.R. Anderson. 2002. Model selection and multimodel inference: a practical information-theoretic approach, 2nd ed. Springer Science + Business Media Inc., New York, USA.

Bury, R.B. 1983. Differences in amphibian populations in logged and old growth redwood forest. Northwest Science. 57:167–178.

Canadian Biodiversity Information Facility. Government of Canada. Accessed August 2009. http://www.cbif.gc.ca/spp_pages/butterflies/species/UncasSkipper_e.php

Carr L. & L. Fahrig. 2001. Effect of road traffic on two amphibian species of differing vagility. Conservation Biology. 15(4):1071-1078.

CEAA. 1994. Addressing cumulative environmental effects. A reference guide for the Canadian Environmental Assessment Act. Prepared by the Federal Environmental Assessment Review Office. November 1994.

Cook, F. R. 1984. Introduction to Canadian amphibians and reptiles. National Museum of Natural Sciences, National Museums of Canada. Ottawa, Canada.

Corn, P.S. and R.B. Bury. 1990. Sampling methods for terrestrial amphibians and reptiles. Pp 1–34. *In* Carey, A.B. and L.F. Ruggiero (Eds.), Wildlife-Habitat Relationships: Sampling Procedures for Pacific Northwest Vertebrates. U.S.D.A. Forest Service, General Technical Report, PNW-GTR-256, Pacific Northwest Research Station, Portland, Oregon.

COSEWIC. 2000. COSEWIC assessment and update status report on the northern leopard frog *Rana pipiens* (Southern Mountain and Prairie populations) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 40 pp.

COSEWIC. 2003. COSEWIC assessment and status report on the Dakota skipper *Hesperia dacotae* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 35 pp. (www.sararegistry.gc.ca/status/status_e.cfm).

COSEWIC. 2004. COSEWIC assessment and update status report on the prairie skink *Eumeces septentrionalis* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 22 pp. (www.sararegistry.gc.ca/status/status_e.cfm).

COSEWIC. 2005. COSEWIC assessment and status report on the Ottoe Skipper *Hesperia ottoe* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 26 pp. (www.sararegistry.gc.ca/status/status_e.cfm).

COSEWIC. 2009a. COSEWIC assessment and update status report on the Northern Leopard Frog *Lithobates pipiens*, Rocky Mountain population, Western Boreal/Prairie populations and Eastern populations, in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 69 pp. (www.sararegistry.gc.ca/status/status_e.cfm).

COSEWIC. 2009b. Wildlife Species Search database. Government of Canada Accessed August 2009. (http://www.cosewic.gc.ca/eng/sct1/searchform_e.cfm).

Critical Wildlife Habitat Program. 2010. Native grassland and cultivated sites included in the Mixed-grass Prairie Inventory for Manitoba (1989-2007). Manitoba Conservation. Data obtained through Joro Geomatics Inc. as part of a data sharing agreement.

Dalbey, S.R., T.E. McMahon, and W. Fredenberg. 1996. Effect of electrofishing pulse shape and electrofishing-induced spinal injury on long-term growth and survival of wild rainbow trout. North American Journal of Fisheries Management. 16:560-569.

Dana, R.P. 1991. Conservation management of the prairie skippers *Hesperia dacotae* and *Hesperia ottoe*: basic biology and threat of mortality during prescribed burning in spring. Minnesota Agricultural Experiment Station Bulletin 594-1991 (AD-SB-5511-S). University of Minnesota, St. Paul. 63 pp.

Danks, H.V and R.G. Foottit. 1989. Insects of the boreal zone of Canada. The Canadian Entomologist. 121(8):625-690.

deMaynadier, P.G., M.L. Hunter. 2000. Road effects on amphibian movements in a forested landscape. Natural Areas Journal. 20:56–65.

deMaynadier, P.G. and M.L. Hunter, Jr. 1999. Canopy closure and juvenile emigration by pool-breeding amphibians in Maine. The Journal of Wildlife Management. 63(2): 441-450.

de Vries, H.H., and P.J. den Boer. 1990. Survival of populations of *Agonum ericetti* Panz. (Col., Carabidae) in relation to fragmentation of habitat. Netherlands Journal of Zoology. 40:484-498.

Didham, R.K., J. Ghazoul, N.E. Stork, A.J. Davis. 1996. Insects in fragmented forests: a functional approach. Trends in Ecology and Evolution. 11:255-260.

Ecological Stratification Working Group. 1995. A National Ecological Framework for Canada. Agriculture and Agri-Food Canada, Research Branch, Centre for Land and Biological Resources Research and Environment Canada, State of the Environment Directorate, Ecozone Analysis Branch, Ottawa/Hull. Report and national map at 1:7,500,000 scale.

Eddy, S.B. 1976. Population ecology of the northern leopard frog *Rana pipiens pipiens* Screber at Delta Marsh, Manitoba. MSc thesis, Department of Zoology, University of Manitoba. Winnipeg, Manitoba.

Eigenbrod, F., S.J. Hecnar, and L. Fahrig. 2009. Quantifying the road-effect zone: threshold effects of a motorway on anuran populations in Ontario, Canada. Ecology and Society. 14(1): 24.

Enge, K.M. and W.R. Marion. 1986. Effects of clearcutting and site preparation on herpetofauna of a north Florida flatwoods. Forest Ecology and Management. 14:177–192.

Environment Canada. 2009. Petroleum industry activity guidelines for wildlife species at risk in the prairie and northern region. Canadian Wildlife Service. Environment Canada, Prairie and Northern Region. Edmonton Alberta. 64 pp.

Exponent Inc. 2011. Modeling of the Electrical Environment for Proposed DC and AC components of the Bipole III Project. Prepared for Manitoba Hydro. Bowie, MD.

Fahrig, L., J.H. Pedlar, S.E. Pope, P.D. Taylor, and J.F. Wegner. 1995. Effect of road traffic on amphibian density. Biological Conservation. 73: 177-182.

Federal Environmental Assessment Review Office. 1994. A Reference Guide for the Canadian Environmental Assessment Act; Determining whether a project is likely to cause significant adverse environmental effects. Hull, Quebec. 16 pp.

Findlay, CS., J. Lenton and L. Zheng. 2001. Land-use correlates of anuran community richness and composition in southeastern Ontario wetlands. Ecoscience. 8: 336-343.

Gibbs, J.P. 1998. Amphibian movements in response to forest edges, roads, and streambeds in Southern New England. The Journal of Wildlife Management. 62(2):584-589.

Gibson, T., S. Nicol, and L. Streigh (Eds). 1997. State of the environment report for Manitoba, 1997. Biennial. Government of Manitoba. 174 pp.

Graeter, G.J., B.B. Rothermel, and J.W. Gibbons. 2008. Habitat selection and movement of pond-breeding amphibians in experimentally fragmented pine forests. Journal of Wildlife Management. 72(2):473-482.

Gregory, P.T. 1977. Life-history parameters of the red-sided garter snake (*Thamnophis sirtalis parietalis*) in an extreme environment, the interlake region of Manitoba. National Museum of Natural Sciences. Publications in Zoology No.13. National Museums of Canada. 44 pp.

Gregory, P.T. and K.W. Stewart. 1975. Long-distance dispersal and feeding strategy of the red-sided garter snake (*Thamnophis sirtalis parietalis*) in the Interlake of Manitoba. Canadian Journal of Zoology. 53:238-245.

Government of Manitoba. 2010. Snakes of Narcisse. Accessed September 2010. (http://www.gov.mb.ca/conservation/wildlife/spmon/narsnakes/snakes_status.html).

Hailman, J.P. 1984. Bimodal nocturnal activity of the western toad (*Bufo boreas*) in relation to ambient illumination. Copeia. (2): 283-290.

Hall, J.P. 1996. Forest insect and disease conditions in Canada 1994. Forest Insect and Disease Survey. Natural Resources Canada. Canadian Forest Service. Ottawa.

Hamilton, K.G.A. 2005. Bugs reveal an extensive, long-lost Northern tallgrass prairie. BioScience. 55(1):49-59.

Hanski, I.A., A. Moilanen and M. Gyllenberg. 1996. Minimum viable metapopulation size. American Naturalists 147:527-541.

Harrell, F.E Jr. 2010. The rms package for R, Version 3.1-0. Updated September 12, 2010. (http://biostat.mc.vanderbilt.edu/wiki/Main/Rrms).

Hartline, P.H. 1971. Physiological basis for detection of sound and vibration in snakes. Journal of Experimental Biology. 54:349-371.

Haskell, D.G. 2000. Effects of forest roads on macroinvertebrate soil fauna of the southern Appalachian Mountains. Conservation Biology. 14:57-63.

Hayes, T.B., A. Collins, M. Lee, M. Mendoza, N. Noriega, A. A. Stuart, and A. Vonk. 2002. Hermaphroditic, demasculanized frogs after exposure to the herbicide atrazine at low ecologically relevant doses. Proceedings of the National Academy of Sciences. 99(8): 5476-5480.

Hayes, W.P. 1927. Prairie insects. Ecology 8(2):238-250.

Hels, T. and E. Buchwald. 2001. The effect of road kills on amphibian populations. Biological Conservation. 99:331–340.

Henderson, D.C. 2009. Activity set-back distance guidelines for prairie plant species at risk. Environment Canada. Canadian Wildlife Service. Prairie and Northern Region. 18 pp.

Hine, R.L., B.L. Les, and B.F. Hellmich. 1981. Leopard frog populations and mortality in Wisconsin, 1974-1976. Department of Natural Resources, Madison, Wisconsin.

Holmquist, J.G. 1998. Permeability of patch boundaries to invertebrates: influences of boundary contrast, light level, and faunal density and mobility. Oikos 81:558-566.

Hopkins, P.J., N.R. Webb. 1984. The composition of the beetle and spider faunas on fragmented heathlands. Journal of Applied Ecology. 21:935-946.

Hosmer, D.W., T. Hosmer, S. Le Cessie and S. Lemeshow. 1997. A comparison of goodness-of-fit tests for the logistic regression model. Statistics in Medicine. 16: 965-980.

Houlahan, J.E. and C.S. Findlay. 2003. The effects of adjacent land use on wetland amphibian species richness and community composition. Canadian Journal of Fisheries and Aquatic Sciences. 60: 1078-1094.

Integrated Taxonomic Information System (ITIS). 2009. Canadian Biodiversity Information Facility. Government of Canada. (http://www.cbif.gc.ca).

Jaeger, J.A.G, J. Bowman, J. Brennan, L. Fahrig, D. Bert, J. Bouchard, N. Charbonneau, K. Frank, B. Gruber, and K. T. von Toschanowitz. 2005. Predicting when animal populations are at risk from roads: an interactive model of road avoidance behavior. Ecological Modelling. 185:329-348.

Jaeger, R.G., and J.P. Hailman. 1981. Activity of neotropical frogs in relation to ambient light. Biotropica. 13: 59-65.

Kamstra, J., S. Hounsell, and W. Weller. 1995. Vulnerability of reptiles and amphibians to Transmission Line corridors and facilities. *In* Doucet, J., C. Séguin, and M. Giguère. Proceedings of the Fifth International Symposium on Environmental Concerns in Rights-of-Way Management. September 19-22, 1993. Vice Présidence Environment Hydro-Québec. Montreal, Quebec, Canada. 300-304.

Kendell, K. 1998. Red-sided garter snake (*Thamnophis sirtalis parietalis*) literature review. Submitted to Alberta Environmental Protection, Natural Resources Service, Fisheries and Wildlife Management Division. 38 pp.

Kendell, K. 2002. Survey protocol for the northern leopard frog. Alberta Sustainable Resource Development, Fish and Wildlife Division, Alberta Species at Risk Report No.43, Edmonton, AB. 30 pp.

Klassen, P., A.R. Westwood, W.B. Preston, and W.B. McKillop. 1989. The Butterflies of Manitoba. Manitoba Museum of Man and Nature. Winnipeg, Manitoba. 290 pp.

Klein BC .1989. Effects of forest fragmentation on dung and carrion beetle communities in central Amazonia. Ecology 70:1715-1725

Koonz, W. H. 1991. Red-sided garter snake management plan. Manitoba Natural Resources, Wildlife Branch. August 1991. 20 pp.

Lauzon, R.D. 1999. Status of the plains spadefoot (*Spea bombifrons*) in Alberta. Alberta Environment, Fisheries and Wildlife Management Division, and Alberta Conservation Association, Wildlife Status Report No.25. Edmonton, Alberta. 17 pp.

Lee Jr., J.M., V.L. Chartier, D.P. Hartman, G.E. Lee, K.S. Pierce, F.L. Shon, R.D. Stearns, and M.T. Zeckermeister. 1989. Electrical and biological effects of transmission lines: a review. U.S. Department of Energy. Bonneville Power Administration. Portland, Oregon.

Lefcort, H., R.A. Mequire, L.H. Wilson, & W.F. Ettinger. 1998. Heavy metals alter the survival, growth, metamorphosis, and anti-predatory behaviour of Columbia spotted frog (*Rana luteiventris*) tadpoles. Archives of Environmental Contamination and Toxicology. 35:447-456.

Linck, M.H. 2000. Reduction in road mortality in a northern leopard frog population. Journal of the Iowa Academy of Science. 107(3): 209-211.

Mader H.J., C. Schell, and P. Kornacker. 1990. Linear barriers to arthropod movements in the landscape. Biological Conservation. 54:209-222.

Manitoba Conservation. 2011. Snakes of Narcisse. Wildlife and Ecosystem Protection. Accessed January 2011. (http://www.gov.mb.ca/conservation/wildlife/spmon/narsnakes/index.html).

Manitoba Conservation. 2008. Forest management guidelines for riparian management areas. Manitoba Conservation Forest Practices Guidebook. January 2008. Manitoba Conservation and Manitoba Water Stewardship. Winnipeg, Manitoba. 47 pp.

Manitoba Conservation. 2009. Manitoba Land Initiative. Forest Resource Inventory digital maps. Accessed August 2009. (https://mli2.gov.mb.ca).

Manitoba Conservation. 2010. Forest Management Guidelines for terrestrial buffers. Manitoba Conservation Forest Practices Guidebook. January 2010. Manitoba Conservation and Manitoba Water Stewardship. Winnipeg, Manitoba. 20 pp.

Manitoba Hydro. 2009. Bipole III Transmission Project: A Major Reliability Improvement Initiative. Draft Environmental Assessment Scoping Document. (www.gov.mb.ca/conservation/eal/registries).

McLeod, R.F. and J.E. Gates. 1998. Response of herpetofaunal communities to forest cutting and burning at Chesapeake Farms, Maryland. American Midland Naturalist. 139:164-177.

Mahaney, P.A. 1994. Effects of freshwater petroleum contamination on amphibian hatching and metamorphosis. Environmental Toxicology and Chemistry. 13:259-265.

Meffe, G.K., C.R. Carroll (Eds). 1997. Principles of Conservation Biology, 2nd edition. Sinauer Associates, Inc., Sunderland MA, 729 pp.

Merrell, D.J. 1977. Life history of the leopard frog, *Rana pipiens,* in Minnesota. Bell Museum of Natural History. University of Minnesota. Minneapolis, Minnesota.

MMM. 2010. Bipole III Transmission Project. A Major Reliability Improvement Initiative. Project Description. Prepared for Manitoba Hydro by MMM Group Limited. December 2010.

MMM. 2011. Bipole III Environmental Scan: Climate Change. Prepared for Manitoba Hydro by MMM Group Limited. September 2011.

National Wetlands Working Group. 1988. Wetlands of Canada. Ecological Land Classification Series, No.24. Sustainable Development Branch, Environment Canada, Ottawa, Ontario, and Polyscience Inc., Montreal, Quebec. 452 pp.

Nelson, W.F. 1963. Natural history of the northern prairie skink, *Eumeces septentrionalis septentrionalis*(Baird). Ph.D. Dissertation. University of Minnesota, Minnesota, Minneapolis, U.S.

Niemalä, J., Y. Haila, E. Halme, T. Lahti, T. Pajunen, P. Punttila. 1998. The distribution of carabid beetles in fragments of old coniferous taiga and adjacent managed forest. Annales Zoologici Fennici. 25:107-119.

Olden, J.D., D.A. Jackson and P.R. Peres-Neto. 2002. Predictive models of fish species distributions: a note on proper validation and chance predictions. Transactions of the American Fisheries Society. 131: 329-336.

Palis, J.G. 1994. Anura: *Rana utricularia* (southern leopard frog): Road mortality. Herpetological Review. 25(3): 119.

Pechmann, J.H.K., D.E. Scott, R.D. Semlitsch, J.P. Caldwell, L.J. Vitt, and J.W. Gibbons. 1991. Declining amphibian populations: the problem of separating human impacts from natural fluctuations. Science. 253:892-895.

Peterson, H., and M. Luxton. 1982. A Comparative analysis of soil fauna populations and their role in decomposition processes. Oikos. 39(3):288-388.

Prairie Skink Recovery Team. 2006. National Recovery Strategy for the Prairie Skink (*Eumeces septentrionalis*) (Proposed). In Species at Risk Act Recovery Strategy Series. 21pp.

Preston, W. 1982. The amphibians and reptiles of Manitoba. Manitoba Museum of Man and Nature, Winnipeg, Manitoba. 128 pp.

Preston, W.B. and D.R.M. Hatch. 1986. The plains spadefoot, *Scaphiopus bombifrons*, in Manitoba. Canadian Field-Naturalist. 100(1):123-125.

Puttaswamy, N. and K. Liber. 2007. Evaluation of oil sands coke leachate toxicity using Ceriodaphnia dubia. Toxicology Centre, University of Saskatchewan, Saskatoon, SK. In: Munson, B.A., Froese, J.M.W., Ferone, J-M., and Burridge, L.E. (Editors). 2007 Proceedings of the 33rd Annual Aquatic Toxicity Workshop: October 1 to 4, 2006, Jasper, Alberta. Canadian Technical Report of Fisheries and Aquatic Sciences. 2746: xiv + 114 pp.

R Core Development Team. 2010. R: a language and environment for statistical computing, Version 2.12.0. R Foundation for Statistical Computing, Vienna, Austria.

Relyea, R. 2005. The impact of insecticides and herbicides on the biodiversity and productivity of aquatic communities. 15:618-627.

Ross, B., T. Frederickson, E. Ross, W. Hoffman, M.L. Morrision, J. Beyea, M.B. Lester, B.N. Johnson, and N.J. Frederickson. 2000. Relative abundance and species richness of herpetofauna in forest stands in Pennsylvania. Forest Science. 46(1):139-146.

Rothermal, B.B. and R.D. Semlitsch. 2002. An experimental investigation of landscape resistance of forest versus old-field habitats to emigrating juvenile amphibians. Conservation Biology. 16(5):1324-1332.

Rutherford, P. 2010. Determining Critical Habitat for the Northern Prairie Skink: Ground truthing a GIS Mapping Method. Abstract from the 9th Prairie Conservation and Endangered Species Conference. Winnipeg, Manitoba. February 25-27, 2010.

Samson, F. and F. Knopf. 1994. Prairie conservation in North America. Bioscience. 6:418-421.

Samways, M.J. 1994. Insect Conservation Biology. Chapman & Hall, London. 358 pp.

Saskatchewan Environment. 2003. Saskatchewan activity restriction guidelines for sensitive species in natural habitats. (http://www.biodiversity.sk.ca/Docs/SKactivityrestrictions.pdf).

Scott, J.L. 2004. Activity and habitat use of prairie skinks, *Eumeces septentrionalis*, in Manitoba. M.Sc. Thesis. The University of Manitoba, Winnipeg, Manitoba, Canada. 155 pp.

Seale, D.B. 1982. Physical factors influencing oviposition by the woodfrog, *Rana sylvatica*, in Pennsylvania. Copeia 1982(3):627-635.

Seburn, C.N.L., and D.C. Seburn. 1998. COSEWIC status report on the northern leopard frog *Rana pipiens* (Southern Mountain and Prairie populations) in Canada. Committee on the status of endangered wildlife in Canada, Ottawa. 40 pp.

Seburn D. and C. Seburn. 2000. Conservation priorities for the amphibians and reptiles of Canada. Prepared for World Wildlife Fund Canada and the Canadian Amphibian and Reptile Conservation Network. 92 pp.

Semlitsch, R. D. 2000. Principles for management of aquatic-breeding amphibians. Journal of Wildlife Management 64:615-631.

Semlitsch, R. D. 1981. Terrestrial activity and summer home range of the mole salamander (*Ambystoma talpoideum*). Canadian Journal of Zoology. 59:315–322.

Shine, R., B. Phillips, H. Waye, M. Lemaster, and R.T. Mason. 2004a. Species-isolating mechanisms in a mating system with male mate choice (garter snakes, *Thamnophis* spp.). Canadian Journal of Zoology. 82:1091-1098.

Shine, R., M. Lemaster, M. Wall, T. Langkilde, and R. Mason. 2004. Why did the snake cross the road? Effects of roads on movement and location of mates by garter snakes (*Thamnophis sirtalis parietalis*). Ecology and Society. 9(1):9.

Squires, A.J. 2005. Ecotoxicological Assessment of using coke in aquatic reclamation strategies at the Alberta Oil Sands. MSc Thesis. Toxicology Graduate Program, University of Saskatchewan. 191pp.

Steen, D. & J. Gibbs. 2004. Effects of roads on the structure of freshwater turtle populations. Conservation Biology. 18(4):1143-1148.

Strong AM, Dickert C.A. and R.T. Bell. 2002. Ski trail effects on a beetle (Coleoptera: Carabidae, Elateridae) community in Vermont. Journal of Insect Conservation. 6:149-159.

Sun, J.W.C., and P.M. Narins. 2005. Anthropogenic sounds differentially affect amphibian call rate. Biological Conservation. 121: 419-427.

SYSTAT Software Inc. 2007. SYSTAT for Windows, Version 12.02.00. SYSTAT Software Inc., Chicago Illinois.

Taylor, E.H. 1935. A taxonomic study of the cosmopolitan Scincoid lizards of the genus *Eumeces* with an account of the distribution and relationships of its species. The Kansas University Science Bulletin. 23:1-643.

Thibodeau, F.R. and N.H. Nickerson. 1986. Impact of power utility rights-of-way on wooded wetland. Environmental Management. 10(6):809-814.

Thomas, J.A. 1984. The conservation of butterflies in temperate countries: past efforts and lessons for the future. 11th Symposium of the Royal Entomological Society of London, Imperial College, London, MS. Pp 333-353.

US EPA, 2008. Petroleum coke category analysis and hazard characterization . Submitted to the US EPA by The American Petroleum Institute, Petroleum HPV Testing Group. Consortium Registration #1100997.

Wake, D. B. 1991. Declining amphibian populations. Science 253:860.

Wall, S.S. , C.R. Berry Jr., C.M. Blausey, J.A. Jenks and C.J. Kopplin. 2004. Fish-habitat modeling for gap analysis to conserve the endangered Topeka shiner (*Notropis topeka*). Canadian Journal of Fisheries and Aquatic Sciences. 61: 954-973.

Walston, L.J. and S.J. Mullin. 2007. Variation in amount of surrounding forest habitat influences the initial orientation of juvenile amphibians emigrating from breeding ponds. Canadian Journal of Zoology. 86:141-146.

Welsh, H.H., Jr. and A.J. Lind. 1988. Old growth forests and the distribution of the terrestrial herpetofauna. Pp 439–455. *In* Szaro, R.C., K.E. Severson and D.R. Patton (Eds.), Management of Amphibians, Reptiles and Mammals in North America. U.S.D.A. Forest Service, Rocky Mountain Forest and Range Experimental Station, General Technical Report, RM-166, Fort Collins, Colorado.

Welsh, H.H. Jr. and L.M. Ollivier. 1998. Stream amphibians as indicators of ecosystem stress: a case study from California's Redwoods. Ecosystem Applications. 8(4): 1118-1132.

Yahner, R.H., W.C. Bramble, and W.R. Byrnes. 2001a. Response of amphibian and reptile populations to vegetation maintenance of an electric transmission line right-of-way. Journal of Arboriculture. 27(4):215-221.

Yahner, R.H., W.C. Bramble, and W.R. Byrnes. 2001b. Effect of vegetation maintenance of an electric transmission right-of-way on reptile and amphibian populations. Journal of Arboriculture. Journal of Arboriculture. 27(1):24-29.

Zimmerman, R. 2002. "Thamnophis sirtalis" (On-line), Animal Diversity Web. Accessed February 26, 2010. (http://animaldiversity.ummz.umich.edu/site/accounts/information/Thamnophis_sirtalis.htm)l.

Zweig, M.H. and G. Campbell. 1993. Receiver-operating-characteristic (ROC) plots: a fundamental evaluation tool in clinical medicine. Clinical Chemistry. 39: 561-577.

12.2 Personal Communications

ATK Group Interview. 2010. Bipole III Transmission Project: A major reliability improvement initiative. ATK KPI, Thicket Portage, Manitoba.

ATK Group Workshop. 2010. Bipole III Transmission Project: A major reliability improvement initiative. ATK KPI, Barrows, Manitoba.

ATK Group Workshop. 2009. Bipole III Transmission Project: A major reliability improvement initiative. ATK KPI, Waywayseecappo First Nation, Manitoba.

Beauchamp, W. 2009. Bipole III Transmission Project: A major reliability improvement initiative. ATK, KPI, Camperville, Manitoba.

Berger, Robert. Principal, Wildlife Resource Consulting Services MB Inc. May 18, 2009.

Flett, B. 2009. Bipole III Transmission Project: A major reliability improvement initiative. ATK, KPI, Camperville, Manitoba.

Greenall, Jason. Coordinator, Manitoba Conservation Data Centre. Government of Manitoba. Winnipeg, Manitoba. February 18, 2010.

Ledieu, Pat. Wildlife Permits Clerk, Manitoba Conservation. Wildlife and Ecosystem Protection Branch. March 01, 2010.

Sidenko, Nikolay. Senior Environmental Geochemist, Stantec, Winnipeg, Manitoba. April 11, 2011.

Westwood, Richard. Associate Professor. Department of Biology and Department of Environmental Studies. University of Winnipeg. July 15, 2010.

13.0 Glossary

13.1 List of Acronyms

AIC - Akaike's Information Criterion

ANOVA – Analysis of Variance

CEA – Cumulative Effects Assessment

COSEWIC – Committee on the Status of Endangered Wildlife in Canada

ESS – Environmentally Sensitive Site

km – kilometres

m – metres

MBESA – *Manitoba Endangered Species Act*

PR – proposed route

RoW – Right-of-Way

TIAR – terrestrial invertebrates, amphibians and reptiles

VEC – Valued Environmental Component

13.2 Definition of Terms

Amphibian – A cold-blooded, smooth-skinned vertebrate of the class Amphibia, such as a frog or salamander that characteristically hatches as an aquatic larva with gills. The larva then transforms into an adult having air-breathing lungs.

Cumulative Effect – The impact on the environment which results from the effects of a project when combined with those of other past, existing and imminent projects and activities.

Decommissioned – To remove infrastructure or equipment from active service.

Environmental Impact Assessment (EIA) - an assessment of the effect that a project will have on the environment, undertaken as part of a review under the *Environment Act* (Manitoba) or the *Canadian Environmental Assessment Act*.

Environmental Impact Statement (EIS) – a document setting out the results of an environmental impact assessment (see EIA), including adverse (and sometimes positive) effects of a proposed development. The document is filed as part of an application for environmental approvals under the *Environmental Act* (Manitoba) or the *Canadian Environmental Assessment Act*.

Footprint – The surface area occupied by a structure or activity.

Habitat Fragmentation – The division or disruption of habitat into small and isolated patches; or the result of development in a large area where habitat is now fragmented into separate units. Such discontinuity can considerably impair the ability of a population to use the area because of its small size and discontinuity.

Impact– A positive or negative effect of a disturbance on either the environment or a component of the environment.

Larvae – the immature, wingless and often vermiform feeding form of those insects that undergo three stages of metamorphosis, such as butterflies, moths, and beetles. Insect larvae hatch from eggs, alters chiefly in size while passing through several molts, are transformed into a pupa or chrysalis, and finally turn in adults.

Mitigation – Actions taken during the planning, design, construction and operation of works to reduce or avoid potential adverse effects.

Monitoring – Any on-going process or program used for measuring the actual effects of the construction, operation, or decommissioning of a development.

Terrestrial Invertebrate – an association of animals without a spinal column, that prefer to occupy upland habitats.

Valued Environmental Component (VEC) – Any part of the environment that is considered important by the proponent, public, scientists and government involved in the assessment process of a project. Importance may be determined on the basis of cultural values or scientific concern.

14.0 Appendices

APPENDIX 1.

TIAR SPECIES VECS MODELS BASED ON SPECIES HABITAT REQUIREMENTS

Table A1-1. Source code generated by Joro Geomatics Inc. for VEC TIAR species models, as based on species habitat requirements.

<u>Dakota Skipper (*Hesperia dacotae*):</u>

("COVTYPE" > 121 OR "COVTYPE" < 122) AND ("COVERTYPE" = '99821' OR "COVERTYPE" = '99822' OR "COVERTYPE" = '99823').

<u>Uncas Skipper (*Hesperia uncas*):</u>

("COVTYPE" > 121 OR "COVTYPE" < 122) AND ("COVERTYPE" = '99821' OR "COVERTYPE" = '99824')

<u>Ottoe Skipper (*Hesperia ottoe*):</u>

("COVTYPE" > 121 OR "COVTYPE" < 122) AND ("COVERTYPE" = '99821' OR "COVERTYPE" = '99824' OR "COVERTYPE" = '99804')

<u>Prairie Skink (*Plestiodon septentrionalis septentrionalis*):</u>

("COVTYPE" > 121 OR "COVTYPE" < 122) AND ("COVERTYPE" = '99821' OR "COVERTYPE" = '99824' OR "COVERTYPE" = '99804')

<u>Red-Sided Garter snake (*Thamnophis sirtalis parietalis*):</u>

Summering/Feeding:

1km buffer around NHN Waterbodies and "COVERTYPE" = '99831' OR "COVERTYPE" = '99832' OR "COVERTYPE" = '99835' OR "COVERTYPE" = '99847' OR "COVERTYPE" = '99848' OR "COVERTYPE" = '99849'

Union NHN_Waterbody and feeding habitat, delete waterbodies. Delete feeding edge habitat types and grassland types (FRI): "COVERTYPE" = '99821' OR "COVERTYPE" = '99822' OR "COVERTYPE" = '99823' OR "COVERTYPE" = '99824' OR "COVERTYPE" = '99831' OR "COVERTYPE" = '99832' OR "COVERTYPE" = '99835' OR "COVERTYPE" = '99847' OR "COVERTYPE" = '99848' OR "COVERTYPE" = '99849'

Hibernation/Overwintering:

(Geology layer) "LegLink$ROCK" = 'Carbonate' OR "LegLink$ROCK" = 'Shale'

Union NHN_Waterbody and hibernation habitat, delete waterbodies

<u>Wood Frog (*Lithobates sylvaticus*):</u>

Reproduction:

"COVERTYPE" = '99831' OR "COVERTYPE" = '99832' OR "COVERTYPE" = '99835'

Feeding:

"COVERTYPE" = '99701' OR "COVERTYPE" = '99702' OR "COVERTYPE" = '99703'

"COVERTYPE" = '99847' OR "COVERTYPE" = '99848' OR "COVERTYPE" = '99849' within 300m of "COVERTYPE" = '9B124' OR "COVERTYPE" = '9B143' OR

"COVERTYPE" = '9B154' OR "COVERTYPE" = '9E133' OR "COVERTYPE" = '9E134' OR ("COVERTYPE" >'80000' AND "COVERTYPE" <'99000')

Hibernation/Overwintering:

"COVERTYPE" = '9B124' OR "COVERTYPE" = '9B143' OR "COVERTYPE" = '9B154' OR "COVERTYPE" = '9E133' OR "COVERTYPE" = '9E134' OR ("COVERTYPE" >'80000' AND "COVERTYPE" <'99000')

<u>Northern Leopard Frog (*Lithobates pipiens*):</u>

Reproduction:

"COVERTYPE" = '99831' OR "COVERTYPE" = '99832' OR "COVERTYPE" = '99835' OR "COVERTYPE" = '99847' OR "COVERTYPE" = '99848' OR "COVERTYPE" = '99849'

NHN waterbodies (2km in buffer for margin) – use NHN_Waterbody preferred route clip

Feeding:

"COVERTYPE" = '99701' OR "COVERTYPE" = '99702' OR "COVERTYPE" = '99703' OR "COVERTYPE" = '99822' OR "COVERTYPE" = '99823'

Hibernation/Overwintering:

NHN_Waterbody (2 km inner buffer for margin) for ‘lake’ features >100km^2 must also include Lake Manitoba and Lake Winnipegosis layer

<u>Plains Spadefoot (*Spea bombifrons*):</u>

All life requisites:

("COVTYPE" > 121 OR "COVTYPE" < 122) AND "COVERTYPE" = '99821' OR "COVERTYPE" = '99824' OR "COVERTYPE" = '99804'

Reproduction:

"COVERTYPE" = '99831' OR "COVERTYPE" = '99832' OR "COVERTYPE" = '99835' OR "COVERTYPE" = '99823' OR "COVERTYPE" = '99847' OR "COVERTYPE" = '99848' OR "COVERTYPE" = '99849'

APPENDIX 2.

MODEL VERIFICATION AND RESULTS DETAILS FOR VEC ANURAN SURVEYS WITHIN THE BIPOLE III TRANSMISSION PROJECT STUDY AREA

Page

Table A2-1. Summary of anuran predictor/habitat variables created from the Land Cover Classification Enhanced for Bipole III (LCCEB) data layer.

Code	**Variable**	**LCCEB Code(s)**	**Description**	**Units**
WATER	water	20	area classified as water (lakes, rivers, streams, etc.)	proportion
WET_TREE	wetland - treed	81	area classified as wetland - treed/buffer area	proportion
WET_SHRUB	wetland - shrub	82	area classified as wetland - shrub/buffer area	proportion
WET_HERB	wetland - herb	83	area classified as wetland - herb/buffer area	proportion
CONIFER[a]	coniferous forest	211, 212, and 213	area classified as coniferous forest/buffer area	proportion
DECID[a]	deciduous forest	220, 221, and 222	area classified as deciduous forest/buffer area	proportion
MIXED[a]	mixed forest	231	area classified as mixed forest/buffer area	proportion
GRASS[b]	grassland	110	area classified as grassland/buffer area	proportion
AG	agricultural	121 and 122	area classified as agricultural (annual and perennial cropland, etc)/buffer area	proportion
DEVELOP	developed	34	area classified as developed (roads, railway tracks, buildings, etc.)./buffer area	proportion

[a]included in wood frog model selection only.
[b]included in northern leopard frog model selection only.

Table A2-2. Details presented for calculations related to logistic regression models.

Logistic regression model fits the probability of occurrence to a logistic function as follows:

$z = \alpha + \beta 1X1 + \beta 2X2 + ...+ \beta iXi + \varepsilon$

$f(z) = 1/1+e\text{-}z$

where z is the linear model, $f(z)$ is the probability of occurrence given a set of independent variables (i.e., habitat variables), e is the base of the natural logarithm, α is the intercept, β is a coefficient for the independent variable X and ε is the error term.

AIC (Burnham and Anderson 2002), an information-theoretic method, ranks various research hypotheses (represented by models), and several quantities can be calculated to estimate a strength of evidence for alternative hypotheses (Anderson et al. 2001).

AIC, was calculated as

AIC = -2loglikelihood + 2K

where K is the number of parameters that have been fit. To rank each model, AIC values were re-scaled so that the model with the minimum AIC had a value of 0. Further wi or AIC weights were used to calculate the likelihood of the model using the following equation:

$wi = \exp(-1/2\Delta i)/\sum \exp(-1/2\Delta r)$

Table A2-3. Number of sites where northern leopard frogs and wood frogs were detected and not detected within the Bipole III Study Area. Data were collected in late spring and early summer 2010.

Ecozone	# of sites	detected	not detected	Frequency of Occurrence (%)
northern leopard frog				
Boreal Shield	51	0	51	0
Boreal Plain	64	18	46	28
Prairie	55	5	50	9
total	170	23	107	14
wood frog				
Boreal Shield	51	47	4	92
Boreal Plain	64	46	18	72
Prairie	55	29	26	53
total	170	122	48	72

Table A2-4. Parameter estimates (β[P]) and Akaike weights (wi) for single habitat predictor models fit to wood and northern leopard frog presence/absence data.

ecozone	term	*β*(*P*)	w_i
northern leopard frog			
Boreal Plain	wetland_tree	-0.77(0.75)	0
	wetland_shrub	0.48(0.72)	0
	wetland_herb	-1.41(0.42)	0.0001
	water	-3.01(0.55)	0.0001
	grass	4.73(0.00)	**0.9996**
	ag	3.34(0.20)	0.0001
	develop	2.50(0.29)	0.0001
Prairie	wetland_shrub	6.43(0.03)	**0.5124**
	wetland_herb	-1.73(0.51)	0.025
	water	-1.03(0.90)	0.0196
	grass	-1.39(0.37)	0.0291
	ag	4.55(0.02)	**0.3834**
	develop	-6.81(0.35)	0.0304
wood frog			
Boreal Shield	wetland_tree	20.87(1.00)	0.0593
	wetland_shrub	1.17(0.80)	0.0273
	wetland_herb	39.91(1.00)	**0.1646**
	water	73.63(1.00)	**0.1137**
	conifer	0.53(0.77)	0.0275
	broad	-6.16(0.02)	**0.5808**
	mixed	-0.70(0.83)	0.0269
Boreal Plain	wetland_tree	0.33(0.88)	0.0169
	wetland_shrub	1.22(0.43)	0.0236
	wetland_herb	-0.47(0.75)	0.0176
	water	5.05(0.39)	0.0272
	conifer	0.02(0.99)	0.0167
	broad	3.63(0.05)	**0.3395**
	mixed	-1.36(0.13)	0.0532
	ag	-5.01(0.06)	0.1029
	develop	-9.59(0.05)	**0.4025**
Prairie	wetland_shrub	-0.84(0.67)	0.0001
	wetland_herb	7.21(0.00)	**0.9984**
	water	4.25(0.39)	0.0002
	broad	-1.80(0.18)	0.003
	ag	-2.11(0.14)	0.0003
	develop	-8.66(0.05)	0.0008

Table A2-5. Results of Chi-square analyses estimating the relationship between wood (WOFR) and northern leopard (NLFR) frog occurrence and various habitat variables in each ecozone in the BPIII Study Area.

Habitat Variable	Boreal Shield Ecozone		Boreal Plain Ecozone				Prairie Ecozone			
	WOFR		NLFR		WOFR		NLFR		WOFR	
	X^2	p	X^2	p	X^2	p	X^2	p	X^2	p
wetland treed	0.93	0.34	3.9	0.05	0	0.97				
wetland shrub	1.57	0.21	0.76	0.38	0.64	0.42	2.97	0.09	0.3	0.58
wetland herb	2.37	0.12	0.15	0.7	0.55	0.46	0.41	0.53	6.68	0.01
water	1.81	0.18	1.7	0.19	0.4	0.53	0.01	0.91	1.46	0.23
agricultural			7.46	0.006	1.92	0.17	1.11	0.29	2.92	0.09
developed			17.42	0	2.58	0.11	0.45	0.5	3.51	0.06
grassland			30.54	0			0.21	0.65		
conifer	0.69	0.41			0.95	0.33				
broad	3.39	0.07			0.42	0.52			6.26	0.01
mixed	3	0.08			0.63	0.43				

Table A2-6. Calculated percent composition for "important" frog habitat by ecozone in the Bipole III Study Area. LCCEB data are from 200 m buffers placed around sample sites visited in spring/summer 2010.

Habitat Variable	Boreal Shield Ecozone	Boreal Plain Ecozone	Prairie Ecozone
wetland treed	3.4	5.0	0
wetland shrub	8.0	13.7	5.6
wetland herb	6.3	10.4	19.7
water	7.9	2.7	2.1
agricultural	0	3.8	8.9
developed	0	4.3	9.1
grassland	0	12.8	39.0
conifer	21.3	5.8	0
broad	7.2	11.9	11.5
mixed	5.1	12.1	0

Table A2-7. Summary of wood and northern leopard frog parameter estimates and overall model performance based on the logistic regression model with highest support based on model selection using a step-wise procedure.

ecozone	**predictor**	**β(±95%CI)**	**e^{β}(95%CIs)**	***c***	***P***
northern leopard frog					
Boreal Plain	intercept	-1.88(0.82)		0.83	0.003
	grass	4.72(2.43)	112.53(9.89, 1280.57)		
Prairie	intercept	-5.27(3.25)		0.95	0.35
	wetland_shrub	9.54(7.98)	13912.38(4.77, 40615588.34)		
	ag	7.42(5.93)	4.75(0.71, 31.86)		
wood frog					
Boreal Shield	intercept	3.5(1.70)		0.79	0.79
	broad	-6.24(5.19)	0.002(0, 0.35)		
Boreal Plain	intercept	2.83(1.43)		0.8	0.44
	conifer	-2.29(2.81)	0.10(0.006, 1.69)		
	mixed	-3.41(2.33)	0.03(0.003, 0.34)		
	develop	-13.97(13.50)	0(0, 0.63)		
	ag	-7.21(6.65)	0.001(0, 0.57)		
Prairie	intercept	-0.27(1.26)		0.83	0.4
	wetland_herb	7.26(4.30)	1426.42(19.42, 104749.44)		
	develop	-9.17(10.38)	0(0, 3.38)		

Note: Parameter estimates (β±95%CI), odds ratios (e^{β} with 95% CIs), and area under the Receiver Operating Characteristic curves (*c*). *P*-values were obtained from an unweighted sum-of-squares, goodness-of-fit statistic (Hosmer et al. 1997) – the larger the p-value, the better the model fits the data.

Table A2-8. Probability of wood (WOFR) and northern leopard frog (NLFR) occurrence within the Bipole III Local Study Area by ecodistrict.

Ecozone	Ecodistrict	*P*(WOFR)	*P*(NLFR)
Boreal Shield	350 - Waskaiowaka Lake	0.971	
	355 - Orr Lake	0.969	
	356 - Three Point Lake	0.97	
	360 - Knee Lake	0.971	
	361 - Pikwitonei Lake	0.931	
	363 - Sipiwesk Lake	0.962	
	366 - Norway House	0.971	
Boreal Plains	663 - Playgreen Lake	0.726	0.132
	665 - Cormorant Lake	0.82	0.132
	667 - Summerberry	0.756	0.153
	668 - The Pas Moraine	0.648	0.133
	672 - Overflowing River	0.719	0.133
	717 - Swan Lake	0.712	0.161
	718 - Waterhen	0.638	0.582
	726 - Steinbach	0.051	0.279
Prairie	757 - Shilo	0.375	0.859
	758 - Stockton	0.371	0.209
	840 - Dauphin	0.532	0.399
	841 - Alonsa	0.565	0.019
	843 - Ste Rose	0.412	0.006
	847 - Gladstone	0.343	0.779
	848 - Langruth	0.333	0.221
	849 - Winnipeg	0.356	0.772
	850 - MacGregor	0.37	0.318
	851 - Portage	0.352	0.85
	852 - Winkler	0.353	0.793

APPENDIX 3.

ENVIRONMENTALLY SENSITIVE SITES WITHIN THE BIPOLE III TRANSMISSION PROJECT STUDY AREA, 2010

Page

Table A3-1. List of environmentally sensitive sites, as based on polygons of TIAR species VEC habitat.

ESS_NAME	DESCRIPTIO	SOURCE_ID2	ENV_EFFECT	MIT_1	MIT_2	MIT_3	MIT_4	MIT_5	MIT_6	MIT_7	MIT_8	MIT_9	MIT_10
Uncas and Ottoe Skipper suitable habitat	Suitable modeled habitat present within Study Area RoW; habitat polygon is <420m in linear length	OTUN9, OTUN23, OTUN26, OTUN35, OTUN36, OTUN39, OTUN41, OTUN42, OTUN47-OTUN49, OTUN61-OTUN65, OTUN68, OTUN70-OTUN72, OTUN79, OTUN81, OTUN85-OTUN87, OTUN95, OTUN137, OTUN140, OTUN147, OTUN148, OTUN154, OTUN157, OTUN159, OTUN161, OTUN164, OTUN165, OTUN167-OTUN170, OTUN175-OTUN177, OTUN192, OTUN195, OTUN199, OTUN200	Disturbance of suitable habitat; habitat loss at tower footprints; microhabitat alterations; sensory disturbance effects and direct mortality from machinery-related activity	Carry out construction activities on frozen or dry ground to minimize surface damage, rutting and erosion	Use existing access roads and trails to the extent possible	Provide 30m vegetated (shrub and Herbaceous) buffer around site	Identify and flag buffer areas prior to construction	Conduct Summer field investigations prior to tower placement where habitat overlaps tower footprints	Maintain shrub and herbaceous vegetation to the extent possible	Remove trees from buffer by hand or other low-disturbance methods	Confine vehicle traffic to established trails to the extent possible	Stabilize sites immediately after construction and re-vegetate disturbed areas in accordance with site Rehabilitation Plan	
Plains Spadefoot Breeding Habitat	Suitable modeled breeding habitat present within Study Area RoW; Potential concentrations of individuals at these sites during peak breeding activity; habitat polygon <420m in linear length	PSFO1-PSFO4, PSFO6-PSFO16, PSFO20, PSFO21, PSFO23-PSFO27, PSFO29-PSFO31, PSFO35-PSFO41, PSFO43-PSFO48, PSFO50-PSFO52, PSFO54, PSFO55, PSFO57, PSFO58, PSFO60-PSFO67	Alteration/disturbance of suitable habitat within RoW; fragmentation within home ranges; microhabitat alterations; sensory disturbance effects & direct mortality from machinery-related activity	Use existing access roads and trails to the extent possible	Carry out construction activities on frozen or dry ground to minimize surface damage, rutting and erosion.	Provide 30m vegetated (shrub and Herbaceous) buffer around site	Identify and flag buffer areas prior to construction	Maintain shrub and herbaceous vegetation to the extent possible	Remove trees from buffer by hand or other low-disturbance methods	Confine vehicle traffic to established trails to the extent possible	Stabilize sites immediately after construction and re-vegetate disturbed areas in accordance with site Rehabilitation Plan	Carry out construction activities outside of the June 1- August 15 breeding period (Appendix F)>	Avoid plains spadefoot breeding habitat during tower placement
Plains Spadefoot Breeding Habitat	Suitable modeled breeding habitat present within Study Area RoW; Potential concentrations of individuals at these sites during peak breeding activity; habitat polygon >420m in linear length	PSFO5, PSFO17-PSFO19, PSFO22, PSFO28, PSFO32-PSFO34, PSFO42, PSFO49, PSFO53, PSFO56, PSFO59	Alteration/disturbance of suitable habitat within RoW; fragmentation within home ranges; microhabitat alterations; sensory disturbance effects & direct mortality from machinery-related activity	Use existing access roads and trails to the extent possible	Carry out construction activities on frozen or dry ground to minimize surface damage, rutting and erosion	Provide 30m vegetated (shrub and Herbaceous) buffer around site	Identify and flag buffer areas prior to construction	Maintain shrub and herbaceous vegetation to the extent possible	Remove trees from buffer by hand or other low-disturbance methods	Confine vehicle traffic to established trails to the extent possible	Stabilize sites immediately after construction and re-vegetate disturbed areas in accordance with site Rehabilitation Plan	Carry out construction activities outside of the June 1- August 15 breeding period (Appendix F)>	Conduct Summer field investigations prior to tower placement where habitat overlaps tower footprints
Northern leopard frog and wood frog breeding habitat	Suitable modeled breeding habitat present within Boreal Shield, Taiga Shield and Hudson Plain Ecozones within the Study Area RoW, as based on presence of wetlands; Potential concentrations of individuals at these sites during peak breeding activity	TREED1, TREED3, TREED5, TREED6, TREED10-TREED88, TREED268-TREED274, TREED276, TREED278, TREED280, TREED283, TREED285-TREED287, TREED289, TREED290, TREED 292-295, TREED297, TREED299-306, TREED308-415, SHRUB429-SHRUB476, SHRUB822-SHRUB826, SHRUB828-SHRUB834, SHRUB836-SHRUB1223, HERB1224, HERB1226-HERB1252, HERB1501-HERB1503, HERB1506, HERB1508-HERB1510, HERB1512-HERB1615	Alteration/disturbance of suitable habitat within RoW; fragmentation within home ranges; microhabitat alterations; sensory disturbance effects & direct mortality from machinery-related activity	It is recommended that construction and maintenance at wetland habitats occurs in fall and winter (i.e., Aug.16 to March 31), outside of peak anuran breeding periods									

Table A3-1. Continued.

ESS_NAME	DESCRIPTIO	SOURCE_ID2	ENV_EFFECT	MIT_1	MIT_2	MIT_3	MIT_4	MIT_5	MIT_6	MIT_7	MIT_8	MIT_9	MIT_10
Northern leopard frog and wood frog breeding habitat	Suitable modeled breeding habitat present within the Prairie and Boreal Plains Ecozones within the Study Area RoW, as based on presence of wetlands; Potential concentrations of individuals at these sites during peak breeding activity	TREED2, TREED4, TREED7-TREED9, TREED89-TREED267, TREED275, TREED277, TREED279, TREED281, TREED282, TREED284, TREED288, TREED291, TREED296, TREED298, TREED307, TREED416-TREED428, SHRUB477-SHRUB821, SHRUB827, SHRUB835, HERB1225, HERB1253-HERB1500, HERB1504, HERB1505, HERB1507, HERB1511, HERB1616	Alteration/disturbance of suitable habitat within RoW; fragmentation within home ranges; microhabitat alterations; sensory disturbance effects & direct mortality from machinery-related activity	Construction and maintenance at suitable anuran habitats will occur in fall or winter, outside of peak VEC anuran breeding periods, i.e., outside of April 1- August 15	A vegetation buffer of 30 m will be retained around plains spadefoot breeding habitat that occurs along the Project HVdc transmission line RoW, within which ground disturbance, vegetation removal, and vehicular traffic will be limited	Where possible, it is recommended riparian buffers of 30 m be retained around northern leopard frog and wood frog suitable habitat (i.e., wetland polygons), lakes, streams, and other suitable anuran breeding habitat within the Bipole III Local Study Area footprint, within which ground disturbance, vegetation removal, and vehicular traffic be limited	Where overstory/tall-growth vegetation (i.e., trees) needs to be removed from buffers for transmission line clearance, removal methods that best minimize disturbance to soil and ground cover are recommended	Where feasible, HVdc transmission line RoW tower installation in buffered suitable plains spadefoot and wetland habitat will be avoided	Where avoidance of suitable habitat is not feasible during tower installation, construction activity methods that best minimize habitat disturbance are recommended, or that summer field investigations are conducted prior to tower placement to aid in tower location adjustments in the case of plains spadefoot habitat				
Northern Prairie Skink Habitat	Suitable modeled habitat present within Study Area RoW; habitat polygon is <80m in linear length	NPSK15, NPSK26, NPSK28, NPSK64, NPSK98, NPSK101, NPSK112, NPSK113, NPSK119, NPSK194	Disturbance and destruction of suitable habitat/habitat loss (including nests if present) along the RoW; microhabitat alterations; sensory disturbance effects and direct mortality from machinery-related activity	Carry out construction activities on frozen or dry ground to minimize surface damage, rutting and erosion	Use existing access roads and trails to the extent possible	Establish 100 m buffers around habitat polygons intercepting or paralleling the Project RoW (Appendix G)	Identify and flag buffer areas prior to construction	Remove trees from buffer by hand or other low-disturbance methods	Maintain shrub and herbaceous vegetation to the extent possible	Stabilize sites immediately after construction and re-vegetate disturbed areas in accordance with site Rehabilitation Plan	Confine vehicle traffic to established trails to the extent possible	Establish 200 m buffer from any observed or located skink nests, should they occur (Appendix G)	Establish 200 m-buffer from suitable habitat during tower placement (Appendix G)
Northern Prairie Skink Habitat	Suitable modeled habitat present within Study Area RoW; habitat polygon is >80m in linear length	NPSK1, NPSK2, NPSK5, NPSK12-NPSK14, NPSK18, NPSK20, NPSK21, NPSK23, NPSK25, NPSK27, NPSK40-NPSK44, NPSK47-NPSK51, NPSK53, NPSK58, NPSK60, NPSK61, NPSK65, NPSK66, NPSK79,NPSK91, NPSK92, NPSK103, NPSK105-NPSK109, NPSK111, NPSK114, NPSK118, NPSK120-NPSK122, NPSK136, NPSK139, NPSK143, NPSK144, NPSK149, NPSK150, NPSK171, NPSK174, NPSK177, NPSK191	Disturbance and destruction of suitable habitat/habitat loss (including nests if present) along the RoW; microhabitat alterations; sensory disturbance effects and direct mortality from machinery-related activity	Carry out construction activities on frozen or dry ground to minimize surface damage, rutting and erosion	Use existing access roads and trails to the extent possible	Establish 100 m-buffers around habitat polygons intercepting or paralleling the Project RoW (Appendix G)	Identify and flag buffer areas prior to construction	Remove trees from buffer by hand or other low-disturbance methods	Maintain shrub and herbaceous vegetation to the extent possible	Stabilize sites immediately after construction and re-vegetate disturbed areas in accordance with site Rehabilitation Plan	Confine vehicle traffic to established trails to the extent possible	Establish 200 m buffer from any observed or located skink nests, should they occur (Appendix G)	Conduct Spring/Summer field investigations prior to tower placement where habitat overlaps tower footprints
Garter Snake Hibernacula Habitat	Suitable modeled hibernacula habitat present within Study Area; abundance of high concentration areas during fall, winter and spring; habitat polygon is >80m in linear length	GASN1-GASN6, GASN8-GASN13, GASN15-GASN30, GASN32-GASN40	Creation of movement corridor (RoW); disturbance/destruction of overwintering habitat, microhabitat alterations; sensory disturbance effects & direct mortality from machinery-related activity	Use existing access roads and trails to the extent possible	Remove trees from buffer by hand or other low-disturbance methods	No blasting within 200 m of hibernacula habitat (Appendix G)	Identify and flag buffer areas prior to construction	Confine vehicle traffic to established trails to the extent possible	Stabilize sites immediately after construction and re-vegetate disturbed areas in accordance with site Rehabilitation Plan	Carry out tower installation during summer months (June 1-August 31) (Appendix F) or conduct summer field investigations prior to construction where polygons overlap tower footprints			
Garter Snake Hibernacula Habitat	Suitable modeled hibernacula habitat present within Study Area; abundance of high concentration areas during fall, winter and spring; habitat polygon is <80m in linear length	GASN7, GASN14, GASN31	Creation of movement corridor (RoW); disturbance/destruction of overwintering habitat, microhabitat alterations; sensory disturbance effects & direct mortality from machinery-related activity	Use existing access roads and trails to the extent possible	Remove trees from buffer by hand or other low-disturbance methods	No blasting within 200 m of hibernacula habitat (Appendix G)	Identify and flag buffer areas prior to construction	Confine vehicle traffic to established trails to the extent possible	Stabilize sites immediately after construction and re-vegetate disturbed areas in accordance with site Rehabilitation Plan	Establish required 200 m buffers around hibernacula habitat polygons intercepting or paralleling the Project RoW (Appendix G)	Avoid garter snake habitat during tower placement		

APPENDIX 4.

RAW DATA FOR SURVEYS CONDUCTED WITHIN THE BIPOLE III TRANSMISSION PROJECT STUDY AREA, 2010

Page

Table A4-1. Raw data results for sweep-net surveys conducted in Prairie habitats within the Bipole III Transmission Project Local Study Area, 2010.

SAMPLE ID	(UTM ZONE 14U) START EASTING	START NORTHING	DATE	SITE ID	VISIT	START TIME	END TIME	(UTM ZONE 14U) END EASTING	END NORTHING	FAMILY	SPECIES	# OF INDS
T01-SN01-01	539804	5498991	07/06/10	SE-11-008-08W1	1	15:25	15:45	539778	5499044	Satyridae		2
T01-SN01-02	539804	5498991	07/06/10	SE-11-008-08W1	1	15:25	15:45	539778	5499044	Nymphalidae	Speyeria spp (likely cybele)	1
T01-SN01-03	539804	5498991	07/06/10	SE-11-008-08W1	1	15:25	15:45	539778	5499044	Satyridae	Cercyonis pegala	1
T02-SN01-01	539789	5498917	07/06/10	SE-11-008-08W1	1	16:55	17:17	539793	5498710	Satyridae	Cercyonis pegala	1
T02-SN01-02	539789	5498917	07/06/10	SE-11-008-08W1	1	16:55	17:17	539793	5498710	Satyridae	Cercyonis pegala?	1
T02-SN01-03	539789	5498917	07/06/10	SE-11-008-08W1	1	16:55	17:17	539793	5498710	Satyridae	unkn	1
T02-SN01-04	539795	5498773	07/06/10	SE-11-008-08W1	1							1
T0403-SN01-01	539787	5498382	07/06/10	SE-11-008-08W1	1	12:14	12:29	539793	5498512	Tortricidae		1
T0403-SN01-02	539787	5498382	07/06/10	SE-11-008-08W1	1	12:14	12:29	539793	5498512	Nymphalidae	Pyciodes spp	2
T0403-SN01-03	539787	5498382	07/06/10	SE-11-008-08W1	1	12:14	12:29	539793	5498512	Nymphalidae	Nymphalis antiopa	2
T0403-SN01-04	539787	5498382	07/06/10	SE-11-008-08W1	1	12:14	12:29	539793	5498512	Satyridae	Cercyonis pegala	2
T0403-SN01-05	539800	5498376	07/06/10	SE-11-008-08W1	1					Danaidae	Danaus plexippus	1
T0403-SN01-06	539787	5498382	07/06/10	SE-11-008-08W1	1	14:02	14:24	539793	5498512	Danaidae	Danaus plexippus	1
T0403-SN01-07	539787	5498382	07/06/10	SE-11-008-08W1	1	14:02	14:24	539793	5498512	Satyridae	Megisto cymela or Cercyonis pegala	1
T0403-SN01-08	539787	5498382	07/06/10	SE-11-008-08W1	1	14:02	14:24	539793	5498512	Satyridae	Satyrodes eurydice	1
T0403-SN01-09	539787	5498382	07/06/10	SE-11-008-08W1	1	14:02	14:24	539793	5498512	Nymphalidae	Phyciodes morpheus	1
T0403-SN01-10	539787	5498382	07/06/10	SE-11-008-08W1	1	14:02	14:24	539793	5498512	Satyridae	unkn	2
T0403-SN01-11	539949	5498474	07/06/10	SE-11-008-08W1	1					Danaidae	Danaus plexippus	1
T01-SN02-01	539761	5498989	07/16/10	SE-11-008-08W1	2	17:17	17:37	539776	5498983	Nymphalidae	Nymphalis antiopa	1
T01-SN02-02	539761	5498989	07/16/10	SE-11-008-08W1	2	17:17	17:37	539776	5498983	Nymphalidae		1
T01-SN02-03	539761	5498989	07/16/10	SE-11-008-08W1	2	17:17	17:37	539776	5498983	Satyridae	Megisto cymela or Cercyonis pegala	2
T01-SN02-04	539761	5498984	07/16/10	SE-11-008-08W1	2	17:17	17:37	539771	5498986	Satyridae		4
T02-SN02-01	539766	5498717	07/16/10	SE-11-008-08W1	2	16:35	16:59	539769	5498762	Satyridae	Cercyonis pegala	2
T02-SN02-02	539766	5498717	07/16/10	SE-11-008-08W1	2	16:35	16:59	539769	5498762	Nymphalidae	Speyeria spp- cybele?	1
T02-SN02-03	539769	5498762	07/16/10	SE-11-008-08W1	2						Lithobates sylvaticus	1
T02-SN02-04	539765	5498710	07/16/10	SE-11-008-08W1	2	16:35	16:59	539747	5498733	Satyridae		8
T02-SN02-05	539765	5498710	07/16/10	SE-11-008-08W1	2	16:35	16:59	539747	5498733	Nymphalidae		5
T02-SN02-06	539765	5498710	07/16/10	SE-11-008-08W1	2	16:35	16:59	539747	5498733	Pieridae		1

Table A4-1. Continued.

SAMPLE ID	(UTM ZONE 14U) START EASTING	START NORTHING	DATE	SITE ID	VISIT	START TIME	END TIME	(UTM ZONE 14U) END EASTING	END NORTHING	FAMILY	SPECIES	# OF INDS
T03-SN02-01	539821	5498422	07/16/10	SE-11-008-08W1	2	16:06	16:21	539792	5498406	Satyridae	unkn	2
T03-SN02-02	539821	5498422	07/16/10	SE-11-008-08W1	2	16:06	16:21	539792	5498406	Pieridae	Pieris rapae	1
T03-SN02-03	539794	5498355	07/16/10	SE-11-008-08W1	2	16:06	16:21	539791	5498403	Nymphalidae	Speyeria spp- electa?	1
T03-SN02-04	539794	5498355	07/16/10	SE-11-008-08W1	2	16:06	16:21	539791	5498403	Nymphalidae	Phyciodes spp	1
T03-SN02-05	539794	5498355	07/16/10	SE-11-008-08W1	2	16:06	16:21	539791	5498403	Satyridae	unkn	2
T03-SN02-06	539794	5498355	07/16/10	SE-11-008-08W1	2	16:06	16:21	539791	5498403	Nymphalidae		3
T04-SN02-01	539794	5498355	07/16/10	SE-11-008-08W1	2	15:43	15:58	539804	5498390	Pieridae	Colias spp	1
T04-SN02-02	539794	5498355	07/16/10	SE-11-008-08W1	2	15:43	15:58	539804	5498390	Satyridae	unkn	2
T04-SN02-03	539794	5498355	07/16/10	SE-11-008-08W1	2	15:43	15:58	539804	5498390	Satyridae	unkn	4
T04-SN02-04	539794	5498355	07/16/10	SE-11-008-08W1	2	15:43	15:58	539804	5498390	Nymphalidae		3
T04-SN02-05	539794	5498355	07/16/10	SE-11-008-08W1	2	15:43	15:58	539804	5498390	Nymphalidae		1
T05-SN01-01	552115	5497000	07/16/10	SW-01-008-07W1	1					Pieridae	Pieris rapae?	2
T05-SN01-02	552115	5497000	07/16/10	SE-01-008-07W1	1					Danaidae	Danaus plexippus	1
T05-SN01-03	552124	5497050	07/16/10	SE-01-008-07W1	1						Lithobates sylvaticus	11
T05-SN01-04	552124	5497050	07/16/10	SE-01-008-07W1	1						Lithobates sylvaticus	1
T05-SN01-05	552112	5497433	07/16/10	SE-01-008-07W1	1	11:30	12:00	552127	5497102	Satyridae	unkn	2
T05-SN01-06	552112	5497433	07/16/10	SE-01-008-07W1	1	11:30	12:00	552127	5497102	Satyridae	unkn	1
T05-SN01-07	552112	5497433	07/16/10	SE-01-008-07W1	1	11:30	12:00	552127	5497102	Pieridae	Pieris rapae	2
T05-SN01-08	552112	5497433	07/16/10	SE-01-008-07W1	1	11:30	12:00	552127	5497102	Pieridae	Pieris rapae	9
T05-SN01-09	552112	5497433	07/16/10	SE-01-008-07W1	1	11:30	12:00	552127	5497102	Danaidae	Danaus plexippus	1
T05-SN01-10	552112	5497433	07/16/10	SE-01-008-07W1	1	11:30	12:00	552127	5497102	Nymphalidae	Nymphalis antiopa	1
T06-SN01-01	550508	5497488	07/16/10	SW-01-008-07W1	1					Danaidae	Danaus plexippus	1
T06-SN01-02	551160	5497563	07/16/10	SW-01-008-07W1	1							2
T06-SN01-03	551172	5497556	07/16/10	SW-01-008-07W1	1							1
T06-SN01-04	551221	5497534	07/16/10	SW-01-008-07W1	1							1
T06-SN01-05	551226	5497539	07/16/10	SW-01-008-07W1	1						Anaxyrus spp	100

Table A4-1. Continued.

SAMPLE ID	(UTM ZONE 14U) START EASTING	START NORTHING	DATE	SITE ID	VISIT	START TIME	END TIME	(UTM ZONE 14U) END EASTING	END NORTHING	FAMILY	SPECIES	# OF INDS
T06-SN01-06	551226	5497539	07/16/10	SW-01-008-07W1	1					Pieridae	Pieris or Colias	5
T08-SN01-01	536635	5509622	07/16/10	NE-09-009-08-W1	1	13:50		536599	5509720	Satyridae	unkn	4
T08-SN01-02	536635	5509622	07/16/10	NE-09-009-08-W1	1	13:50		536599	5509720	Lycaenidae	Harkenclenus titus	1
T08-SN01-03	536635	5509622	07/16/10	NE-09-009-08-W1	1	13:50		536599	5509720	Pieridae	Colias spp	1
T01-SN03-01	539770	5499071	07/23/10	SE-11-008-08W1	3	15:49	16:09	539790	5499038	Satyridae	Cercyonis pegala	1
T01-SN03-02	539770	5499071	07/23/10	SE-11-008-08W1	3	15:49	16:09	539790	5499038			1
T01-SN03-03	539770	5499071	07/23/10	SE-11-008-08W1	3	15:49	16:09	539790	5499038	Nymphalidae	Speyeria spp	2
T01-SN03-04	539770	5499071	07/23/10	SE-11-008-08W1	3	15:49	16:09	539790	5499038	Satyridae	Cercyonis pegala	1
T01-SN03-05	539770	5499071	07/23/10	SE-11-008-08W1	3	15:49	16:09	539790	5499038	Nymphalidae	Speyeria cybele	1
T01-SN03-06	539770	5499071	07/23/10	SE-11-008-08W1	3	15:49	16:09	539790	5499038	Nymphalidae	Nymphalis antiopa	1
T01-SN03-07	539770	5499071	07/23/10	SE-11-008-08W1	3	15:45	16:05	539757	5498994	Satyridae	unkn	2
T02-SN03-01	539788	5498915	07/23/10	SE-11-008-08W1	3	15:10	15:38	539791	5498707	Satyridae	Cercyonis pegala	1
T02-SN03-02	539757	5498885	07/23/10	SE-11-008-08W1	3						Lithobates sylvaticus	2
T02-SN03-03	539788	5498915	07/23/10	SE-11-008-08W1	3	15:10	15:38	539791	5498707	Nymphalidae	Speyeria spp	1
T02-SN03-04	539788	5498915	07/23/10	SE-11-008-08W1	3	15:10	15:38	539791	5498707	Nymphalidae	Speyeria spp	1
T02-SN03-05	539788	5498915	07/23/10	SE-11-008-08W1	3	15:10	15:38	539791	5498707	Satyridae	Cercyonis pegala	1
T02-SN03-06	539788	5498915	07/23/10	SE-11-008-08W1	3	15:10	15:38	539791	5498707			1
T02-SN03-07	539788	5498915	07/23/10	SE-11-008-08W1	3	15:10	15:38	539791	5498707		Pseudacris maculata	1
T02-SN03-08	539788	5498915	07/23/10	SE-11-008-08W1	3	15:10	15:38	539791	5498707	Nymphalidae	Speyeria spp	1
T02-SN03-09	539788	5498915	07/23/10	SE-11-008-08W1	3	15:09	15:29	539791	5498707	Nymphalidae	Limenitis arthemis	1
T03-SN03-01	539810	5498530	07/23/10	SE-11-008-08W1	3	14:14	14:37	539804	5498513	Nymphalidae	Speyeria spp	1
T03-SN03-02	539810	5498530	07/23/10	SE-11-008-08W1	3	14:14	14:37	539804	5498513	Nymphalidae	Speyeria spp	1
T03-SN03-03	539810	5498530	07/23/10	SE-11-008-08W1	3	14:14	14:37	539804	5498513	Nymphalidae	Speyeria spp	1
T03-SN03-04	539810	5498530	07/23/10	SE-11-008-08W1	3	14:14	14:34	539804	5498513	Nymphalidae	Nymphalis antiopa	1
T03-SN03-05	539810	5498530	07/23/10	SE-11-008-08W1	3	14:14	14:34	539804	5498513	Satyridae	Cercyonis pegala	1
T03-SN03-06	539810	5498530	07/23/10	SE-11-008-08W1	3	14:14	14:34	539804	5498513	Pieridae	Pieris rapae	1
T04-SN03-01	539799	5498369	07/23/10	SE-11-008-08W1	3	13:44	14:03	539823	5498327	Satyridae	unkn	1
T04-SN03-02	539799	5498369	07/23/10	SE-11-008-08W1	3	13:44	14:03	539823	5498327	Danaidae	Danaus plexippus	1
T04-SN03-03	539799	5498369	07/23/10	SE-11-008-08W1	3	13:41	14:01	539823	5498327	Danaidae	Danaus plexippus	2
T04-SN03-04	539799	5498369	07/23/10	SE-11-008-08W1	3	13:41	14:01	539823	5498327	Satyridae	Cercyonis pegala	1
T04-SN03-05	539799	5498369	07/23/10	SE-11-008-08W1	3	13:41	14:01	539823	5498327	Satyridae	unkn	1
T04-SN03-06	539799	5498369	07/23/10	SE-11-008-08W1	3	13:41	14:01	539823	5498327	Pieridae	Pieris rapae	1
T05-SN02-01	552125	5497296	07/23/10	SE-01-008-07W1	2	10:33	11:00	552151	5497184	Pieridae	Pieris rapae	1
T05-SN02-02	552125	5497296	07/23/10	SE-01-008-07W1	2	10:33	11:00	552151	5497184	Satyridae	Cercyonis pegala	2
T05-SN02-03	552125	5497296	07/23/10	SE-01-008-07W1	2	10:33	11:00	552151	5497184	Satyridae	unkn	2

Table A4-1. Continued.

SAMPLE ID	(UTM ZONE 14U) START EASTING	START NORTHING	DATE	SITE ID	VISIT	START TIME	END TIME	(UTM ZONE 14U) END EASTING	END NORTHING	FAMILY	SPECIES	# OF INDS
T05-SN02-04	552125	5497296	07/23/10	SE-01-008-07W1	2	10:33	11:00	552151	5497184	Satyridae	Cercyonis pegala	1
T05-SN02-05	552125	5497296	07/23/10	SE-01-008-07W1	2	10:32	10:52	552151	5497184	Danaidae	Danaus plexippus	2
T05-SN02-06	552125	5497296	07/23/10	SE-01-008-07W1	2	10:32	10:52	552151	5497184	Satyridae	Cercyonis pegala	2
T05-SN02-07	552125	5497296	07/23/10	SE-01-008-07W1	2	10:32	10:52	552151	5497184	Pieridae	Colias spp	1
T05-SN02-08	552125	5497296	07/23/10	SE-01-008-07W1	2	10:32	10:52	552151	5497184	Pieridae	Pieris rapae	2
T05-SN02-09	552125	5497296	07/23/10	SE-01-008-07W1	2	10:32	10:52	552151	5497184			1
T05-SN02-10	552151	5497184	07/23/10	SE-01-008-07W1	2						Lithobates sylvaticus	1
T05-SN02-11	552129	5497080	07/23/10	SE-01-008-07W1	2						Anaxyrus spp	3
T05-SN02-12	552128	5497073	07/23/10	SE-01-008-07W1	2						Pseudacris maculata	1
T08-SN02-01	536569	5509647	07/23/10	NE-09-009-08-W1	2	12:40	13:10	536585	5509690	Nymphalidae	Speyeria spp	1
T08-SN02-02	536569	5509647	07/23/10	NE-09-009-08-W1	2	12:40	13:10	536585	5509690	Nymphalidae	Vanessa atalanta	1
T08-SN02-03	536569	5509647	07/23/10	NE-09-009-08-W1	2	12:40	13:10	536585	5509690			1
T08-SN02-04	536569	5509647	07/23/10	NE-09-009-08-W1	2	12:40	13:10	536585	5509690	Danaidae	Danaus plexippus	1
T08-SN02-05	536569	5509647	07/23/10	NE-09-009-08-W1	2	12:40	13:10	536585	5509690	Lycaenidae	Harkenclenus titus	2
T08-SN02-06	536569	5509647	07/23/10	NE-09-009-08-W1	2	12:40	13:10	536585	5509690			4
T13-SN01-01	553531	5496577	07/23/10	NE-31-007-06W1	1						Anaxyrus spp	1
T13-SN01-02	553522	5496654	07/23/10	NE-31-007-06W1	1						Anaxyrus spp	1
T13-SN01-03	553369	5496731	07/23/10	NE-31-007-06W1	1						Anaxyrus spp	1
T01-SN04-01	539760.3	5498999	08/03/10	SE-11-008-08W1	4	10:50	11:10	539760.3	5499001	Pieridae	Pieris rapae	4
T01-SN04-02	539760.3	5498999	08/03/10	SE-11-008-08W1	4	10:50	11:10	539760.3	5499001			tons
T01-SN04-03	539760.3	5498999	08/03/10	SE-11-008-08W1	4	10:50	11:10	539760.3	5499001			tons
T01-SN04-04	539760.3	5498999	08/03/10	SE-11-008-08W1	4	10:50	11:10	539760.3	5499001	Satyridae	Cercyonis pegala	1
T01-SN04-05	539760.3	5498999	08/03/10	SE-11-008-08W1	4	10:50	11:10	539760.3	5499001	Satyridae	Cercyonis pegala	1
T01-SN04-06	539760.3	5498999	08/03/10	SE-11-008-08W1	4	10:49	11:11	539760.3	5499001	Satyridae	Cercyonis pegala	2
T01-SN04-07	539760.3	5498999	08/03/10	SE-11-008-08W1	4	10:49	11:11	539760.3	5499001	Satyridae	Satyrodes eurydice?	1
T01-SN04-08	539760.3	5498999	08/03/10	SE-11-008-08W1	4	10:49	11:11	539760.3	5499001	Pieridae	Pieris rapae	1
T01-SN04-09	539760.3	5498999	08/03/10	SE-11-008-08W1	4	10:49	11:11	539760.3	5499001	Satyridae	unkn	1
T01-SN04-10	539760.3	5498999	08/03/10	SE-11-008-08W1	4	10:49	11:11	539760.3	5499001	Pieridae	Pieris rapae	1
T02-SN04-01	539757.9	5498870	08/03/10	SE-11-008-08W1	4	11:15	11:35	539760	5498866	Nymphalidae	Speyeria spp	1
T02-SN04-02	539757.9	5498870	08/03/10	SE-11-008-08W1	4	11:15	11:35	539760	5498866	Pieridae	Pieris rapae	1
T02-SN04-03	539757.9	5498870	08/03/10	SE-11-008-08W1	4	11:15	11:35	539760	5498866	Danaidae	Danaus plexippus	1
T02-SN04-04	539757.9	5498870	08/03/10	SE-11-008-08W1	4	11:15	11:35	539760	5498866	Pieridae	Pieris rapae	1
T02-SN04-05	539757.9	5498870	08/03/10	SE-11-008-08W1	4	11:15	11:35	539760	5498866	Pieridae		1
T02-SN04-06	539844.1	549889	08/03/10	SE-11-008-08W1	4						Pseudacris maculata	1

Table A4-1. Continued.

SAMPLE ID	(UTM ZONE 14U) START EASTING	START NORTHING	DATE	SITE ID	VISIT	START TIME	END TIME	(UTM ZONE 14U) END EASTING	END NORTHING	FAMILY	SPECIES	# OF INDS
T02-SN04-07	552127.9	5497068	08/03/10	SE-11-008-08W1	4						Anaxyrus spp	1
T02-SN04-08	539757.9	5498870	08/03/10	SE-11-008-08W1	4	11:16	11:39	539760	5498866	Nymphalidae	Speyeria spp	1
T02-SN04-09	539757.9	5498870	08/03/10	SE-11-008-08W1	4	11:16	11:39	539760	5498866	Nymphalidae	Speyeria spp	1
T03-SN04-01	539769.1	5498451	08/03/10	SE-11-008-08W1	4	11:45	12:06	539771.5	5498447	Pieridae	Pieris rapae	1
T03-SN04-02	539769.1	5498451	08/03/10	SE-11-008-08W1	4	11:45	12:06	539771.5	5498447	Danaidae	Danaus plexippus	1
T03-SN04-03	539769.1	5498451	08/03/10	SE-11-008-08W1	4	11:45	12:06	539771.5	5498447	Pieridae	Pieris rapae	1
T03-SN04-04	539769.1	5498451	08/03/10	SE-11-008-08W1	4	11:45	12:06	539771.5	5498447	Nymphalidae	Limenitis arthemis	1
T04-SN04-01	539792.7	5498347	08/03/10	SE-11-008-08W1	4	12:15	12:35	539792.7	5498351	Danaidae	Danaus plexippus	1
T04-SN04-02	539792.7	5498347	08/03/10	SE-11-008-08W1	4	12:15	12:35	539792.7	5498351	Pieridae	Pieris rapae	1
T04-SN04-03	539804.4	5498394	08/03/10	SE-11-008-08W1	4						Anaxyrus hemiophrys	1
T04-SN04-04	539804.4	5498394	08/03/10	SE-11-008-08W1	4							1
T04-SN04-05	539792.7	5498347	08/03/10	SE-11-008-08W1	4	12:15	12:35	539792.7	5498351	Nymphalidae	Limenitis archippus	1
T04-SN04-06	539792.7	5498347	08/03/10	SE-11-008-08W1	4	12:15	12:35	539792.7	5498351	Nymphalidae	Phyciodes spp	1
T04-SN04-07	539792.7	5498347	08/03/10	SE-11-008-08W1	4	12:15	12:35	539792.7	5498351	Pieridae	Pieris rapae	1
T04-SN04-08	539792.7	5498347	08/03/10	SE-11-008-08W1	4	12:15	12:35	539792.7	5498351	Pieridae	Colias spp	1
T04-SN04-09	539792.7	5498347	08/03/10	SE-11-008-08W1	4	12:13	12:35	539792.7	5498351	Pieridae		2
T04-SN04-10	539792.7	5498347	08/03/10	SE-11-008-08W1	4	12:13	12:35	539792.7	5498351	Satyridae	Cercyonis spp- pegala?	1
T05-SN03-01	552125	5497021	08/03/10	SE-01-008-07W1	3	13:10	13:30	552115	5497279	Pieridae	Pieris rapae	1
T05-SN03-02	552125	5497021	08/03/10	SE-01-008-07W1	3	13:10	13:30	552115	5497279	Satyridae	Cercyonis pegala	1
T05-SN03-03	552125	5497021	08/03/10	SE-01-008-07W1	3	13:10	13:30	552115	5497279			1
T05-SN03-04	552125	5497021	08/03/10	SE-01-008-07W1	3	13:10	13:30	552115	5497279	Pieridae	Pieris rapae	15
T05-SN03-05	552125	5497021	08/03/10	SE-01-008-07W1	3	13:10	13:30	552115	5497279	Nymphalidae	Limenitis archippus	1
T05-SN03-06	552125	5497021	08/03/10	SE-01-008-07W1	3	13:10	13:30	552115	5497279	Nymphalidae	Vanessa atalanta	1
T05-SN03-07	552125	5497131	08/03/10	SE-01-008-07W1	3						Lithobates sylvaticus	2
T05-SN03-08	539756	5498866	08/03/10	SE-01-008-07W1	3						Anaxyrus spp	1
T05-SN03-09	552125	5497021	08/03/10	SE-01-008-07W1	3	13:10	13:34	552115	5497279		Anaxyrus spp	1
T05-SN03-10	552125	5497021	08/03/10	SE-01-008-07W1	3	13:10	13:34	552115	5497279	Satyridae	Satyrodes eurydice?	1
T05-SN03-11	552125	5497021	08/03/10	SE-01-008-07W1	3	13:10	13:34	552115	5497279	Pieridae	Pieris rapae	1
T05-SN03-12	552125	5497021	08/03/10	SE-01-008-07W1	3	13:10	13:34	552115	5497279	Pieridae	Pieris rapae	1
T08-SN03-01	536584	5509743	08/03/10	NE-09-009-08-W1	3	14:25	14:45	536572	5509741			0
T08-SN03-02	536584	5509743	08/03/10	NE-09-009-08-W1	3	14:22	14:48	536572	5509741	Pieridae		2
T08-SN03-03	536584	5509743	08/03/10	NE-09-009-08-W1	3	14:22	14:48	536572	5509741	Pieridae	Pieris rapae	1
T01-SN05-01	539755	5498999	08/10/10	SE-11-008-08W1	5	14:50	15:05	539753	5498997	Pieridae	Pieris rapae	3
T01-SN05-02	539755	5498999	08/10/10	SE-11-008-08W1	5	14:50	15:05	539753	5498997	Pieridae	Colias spp- philodice?	1
T01-SN05-03	539755	5498999	08/10/10	SE-11-008-08W1	5	14:48	15:05	539753	5498997	Lycaenidae	Satyrium liparops	1
T01-SN05-04	539755	5498999	08/10/10	SE-11-008-08W1	5	14:48	15:05	539753	5498997	Pieridae		7

Table A4-1. Continued.

SAMPLE ID	(UTM ZONE 14U) START EASTING	START NORTHING	DATE	SITE ID	VISIT	START TIME	END TIME	(UTM ZONE 14U) END EASTING	END NORTHING	FAMILY	SPECIES	# OF INDS
T01-SN05-05	539755	5498999	08/10/10	SE-11-008-08W1	5	14:48	15:05	539753	5498997	Pieridae	Colias spp- philodice?	1
T01-SN05-06	539755	5498999	08/10/10	SE-11-008-08W1	5	14:48	15:05	539753	5498997	Danaidae or Nymphalidae	Danaus plexippus or Limenitis archippus	3
T02-SN05-01	539758	5498846	08/10/10	SE-11-008-08W1	5	14:30	14:45	539757	5498845	Pieridae	Pieris rapae	5
T02-SN05-02	539758	5498846	08/10/10	SE-11-008-08W1	5	14:30	14:45	539757	5498845	Pieridae	Colias spp	1
T02-SN05-03	539758	5498846	08/10/10	SE-11-008-08W1	5	14:30	14:45	539757	5498845	Nymphalidae	Limenitis archippus	1
T02-SN05-04	539758	5498846	08/10/10	SE-11-008-08W1	5	14:29	14:44	539757	5498845	Pieridae		10
T02-SN05-05	539758	5498846	08/10/10	SE-11-008-08W1	5	14:29	14:44	539757	5498845	Satyridae	Cercyonis pegala	3
T03-SN05-01	539772	5498449	08/10/10	SE-11-008-08W1	5	14:05	14:20	539808	5498486	Pieridae	Pieris rapae	4
T03-SN05-02	539772	5498449	08/10/10	SE-11-008-08W1	5	14:05	14:20	539808	5498486	Nymphalidae	Limenitis archippus	1
T03-SN05-03	539772	5498449	08/10/10	SE-11-008-08W1	5	14:05	14:20	539808	5498486	Pieridae	Colias spp	2
T03-SN05-04	539772	5498449	08/10/10	SE-11-008-08W1	5	14:05	14:20	539808	5498486	Pieridae	Colias spp- philodice or gigantea?	1
T03-SN05-05	539772	5498449	08/10/10	SE-11-008-08W1	5	14:02	14:21	539808	5498486	Pieridae		10
T03-SN05-06	539772	5498449	08/10/10	SE-11-008-08W1	5	14:02	14:21	539808	5498486			1
T03-SN05-07	539772	5498449	08/10/10	SE-11-008-08W1	5	14:02	14:21	539808	5498486	Pieridae	Pieris rapae	1
T03-SN05-08	539772	5498449	08/10/10	SE-11-008-08W1	5	14:02	14:21	539808	5498486	Nymphalidae		1
T03-SN05-09	539814	5498529	08/10/10	SE-11-008-08W1	5						Anaxyrus spp	1
T04-SN05-01	539779	5498356	08/10/10	SE-11-008-08W1	5	13:40	13:55	539778	5498358	Pieridae	Pieris rapae	4
T04-SN05-02	539779	5498356	08/10/10	SE-11-008-08W1	5	13:40	13:55	539778	5498358	Satyridae	Cercyonis pegala	1
T04-SN05-03	539779	5498356	08/10/10	SE-11-008-08W1	5	13:40	13:55	539778	5498358	Pieridae	Colias spp	1
T04-SN05-04	539779	5498356	08/10/10	SE-11-008-08W1	5	13:37	13:54	539778	5498358	Pieridae		14
T04-SN05-05	539779	5498356	08/10/10	SE-11-008-08W1	5	13:37	13:54	539778	5498358	Nymphalidae	Limenitis archippus?	1
T04-SN05-06	539779	5498356	08/10/10	SE-11-008-08W1	5	13:37	13:54	539778	5498358	Satyridae	Cercyonis pegala	1
T04-SN05-07	539779	5498356	08/10/10	SE-11-008-08W1	5	13:37	13:54	539778	5498358			1
T08-SN04-01	536566	5509737	08/10/10	NE-09-009-08-W1	4	12:50	13:10	536569	5509742	Pieridae	Pieris rapae	6
T08-SN04-02	536566	5509737	08/10/10	NE-09-009-08-W1	4	12:50	13:10	536569	5509742	Nymphalidae	Vanessa atalanta	1
T08-SN04-03	536566	5509737	08/10/10	NE-09-009-08-W1	4	12:50	13:10	536569	5509742	Pieridae	Colias spp	1
T08-SN04-04	536566	5509737	08/10/10	NE-09-009-08-W1	4	12:47	13:12	536569	5509742	Pieridae	Pieris rapae	1
T08-SN04-05	536566	5509737	08/10/10	NE-09-009-08-W1	4	12:47	13:12	536569	5509742	Pieridae		20
T08-SN04-06	536635	5509753	08/10/10	NE-09-009-08-W1	4						Anaxyrus spp	1
T08-SN04-07	536566	5509737	08/10/10	NE-09-009-08-W1	4	12:47	13:12	536569	5509742			1
T08-SN04-08	536566	5509737	08/10/10	NE-09-009-08-W1	4	12:47	13:12	536569	5509742	Nymphalidae	Speyeria spp- electa?	1

Table A4-1. Continued.

SAMPLE ID	(UTM ZONE 14U) START EASTING	START NORTHING	DATE	SITE ID	VISIT	START TIME	END TIME	(UTM ZONE 14U) END EASTING	END NORTHING	FAMILY	SPECIES	# OF INDS
T08-SN04-09	536566	5509737	08/10/10	NE-09-009-08-W1	4	12:47	13:12	536569	5509742	Nymphalidae		2
T08-SN04-10	536566	5509737	08/10/10	NE-09-009-08-W1	4	12:47	13:12	536569	5509742	Danaidae or Nymphalidae	Danaus plexippus or Limenitis archippus	1
T09-SN01-01	539226	5504343	08/10/10	NW-26-008-08W1	1	12:00	12:20	539357	5504527	Pieridae	Pieris rapae	7
T09-SN01-02	539226	5504343	08/10/10	NW-26-008-08W1	1	12:00	12:20	539357	5504527	Nymphalidae		1
T09-SN01-03	539226	5504343	08/10/10	NW-26-008-08W1	1	12:00	12:20	539357	5504527	Pieridae	Colias spp	1
T09-SN01-04	539226	5504343	08/10/10	NW-26-008-08W1	1	11:57	12:19	539357	5504527	Pieridae		24
T09-SN01-05	539226	5504343	08/10/10	NW-26-008-08W1	1	11:57	12:19	539357	5504527	Nymphalidae		1
T09-SN01-06	539226	5504343	08/10/10	NW-26-008-08W1	1	11:57	12:19	539357	5504527	Pieridae	Pieris rapae	1
T09-SN01-07	539226	5504343	08/10/10	NW-26-008-08W1	1	11:57	12:19	539357	5504527	Pieridae	Pieris rapae	1
T09-SN01-08	539226	5504343	08/10/10	NW-26-008-08W1	1	11:57	12:19	539357	5504527	Nymphalidae	Limenitis archippus	1
T10-SN01-01	539228	5504107	08/10/10	NW-26-008-08W1	1	11:25	11:45	539225	5504121			1
T10-SN01-02	539228	5504107	08/10/10	NW-26-008-08W1	1	11:25	11:45	539225	5504121	Pieridae	Pieris rapae	16
T10-SN01-03	539228	5504107	08/10/10	NW-26-008-08W1	1	11:25	11:45	539225	5504121	Pieridae	Colias spp- philodice?	1
T10-SN01-04	539228	5504107	08/10/10	NW-26-008-08W1	1	11:25	11:45	539225	5504121	Nymphalidae	Speyeria spp	1
T10-SN01-05	539227	5504105	08/10/10	NW-26-008-08W1	1	11:25	11:49	539225	5504121	Danaidae	Danaus plexippus	1
T10-SN01-06	539227	5504105	08/10/10	NW-26-008-08W1	1	11:25	11:49	539225	5504121	Pieridae		25
T10-SN01-07	539227	5504105	08/10/10	NW-26-008-08W1	1	11:25	11:49	539225	5504121	Satyridae	Cercyonis spp- pegala?	1
T10-SN01-08	539058	5504036	08/10/10	NW-26-008-08W1	1						Anaxyrus hemiophrys	1
T10-SN01-09	539058	5504036	08/10/10	NW-26-008-08W1	1						Anaxyrus hemiophrys	1
T10-SN01-10	539227	5504105	08/10/10	NW-26-008-08W1	1	11:25	11:49	539225	5504121	Pieridae	Pieris rapae	1
T10-SN01-11	539227	5504105	08/10/10	NW-26-008-08W1	1	11:25	11:49	539225	5504121	Nymphalidae	Limenitis archippus	1

Table A4-2. Raw data for anuran call surveys conducted in potential breeding habitat within the Bipole III Transmission Project Local Study Area, 2010.

SURVEY PERIOD	SITE ID[1]	ZONE	EASTING	NORTHING	DATE	SURVEY TYPE[2]	START TIME	SPECIES[3]	CALL RANK[4]	# OF INDS
1	3	14N	678398	5532809	04/23/10	Recon	13:15	NLFR	2	3
1	3	14N	678398	5532809	04/23/10	Recon	13:15	WOFR	1	1
1	10	14N	682911	5532190	04/23/10	Recon	13:45	WOFR	1	1
1	11	14N	674777	5522073	04/23/10	Recon	14:30	BCFR	2	2
1	3	14N	678398	5532809	04/23/10	CS (SE)	21:15	NLFR	2	2
1	3	14N	678398	5532809	04/23/10	CS (SE)	21:15	SPPE	3	4
1	3	14N	678398	5532809	04/23/10	CS (SE)	21:15	WOFR	2	3
1	2	14N	677628	5535501	04/23/10	CS (SE)	21:57	None	0	0
1	9	14N	681450	5533803	04/23/10	CS (SE)	22:21	BCFR	3	5
1	9	14N	681450	5533803	04/23/10	CS (SE)	22:21	NLFR	1	1
1	9	14N	681450	5533803	04/23/10	CS (SE)	22:21	SPPE	2	3
1	9	14N	681450	5533803	04/23/10	CS (SE)	22:21	WOFR	2	3
1	10	14N	682838	5532195	04/23/10	CS (SE)	22:55	NLFR	1	1
1	10	14N	682838	5532195	04/23/10	CS (SE)	22:55	SPPE	3	6
1	10	14N	682838	5532195	04/23/10	CS (SE)	22:55	WOFR	4	full chorus
1	10	14N	682838	5532195	04/23/10	CS (SE)	22:55	WOFR	2	3
1	8	14N	679341	5523833	04/23/10	CS (SE)	23:28	BCFR	3	5
1	8	14N	679341	5523833	04/23/10	CS (SE)	23:28	SPPE	1	1
1	8	14N	679341	5523833	04/23/10	CS (SE)	23:28	WOFR	1	1
1	8	14N	678311	5523803	04/23/10	CS (SE)	23:38	WOFR	1	1
1	11	14N	674770	5522054	04/23/10	CS (SE)	23:56	BCFR	3	6
1	11	14N	674770	5522054	04/23/10	CS (SE)	23:56	WOFR	2	3
1	8	14N	679122	5523814	04/23/10	Recon		BCFR	2	3
1	9	14N	681450	5533803	04/23/10	Recon		BCFR	2	4
1	3	14N	677892	5532839	04/23/10	Recon		NLFR	2	2
1	1	14N	665907	5533335	04/23/10	Recon		None	0	0
1	2	14N	677647	5535568	04/23/10	Recon		None	0	0
1	8	14N	679326	5523817	04/23/10	Recon		None	0	0
1	8	14N	678738	5523815	04/23/10	Recon		None	0	0
1	8	14N	678464	5523809	04/23/10	Recon		None	0	0
1	8	14N	678064	5523800	04/23/10	Recon		None	0	0
1	11	14N	674781	5521863	04/23/10	Recon		None	0	0
1	10	14N	682839	5532192	04/23/10	Recon		WOFR	1	1
1	11	14N	674823	5521097	04/24/10	CS (SE)	0:10	AM/CATO	1	1
1	11	14N	674823	5521097	04/24/10	CS (SE)	0:10	BCFR	3	4
1	11	14N	674823	5521097	04/24/10	CS (SE)	0:10	NLFR	1	1
1	1	14N	665872	5533335	04/24/10	CS (SE)	0:46	BCFR	3	
1	1	14N	665872	5533335	04/24/10	CS (SE)	0:46	WOFR	1	1
1	62140				04/25/10	Recon	13:50	None	0	0
1	59494	14N	540494	5509100	04/25/10	Recon	14:18	None	0	0
1	59252	14N	536499	5499919	04/25/10	Recon	14:43	BCFR	2	2
1	49393	14N	525781	5511913	04/25/10	Recon	15:13	None	0	0
1	59498	14N	482710	5563101	04/25/10	Recon	16:25	BCFR	2	2
1	59498	14N	482745	5562954	04/25/10	Recon	16:25	None	0	0
1	59495	14N	458515	5558849	04/25/10	Recon	16:45	NLFR	2	2-3
1	59495.5	14N	484258	5558853	04/25/10	Recon	16:45	None	0	0
1	59499	14N	480613	5572784	04/25/10	Recon	17:40	None	0	0
1	49393	14N	525781	5511913	04/25/10	CS	21:54	None	0	0

Table A4-2. Continued.

SURVEY PERIOD	SITE ID[1]	ZONE	EASTING	NORTHING	DATE	SURVEY TYPE[2]	START TIME	SPECIES[3]	CALL RANK[4]	# OF INDS
1	59252	14N	536499	5499919	04/25/10	CS	22:19	BCFR	4	full chorus
1	59494	14N	540497	5509104	04/25/10	CS	22:35	BCFR	4	full chorus
1	62140	14N	542557	5496657	04/25/10	CS	23:00	BCFR	4	full chorus
1	IO	14N	480240	5571037	04/25/10	IO		Aves		
1	59498	14N	482710	5563101	04/26/10	CS	0:37	BCFR	3	8
1	59495.5	14N	484283	5558853	04/26/10	CS	0:46	NLFR	1	1
1	59495	14N	484546	5558848	04/26/10	CS	0:46	None	0	0
1	59499	14N	480560	5572799	04/26/10	CS	1:19	BCFR	3	4
1	56886	14N	478254	5606460	04/26/10	CS	21:45	BCFR	1	1
1	56886	14N	478254	5606460	04/26/10	CS	21:45	WOFR	2	2
1	59546	14N	481745	5617036	04/26/10	CS	22:48	WOFR	1	1
1	59546.5	14N	481873	5616856	04/26/10	CS	22:58	WOFR	1	1
1	59545	14N	482174	5616277	04/26/10	CS	23:05	WOFR	1	1
1	58055	14N	480580	5614655	04/26/10	CS	23:16	None	0	0
1	62316	14N	477268	5625523	04/26/10	CS	23:49	BCFR	1	1
1	56886	14N	478280	5606457	04/26/10	Recon		BCFR	1	1
1	IO	14N	474867	5624532	04/26/10	IO		Mammal		
1	49546.5	14N	481873	5616852	04/26/10	Recon		None	0	0
1	49546	14N	481757	5617034	04/26/10	Recon		None	0	0
1	49556	14N	474512	5626165	04/26/10	Recon		None	0	0
1	58055	14N	480557	5614648	04/26/10	Recon		None	0	0
1	59344				04/26/10	Recon		None	0	0
1	59545	14N	482171	5616283	04/26/10	Recon		None	0	0
1	62316	14N	477271	5625504	04/26/10	Recon		None	0	0
1	59344	14N	474795	5624553	04/27/10	CS	0:04	BCFR	2	2
1	49556	14N	474517	5626168	04/27/10	CS- Not Done	0:18	WOFR	1	1
1	61334	14N	519064	5568645	04/27/10	Recon	16:00	BCFR	3	6
1	62005	14N	520816	5581799	04/27/10	Recon	16:20	None	0	0
1	49440	14N	517488	5581798	04/27/10	Recon	16:32	None	0	0
1	1833.5	14N	522637	5585095	04/27/10	Recon	16:45	BCFR	2	3
1	1833	14N	522644	5585649	04/27/10	Recon	16:45	BCFR	2	3
1	62012	14N	517064	5594950	04/27/10	Recon	17:15	BCFR	2	2
1	59508	14N	519531	5601632	04/27/10	Recon	17:30	None	0	0
1	62312	14N	513987	5604783	04/27/10	Recon	17:40	None	0	0
1	59519	14N	518052	5604806	04/27/10	Recon	17:50	WOFR		
1	59520	14N	509549	5604768	04/27/10	Recon	18:00	BCFR	1	1
1	61295	14N	508524	5604766	04/27/10	Recon	18:05	None	0	0
1	59526	14N	511827	5606433	04/27/10	Recon	18:30	BCFR	3	5
1	49485	14N	507246	5608027	04/27/10	Recon	18:50	BCFR	2	2-3
1	59543	14N	509812	5616269	04/27/10	Recon	19:17	BCFR	2	2
1	IO	14N	510410	5616260	04/27/10	IO	19:17	Mammal		
1	59543	14N	510327	5616261	04/27/10	Recon	19:40	BCFR	3	4
1	49485	14N	507269	5608029	04/27/10	CS	21:20	BCFR	3	7-8
1	61295	14N	508576	5604767	04/27/10	CS	21:34	WOFR	3	6
1	59520	14N	509620	5604767	04/27/10	CS	21:45	BCFR	2	2
1	59520	14N	509620	5604767	04/27/10	CS	21:45	WOFR	2	3
1	59526	14N	511830	5606438	04/27/10	CS	21:59	BCFR	4	full chorus
1	59526	14N	511830	5606438	04/27/10	CS	21:59	WOFR	1	1

Table A4-2. Continued.

SURVEY PERIOD	SITE ID[1]	ZONE	EASTING	NORTHING	DATE	SURVEY TYPE[2]	START TIME	SPECIES[3]	CALL RANK[4]	# OF INDS
1	62312	14N	514055	5604786	04/27/10	CS	22:14	BCFR	4	full chorus
1	59519	14N	518043	5604803	04/27/10	CS	22:26	BCFR	2	2
1	59519	14N	518043	5604803	04/27/10	CS	22:26	WOFR	3	full chorus
1	59508	14N	519476	5601624	04/27/10	CS	22:38	BCFR	2	2
1	59508	14N	519476	5601624	04/27/10	CS	22:38	WOFR	3	5
1	62012	14N	517080	5594946	04/27/10	CS	23:03	BCFR	3	5
1	62012	14N	517080	5594946	04/27/10	CS	23:03	WOFR	1	1
1	59503	14N	521733	5590820	04/27/10	CS	23:19	BCFR	4	full chorus
1	59503	14N	521733	5590820	04/27/10	CS	23:19	WOFR	1	1
1	1833.5	14N	522651	5585093	04/27/10	CS	23:30	BCFR	3	5
1	1833	14N	522659	5585609	04/27/10	CS	23:30	BCFR	3	5
1	62005	14N	520854	5581799	04/27/10	CS	23:50	BCFR	4	full chorus
1	62005	14N	520854	5581799	04/27/10	CS	23:50	WOFR	1	1
1	59503	14N	521641	5591201	04/27/10	Recon		BCFR	3	6
1	59503	14N	521641	5591201	04/27/10	Recon		None	0	0
1	49440	14N	517477	5581799	04/28/10	CS	0:00	BCFR	3	4
1	49440	14N	517477	5581799	04/28/10	CS	0:00	WOFR	1	1
1	61334	14N	519075	5568646	04/28/10	CS	0:25	BCFR	3	8
1	59499	14N	480561	5572799	04/28/10	CS	1:21	BCFR	3	5
1	59499	14N	480561	5572799	04/28/10	CS	1:21	NLFR	1	1
1	59499	14N	480561	5572799	04/28/10	CS	1:21	WOFR	2	2
1	59556	14N	500937	5627720	04/28/10	Recon	18:00	None	0	0
1	49617	14N	498595	5646788	04/28/10	CS	21:31	None	0	0
1	49617	14N	498595	5645788	04/28/10	CS	21:31	None	0	0
1	49617	14N	498595	5645788	04/28/10	CS	21:31	None	0	0
1	44582	14N	493171	5642488	04/28/10	CS	22:02	BCFR	3	6
1	59562	14N	500225	5641183	04/28/10	CS	22:18	BCFR	2	2
1	59562	14N	500225	5641183	04/28/10	CS	22:18	WOFR	1	1
1	59561	14N	500691	5640890	04/28/10	CS	22:27	WOFR	2	2
1	59561	14N	500659	5640729	04/28/10	CS	22:37	WOFR	1	1
1	61348	14N	505473	5634659	04/28/10	CS- Not Done	23:00	None	0	0
1	59558	14N	505641	5632644	04/28/10	CS- Not Done	23:16	WOFR	1	1
1	59543	14N	510319	5616259	04/28/10	CS	23:47	None	0	0
1	62029	14N	502983	5624959	04/28/10	Recon		BCFR	1	1
1	44582	14N	493211	5642494	04/28/10	Recon		None	0	0
1	49617	14N	498597	5645786	04/28/10	Recon		None	0	0
1	59558	14N	505659	5632643	04/28/10	Recon		None	0	0
1	59561	14N	500659	5640729	04/28/10	Recon		None	0	0
1	59562	14N	500224	5641181	04/28/10	Recon		None	0	0
1	61348	14N	505450	5634669	04/28/10	Recon		None	0	0
1	62029	14N	502978	5624975	04/29/10	CS	0:20	WOFR	1	1
1	59556	14N	500892	5627699	04/29/10	CS	0:34	WOFR	1	1
1	49378	14N	537912	5496609	04/29/10	Recon	16:00	None	0	0
1	58882	14N	358740	5884872	05/09/10	Recon	15:40	WOFR	4	full chorus
1	59780	14N	358633	5888159	05/09/10	Recon	17:10	BCFR	4	full chorus
1	59780	14N	358633	5888159	05/09/10	Recon	17:10	WOFR	1	2
1	51533	14N	358693	5883716	05/09/10	Recon	18:00	BCFR	3	

Table A4-2. Continued.

SURVEY PERIOD	SITE ID[1]	ZONE	EASTING	NORTHING	DATE	SURVEY TYPE[2]	START TIME	SPECIES[3]	CALL RANK[4]	# OF INDS
1	51533	14N	358693	5883716	05/09/10	Recon	18:00	WOFR	1	1
1	51979	14N	358601	5883142	05/09/10	Recon	18:15	BCFR	3	
1	51979	14N	358601	5883142	05/09/10	Recon	18:15	WOFR	2	3-4
1	51976	14N	358628	5882012	05/09/10	Recon	18:20	BCFR	4	full chorus
1	51973	14N	358964	5881713	05/09/10	Recon	18:30	BCFR	1	1
1	51806	14N	360155	5879337	05/09/10	Recon	18:50	None	0	0
1	23533	14N	362260	5876862	05/09/10	Recon	19:05	BCFR	3	
1	51517	14N	362856	5876790	05/09/10	Recon	19:15	BCFR	4	full chorus
1	51517	14N	362856	5876790	05/09/10	Recon	19:15	WOFR	1	1
1	58881	14N	365114	5871152	05/09/10	Recon	19:40	WOFR	2	2-3
1	51795	14N	363376	5870393	05/09/10	Recon	20:05	None	0	0
1	51792	14N	363529	5868934	05/09/10	Recon	20:15	BCFR	2	2
1	51792	14N	363528	5868933	05/09/10	CS	21:15	BCFR	2	2
1	51795	14N	363382	5870385	05/09/10	CS	21:30	None	0	0
1	58881	14N	365004	5871183	05/09/10	CS	21:53	WOFR	3	4
1	51517	14N	362898	5876792	05/09/10	CS	22:18	BCFR	4	full chorus
1	51517	14N	362898	5876792	05/09/10	CS	22:18	BCFR	2	2
1	51517	14N	362898	5876792	05/09/10	CS	22:18	WOFR	4	full chorus
1	51517	14N	362898	5876792	05/09/10	CS	22:18	WOFR	3	
1	51988	14N	391979	6003007	05/09/10	CS	22:28	BCFR	1	1
1	51988	14N	391979	6003007	05/09/10	CS	22:28	WOFR	3	6
1	23533	14N	362251	5876844	05/09/10	CS	22:34	BCFR	2	
1	23533	14N	362251	5876844	05/09/10	CS	22:34	BCFR	4	full chorus
1	23533	14N	362251	5876844	05/09/10	CS	22:34	WOFR	1	1
1	23533	14N	362251	5876844	05/09/10	CS	22:34	WOFR	2	2-3
1	51987	14N	390051	6000475	05/09/10	CS	22:41	WOFR	4	full chorus
1	51806	14N	360159	5879315	05/09/10	CS	22:52	BCFR	2	2
1	51806	14N	360159	5879315	05/09/10	CS	22:52	WOFR	4	full chorus
1	51806	14N	360159	5879315	05/09/10	CS	22:52	WOFR	1	1
1	30798	14N	380501	5989132	05/09/10	CS	23:06	BCFR	1	1
1	51973	14N	358933	5881680	05/09/10	CS	23:06	BCFR	3	
1	30798	14N	380501	5989132	05/09/10	CS	23:06	WOFR	2	3
1	51973	14N	358933	5881680	05/09/10	CS	23:06	WOFR	4	full chorus
1	51976	14N	358645	5882043	05/09/10	CS	23:19	BCFR	4	full chorus
1	51976	14N	358645	5882043	05/09/10	CS	23:19	BCFR	2	3-4
1	51976	14N	358645	5882043	05/09/10	CS	23:19	WOFR	3	
1	51976	14N	358645	5882043	05/09/10	CS	23:19	WOFR	2	2
1	52177	14N	370551	5983272	05/09/10	CS	23:31	BCFR	4	full chorus
1	51979	14N	358601	5883177	05/09/10	CS	23:32	BCFR	4	full chorus
1	51979	14N	358601	5883177	05/09/10	CS	23:32	WOFR	4	full chorus
1	51533	14N	358608	5883712	05/09/10	CS	23:43	BCFR	3	
1	51533	14N	358608	5883712	05/09/10	CS	23:43	WOFR	4	full chorus
1	51533	14N	358608	5883712	05/09/10	CS	23:43	WOFR	2	3

Table A4-2. Continued.

SURVEY PERIOD	SITE ID[1]	ZONE	EASTING	NORTHING	DATE	SURVEY TYPE[2]	START TIME	SPECIES[3]	CALL RANK[4]	# OF INDS
1	51533	14N	358608	5883712	05/09/10	CS	23:43	WOFR	3	
1	46468	14N	372864	5979716	05/09/10	CS	23:50	BCFR	2	3
1	46468	14N	372864	5979716	05/09/10	CS	23:50	WOFR	4	full chorus
1	58882	14N	358612	5884889	05/09/10	CS	23:56	BCFR	4	full chorus
1	58882	14N	358612	5884889	05/09/10	CS	23:56	WOFR	4	full chorus
1	58882	14N	358612	5884889	05/09/10	CS	23:56	WOFR	4	full chorus
1	IO	14N	391378	6002095	05/09/10	Recon		Aves		
1	IO	14N	391378	6002095	05/09/10	Recon		Aves		
1	46468	14N	372870	5979695	05/09/10	Recon		BCFR	1	1
1	51833	14N	368424	5982204	05/09/10	Recon		BCFR	4	full chorus
1	8774	14N	361252	5965082	05/09/10	Recon		BCFR	1	1
1	51809				05/09/10	Recon- Not Done		N/A		
1	51994				05/09/10	Recon- Not Done		N/A		
1	30798	14N	380591	5989168	05/09/10	Recon		None	0	0
1	51988	14N	391994	6003025	05/09/10	Recon		None	0	0
1	52177	14N	370544	5983279	05/09/10	Recon		None	0	0
1	46428	14N	364167	5969164	05/09/10	Recon		WOFR	4	full chorus
1	46468	14N	372870	5979695	05/09/10	Recon		WOFR	2	2
1	51833	14N	368424	5982204	05/09/10	Recon		WOFR	1	1
1	51987	14N	390094	6000534	05/09/10	Recon		WOFR	3	6
1	8738	14N	353615	5954497	05/09/10	Recon		WOFR	1	1
1	51833	14N	368430	5982270	05/10/10	CS	0:09	BCFR	4	full chorus
1	51833	14N	368430	5982270	05/10/10	CS	0:09	WOFR	3	6
1	59780	14N	358633	5888195	05/10/10	CS	0:10	BCFR	4	full chorus
1	59780	14N	358633	5888195	05/10/10	CS	0:10	BCFR	2	2-3
1	59780	14N	358633	5888195	05/10/10	CS	0:10	WOFR	4	full chorus
1	59780	14N	358633	5888195	05/10/10	CS	0:10	WOFR	3	
1	8738	14N	353715	5954333	05/10/10	CS	1:06	BCFR	2	3
1	8738	14N	353715	5954333	05/10/10	CS	1:06	WOFR	3	6
1	46428	14N	364163	5969161	05/10/10	CS	1:44	BCFR	3	2-4
1	46428	14N	364163	5969161	05/10/10	CS	1:44	WOFR	4	full chorus
1	8774	14N	361308	5965067	05/10/10	CS	2:10	BCFR	2	2
1	8774	14N	361308	5965067	05/10/10	CS	2:10	WOFR	2	4
1	51727	14N	370680	5819169	05/10/10	Recon	17:45	BCFR	1	1
1	58874	14N	371892	5819148	05/10/10	Recon	18:10	BCFR	2	
1	62212	14N	372183	5817889	05/10/10	Recon	18:50	None	0	0
1	62211	14N	372940	5818571	05/10/10	Recon	19:00	None	0	0
1	51721	14N	369167	5815973	05/10/10	Recon	19:15	BCFR	2	
1	51721	14N	369167	5815973	05/10/10	Recon	19:15	BCFR	2	
1	52155	14N	370552	5815915	05/10/10	Recon	19:28	BCFR	3	
1	52155	14N	370552	5815915	05/10/10	Recon	19:28	BCFR	2	3
1	59218	14N	367861	5812989	05/10/10	Recon	20:21	BCFR	2	2
1	59218	14N	367855	5812983	05/10/10	CS	21:23	BCFR	3	
1	59218	14N	367855	5812983	05/10/10	CS	21:23	WOFR	1	1
1	59218	14N	367855	5812983	05/10/10	CS	21:23	WOFR	1	1

Table A4-2. Continued.

SURVEY PERIOD	SITE ID[1]	ZONE	EASTING	NORTHING	DATE	SURVEY TYPE[2]	START TIME	SPECIES[3]	CALL RANK[4]	# OF INDS
1	51721	14N	369175	5815971	05/10/10	CS	21:55	BCFR	4	full chorus
1	51721	14N	369175	5815971	05/10/10	CS	21:55	BCFR	4	full chorus
1	51721	14N	369175	5815971	05/10/10	CS	21:55	BCFR	3	
1	51721	14N	369175	5815971	05/10/10	CS	21:55	WOFR	4	full chorus
1	28724	14N	361595	5852426	05/10/10	CS	22:06	BCFR	3	4
1	28724	14N	361595	5852426	05/10/10	CS	22:06	WOFR	2	2
1	52155	14N	370548	5815914	05/10/10	CS	22:08	BCFR	4	full chorus
1	52155	14N	370548	5815914	05/10/10	CS	22:08	WOFR	2	2-3
1	52155	14N	370548	5815914	05/10/10	CS	22:08	WOFR	2	2
1	62212	14N	372191	5817895	05/10/10	CS	22:30	BCFR	3	
1	62212	14N	372191	5817895	05/10/10	CS	22:30	BCFR	1	
1	62212	14N	372191	5817895	05/10/10	CS	22:30	WOFR	3	
1	62212	14N	372191	5817895	05/10/10	CS	22:30	WOFR	1	
1	62211	14N	372940	5818578	05/10/10	CS	22:40	BCFR	1	1
1	62211	14N	372940	5818578	05/10/10	CS	22:40	BCFR	2	2-3
1	62211	14N	372940	5818578	05/10/10	CS	22:40	WOFR	4	full chorus
1	62211	14N	372940	5818578	05/10/10	CS	22:40	WOFR	1	1
1	51727	14N	370696	5819176	05/10/10	CS	23:07	BCFR	2	3
1	51727	14N	370696	5819176	05/10/10	CS	23:07	BCFR	3	
1	51727	14N	370696	5819176	05/10/10	CS	23:07	BCFR	2	3
1	51727	14N	370696	5819176	05/10/10	CS	23:07	WOFR	2	2
1	58874	14N	371827	5819143	05/10/10	CS	23:30	BCFR	4	full chorus
1	58874	14N	371827	5819143	05/10/10	CS	23:30	BCFR	3	
1	58874	14N	371827	5819143	05/10/10	CS	23:30	WOFR	4	full chorus
1	28724	14N	361600	5852429	05/10/10	Recon		BCFR	1	1
1	51497	14N	361128	5858046	05/10/10	Recon		BCFR	2	3
1	52441	14N	363053	5862076	05/10/10	Recon		BCFR	1	1
1	52460	14N	362518	5860034	05/10/10	Recon		BCFR	2	2
1	51789				05/10/10	Recon- Not Done		N/A		
1	58869				05/10/10	Recon- Not Done		N/A		
1	39715	14N	364148	5866050	05/10/10	Recon		None	0	0
1	51782	14N	362349	5861553	05/10/10	Recon		None	0	0
1	51788	14N	363961	5863846	05/10/10	Recon		None	0	0
1	51790	14N	364069	5864773	05/10/10	Recon		None	0	0
1	58878	14N	364021	5862363	05/10/10	Recon		None	0	0
1	59771	14N	362042	5861331	05/10/10	Recon		None	0	0
1	59800	14N	364877	5864013	05/10/10	Recon		None	0	0
1	59594	14N	388757	5770433	05/11/10	Recon	18:10	BCFR	3	
1	49770	14N	386761	5770079	05/11/10	Recon	19:08	BCFR	3	
1	49770	14N	386761	5770079	05/11/10	Recon	19:08	WOFR	1	1
1	49775	14N	386197	5771088	05/11/10	Recon	19:20	WOFR	1	1
1	51850	14N	516708	6078544	05/11/10	Recon	20:16	BCFR	2	3
1	51850	14N	516708	6078544	05/11/10	Recon	20:16	WOFR	2	4
1	58849	14N	366964	5798316	05/11/10	Recon	20:42	None	0	0
1	58852	14N	370367	5801360	05/11/10	Recon	21:00	BCFR	3	
1	58852	14N	370377	5801355	05/11/10	CS	21:28	BCFR	3	

Table A4-2. Continued.

SURVEY PERIOD	SITE ID[1]	ZONE	EASTING	NORTHING	DATE	SURVEY TYPE[2]	START TIME	SPECIES[3]	CALL RANK[4]	# OF INDS
1	58852	14N	370377	5801355	05/11/10	CS	21:28	WOFR	1	1
1	58852	14N	370377	5801355	05/11/10	CS	21:28	WOFR	1	1
1	58849	14N	366946	5798322	05/11/10	CS	21:48	BCFR	3	
1	26	14N	522539	6083583	05/11/10	CS	22:12	BCFR	2	3
1	26	14N	522539	6083583	05/11/10	CS	22:12	WOFR	4	full chorus
1	49775	14N	386215	5771069	05/11/10	CS	22:35	BCFR	1	1
1	49775	14N	386215	5771069	05/11/10	CS	22:35	BCFR	4	full chorus
1	49775	14N	386215	5771069	05/11/10	CS	22:35	WOFR	2	2
1	49775	14N	386215	5771069	05/11/10	CS	22:35	WOFR	1	1
1	49775	14N	386215	5771069	05/11/10	CS	22:35	WOFR	4	full chorus
1	49770	14N	386789	5770026	05/11/10	CS	22:50	BCFR	4	full chorus
1	49770	14N	386789	5770026	05/11/10	CS	22:50	WOFR	4	full chorus
1	59594	14N	388825	5770430	05/11/10	CS	23:27	BCFR	4	full chorus
1	59594	14N	388825	5770430	05/11/10	CS	23:27	WOFR	4	full chorus
1	IO	14N	346634	6032534	05/11/10	IO		Aves		
1	IO	14N	437976	6055302	05/11/10	IO		Aves		
1	59574	14N	427989	5722952	05/12/10	Recon	14:43	WOFR	1	1
1	59575	14N	429842	5722938	05/12/10	Recon	15:15	BCFR	4	full chorus
1	58529	14N	433573	5719627	05/12/10	Recon	15:43	NLFR	1	1
1	62210	14N	435207	5719604	05/12/10	Recon	15:55	None	0	0
1	58935	14N	435986	5719611	05/12/10	Recon	16:10	NLFR	2	2
1	58936	14N	436344	5720575	05/12/10	Recon	16:30	None	0	0
1	58938	14N	437985	5721363	05/12/10	Recon	16:56	BCFR	4	full chorus
1	62305	14N	436781	5721396	05/12/10	Recon	17:15	None	0	0
1	52853	14N	440822	5716303	05/12/10	Recon	17:45	BCFR	4	full chorus
1	58930	14N	434299	5714054	05/12/10	Recon	18:07	None	0	0
1	62209				05/12/10	Recon- Not Done	18:26	N/A		
1	59826	14N	442356	5714108	05/12/10	Recon	19:00	BCFR	1	1
1	34532	14N	442285	5712244	05/12/10	Recon	19:11	BCFR	3	
1	34532	14N	442324	5712247	05/12/10	CS	21:20	BCFR	4	full chorus
1	34532	14N	442324	5712247	05/12/10	CS	21:20	BCFR	2	2-3
1	34532	14N	442324	5712247	05/12/10	CS	21:20	WOFR	2	2
1	59826	14N	442351	5714048	05/12/10	CS	21:36	BCFR	4	full chorus
1	59826	14N	442351	5714048	05/12/10	CS	21:36	BCFR	1	1
1	59826	14N	442351	5714048	05/12/10	CS	21:36	BCFR	1	1
1	58930	14N	434285	5714048	05/12/10	CS	22:07	BCFR	4	full chorus
1	58930	14N	434285	5714048	05/12/10	CS	22:07	NLFR	1	1
1	58930	14N	434285	5714048	05/12/10	CS	22:07	NLFR	2	2
1	58930	14N	434285	5714048	05/12/10	CS	22:07	NLFR	1	1
1	58930	14N	434285	5714048	05/12/10	CS	22:07	WOFR	1	1
1	4	14N	531247	6101022	05/12/10	CS	22:11	BCFR	4	full chorus
1	4	14N	531247	6101022	05/12/10	CS	22:11	WOFR	1	1

Table A4-2. Continued.

SURVEY PERIOD	SITE ID[1]	ZONE	EASTING	NORTHING	DATE	SURVEY TYPE[2]	START TIME	SPECIES[3]	CALL RANK[4]	# OF INDS
1	52853	14N	440773	5716313	05/12/10	CS	22:26	BCFR	4	full chorus
1	52853	14N	440773	5716313	05/12/10	CS	22:26	GRTF	1	1
1	52853	14N	440773	5716313	05/12/10	CS	22:26	NLFR	1	1
1	52853	14N	440773	5716313	05/12/10	CS	22:26	WOFR	1	1
1	52853	14N	440773	5716313	05/12/10	CS	22:26	WOFR	1	1
1	4.5	14N	530818	6100698	05/12/10	CS	22:31	BCFR	4	full chorus
1	4.5	14N	530818	6100698	05/12/10	CS	22:31	WOFR	4	full chorus
1	58938	14N	437992	5721327	05/12/10	CS	22:54	BCFR	4	full chorus
1	58938	14N	437992	5721327	05/12/10	CS	22:54	NLFR	1	1
1	58938	14N	437992	5721327	05/12/10	CS	22:54	WOFR	2	2
1	58938	14N	437992	5721327	05/12/10	CS	22:54	WOFR	1	1
1	3	14N	527421	6095704	05/12/10	CS	22:55	BCFR	4	full chorus
1	3	14N	527421	6095704	05/12/10	CS	22:55	WOFR	3	4
1	58936	14N	436359	5720619	05/12/10	CS	23:10	BCFR	4	full chorus
1	58936	14N	436359	5720619	05/12/10	CS	23:10	NLFR	3	
1	52079	14N	517907	6080984	05/12/10	CS	23:17	BCFR	4	full chorus
1	52079	14N	517907	6080984	05/12/10	CS	23:17	WOFR	3	5
1	62305	14N	436796	5721414	05/12/10	CS	23:23	BCFR	3	
1	62305	14N	436796	5721414	05/12/10	CS	23:23	NLFR	4	full chorus
1	62305	14N	436796	5721414	05/12/10	CS	23:23	WOFR	1	1
1	23640	14N	513442	6073398	05/12/10	CS	23:34	BCFR	4	full chorus
1	23640	14N	513442	6073398	05/12/10	CS	23:34	WOFR	3	5
1	53178	14N	514201	6072163	05/12/10	CS	23:45	BCFR	4	full chorus
1	53178	14N	514201	6072163	05/12/10	CS	23:45	WOFR	3	5
1	58935	14N	436004	5719615	05/12/10	CS	23:46	BCFR	4	full chorus
1	58935	14N	436004	5719615	05/12/10	CS	23:46	NLFR	4	full chorus
1	58935	14N	436004	5719615	05/12/10	CS	23:46	NLFR	2	2-3
1	58935	14N	436004	5719615	05/12/10	CS	23:46	WOFR	1	1
1	1	14N	522745	6073895	05/12/10	Recon		BCFR	4	full chorus
1	23640	14N	513445	6073400	05/12/10	Recon		BCFR	4	full chorus
1	3	14N	527403	6095709	05/12/10	Recon		BCFR	4	full chorus
1	4	14N	531243	6101019	05/12/10	Recon		BCFR	4	full chorus
1	52079	14N	517985	6080931	05/12/10	Recon		BCFR	4	full chorus
1	53178	14N	514165	6072174	05/12/10	Recon		BCFR	4	full chorus
1	53178	14N	514100	6072290	05/12/10	Recon		BCFR	4	full chorus
1	61899	14N	474319	6051953	05/12/10	Recon		BCFR	2	3
1	23936				05/12/10	Recon- Not Done		N/A		
1	53131				05/12/10	Recon- Not Done		N/A		
1	53135	14N	505991	6061778	05/12/10	Recon		None	0	0
1	595751	14N	429812	5722972	05/12/10	Recon		None	0	0

Table A4-2. Continued.

SURVEY PERIOD	SITE ID[1]	ZONE	EASTING	NORTHING	DATE	SURVEY TYPE[2]	START TIME	SPECIES[3]	CALL RANK[4]	# OF INDS
1	2	14N	525439	6075200	05/12/10	Recon		WOFR	1	1
1	3	14N	527403	6095709	05/12/10	Recon		WOFR	1	1
1	52079	14N	517985	6080931	05/12/10	Recon		WOFR	2	2
1	61899	14N	474319	6051953	05/12/10	Recon		WOFR	1	1
1	1	14N	522876	6073920	05/13/10	CS	0:01	BCFR	4	full chorus
1	1	14N	522876	6073920	05/13/10	CS	0:01	WOFR	3	4
1	58529	14N	433576	5719626	05/13/10	CS	0:10	BCFR	4	full chorus
1	58529	14N	433576	5719626	05/13/10	CS	0:10	NLFR	3	
1	58529	14N	433576	5719626	05/13/10	CS	0:10	WOFR	1	1
1	2	14N	525430	6075244	05/13/10	CS	0:15	BCFR	4	full chorus
1	2	14N	525430	6075244	05/13/10	CS	0:15	WOFR	3	5
1	53135	14N	505928	6061830	05/13/10	CS	0:49	BCFR	4	full chorus
1	53135	14N	505928	6061830	05/13/10	CS	0:49	WOFR	2	4
1	59574	14N	427930	5722950	05/13/10	CS	0:50	BCFR	4	full chorus
1	59574	14N	427930	5722950	05/13/10	CS	0:50	NLFR	1	1
1	59574	14N	427930	5722950	05/13/10	CS	0:50	WOFR	2	2
1	59575	14N	429841	5722956	05/13/10	CS	1:10	BCFR	4	full chorus
1	59575	14N	429841	5722956	05/13/10	CS	1:10	NLFR	1	1
1	59575	14N	429841	5722956	05/13/10	CS	1:10	WOFR	1	1
1	59575	14N	429841	5722956	05/13/10	CS	1:10	WOFR	1	1
1	61899	14N	474356	6052049	05/13/10	CS	1:20	BCFR	4	full chorus
1	61899	14N	474356	6052049	05/13/10	CS	1:20	WOFR	3	5-6
1	52712	14N	441280	5709834	05/13/10	Recon	16:15	BCFR	4	full chorus
1	52712	14N	441280	5709834	05/13/10	Recon	16:15	GRTF	1	1
1	58957	14N	443522	5709798	05/13/10	Recon	16:27	BCFR	1	1
1	52915	14N	444640	5713019	05/13/10	Recon	17:10	BCFR	3	
1	52915	14N	444640	5713019	05/13/10	Recon	17:10	NLFR	1	1
1	51409	14N	444994	5713002	05/13/10	Recon	17:20	BCFR	3	
1	51409	14N	444994	5713002	05/13/10	Recon	17:20	BCFR	3	
1	51409	14N	444994	5713002	05/13/10	Recon	17:20	NLFR	1	1
1	62304	14N	447115	5712995	05/13/10	Recon	17:30	BCFR	2	2-3
1	12915	14N	448528	5712993	05/13/10	Recon	17:42	BCFR	2	3
1	12915	14N	448528	5712993	05/13/10	Recon	17:42	GRTF	1	1
1	61560	14N	463317	5694039	05/13/10	Recon	18:40	BCFR	4	full chorus
1	61560	14N	463317	5694039	05/13/10	Recon	18:40	GRTF	1	1
1	61560	14N	463320	5694071	05/13/10	CS	21:17	BCFR	4	full chorus
1	61560	14N	463320	5694071	05/13/10	CS	21:17	BCFR	4	full chorus
1	61560	14N	463320	5694071	05/13/10	CS	21:17	BCFR	4	full chorus
1	61560	14N	463320	5694071	05/13/10	CS	21:17	BCFR	4	full chorus
1	61560	14N	463320	5694071	05/13/10	CS	21:17	GRTF	1	1
1	61560	14N	463320	5694071	05/13/10	CS	21:17	GRTF	1	1
1	61560	14N	463320	5694071	05/13/10	CS	21:17	GRTF	1	1
1	61560	14N	463320	5694071	05/13/10	CS	21:17	GRTF	1	1

Table A4-2. Continued.

SURVEY PERIOD	SITE ID[1]	ZONE	EASTING	NORTHING	DATE	SURVEY TYPE[2]	START TIME	SPECIES[3]	CALL RANK[4]	# OF INDS
1	12915	14N	448522	5712982	05/13/10	CS	21:56	BCFR	4	full chorus
1	12915	14N	448522	5712982	05/13/10	CS	21:56	GRTF	4	full chorus
1	12915	14N	448522	5712982	05/13/10	CS	21:56	GRTF	3	
1	12915	14N	448522	5712982	05/13/10	CS	21:56	NLFR	1	1
1	62304	14N	447078	5712995	05/13/10	CS	22:10	BCFR	4	full chorus
1	62304	14N	447078	5712995	05/13/10	CS	22:10	GRTF	1	1
1	62304	14N	447078	5712995	05/13/10	CS	22:10	GRTF	1	1
1	62304	14N	447078	5712995	05/13/10	CS	22:10	GRTF	1	1
1	62304	14N	447078	5712995	05/13/10	CS	22:10	NLFR	2	2
1	51409	14N	444934	5713010	05/13/10	CS	22:24	BCFR	4	full chorus
1	51409	14N	444934	5713010	05/13/10	CS	22:24	NLFR	2	2-3
1	51409	14N	444934	5713010	05/13/10	CS	22:24	NLFR	2	2
1	51409	14N	444934	5713010	05/13/10	CS	22:24	NLFR	1	1
1	51409	14N	444934	5713010	05/13/10	CS	22:24	WOFR	1	1
1	52915	14N	444594	5713024	05/13/10	CS	22:36	BCFR	4	full chorus
1	52915	14N	444594	5713024	05/13/10	CS	22:36	NLFR	2	2-3
1	52915	14N	444594	5713024	05/13/10	CS	22:36	NLFR	3	
1	52915	14N	444594	5713024	05/13/10	CS	22:36	NLFR	2	2
1	52915	14N	444594	5713024	05/13/10	CS	22:36	WOFR	1	1
1	58957	14N	443518	5709801	05/13/10	CS	22:52	BCFR	4	full chorus
1	58957	14N	443518	5709801	05/13/10	CS	22:52	GRTF	1	1
1	58957	14N	443518	5709801	05/13/10	CS	22:52	NLFR	1	1
1	58957	14N	443518	5709801	05/13/10	CS	22:52	NLFR	1	1
1	58957	14N	443518	5709801	05/13/10	CS	22:52	WOFR	1	1
1	52712	14N	441261	5709832	05/13/10	CS	23:00	BCFR	4	full chorus
1	52712	14N	441261	5709832	05/13/10	CS	23:00	GRTF	2	2
1	52712	14N	441261	5709832	05/13/10	CS	23:00	WOFR	1	1
1	52712	14N	441261	5709832	05/13/10	CS	23:00	WOFR	1	1
1	62210	14N	435215	5719613	05/13/10	CS	0:00	NLFR	2	3-4
1	62210	14N	435215	5719613	05/13/10	CS	0:00	NLFR	1	1
1	62210	14N	435215	5719613	05/13/10	CS	0:00	NLFR	1	1
1	62152	14N	486172	5680211	05/14/10	CS	13:14	BCFR	4	full chorus
1	62152	14N	486172	5680211	05/14/10	CS	13:14	GRTF	1	1
1	62152	14N	486176	5680215	05/14/10	Recon	17:50	BCFR	1	1
1	61518	14N	489553	5666385	05/14/10	Recon	18:15	None	0	0
1	58686	14N	491056	5665452	05/14/10	Recon	18:30	BCFR	3	
1	58686	14N	491056	5665452	05/14/10	Recon	18:30	GRTF	1	1
1	58678	14N	493086	5657899	05/14/10	Recon	19:00	GRTF	1	1
1	44651	14N	485782	5655628	05/14/10	Recon	19:28	BCFR	4	full chorus
1	44651	14N	485782	5655628	05/14/10	Recon	19:28	GRTF	2	3
1	44582	14N	493184	5642486	05/14/10	Recon	20:04	BCFR	3	3-4
1	44582	14N	493184	5642486	05/14/10	Recon	20:04	BCFR	2	2
1	59562	14N	500219	5641193	05/14/10	Recon	20:22	GRTF	4	full chorus
1	59561	14N	500703	5640886	05/14/10	Recon	20:30	None	0	0

Table A4-2. Continued.

SURVEY PERIOD	SITE ID[1]	ZONE	EASTING	NORTHING	DATE	SURVEY TYPE[2]	START TIME	SPECIES[3]	CALL RANK[4]	# OF INDS
1	49617	14N	498611	5645787	05/14/10	Recon	20:55	None	0	0
1	49584	14N	504109	5635927	05/14/10	Recon	21:15	None	0	0
1	49583	14N	503092	5635924	05/14/10	Recon	21:20	BCFR	2	2
1	49583	14N	503069	5635927	05/14/10	CS	21:40	BCFR	3	
1	49583	14N	503069	5635927	05/14/10	CS	21:40	BCFR	2	2-3
1	49584	14N	504104	5635927	05/14/10	CS	21:50	BCFR	4	full chorus
1	49584	14N	504104	5635927	05/14/10	CS	21:50	WOFR	1	1
1	49584	14N	504104	5635927	05/14/10	CS	21:50	WOFR	1	1
1	49617	14N	498605	5645785	05/14/10	CS	22:18	BCFR	2	3-4
1	49617	14N	498605	5645785	05/14/10	CS	22:18	BCFR	3	
1	49617	14N	498605	5645785	05/14/10	CS	22:18	GRTF	1	1
1	49617	14N	498605	5645785	05/14/10	CS	22:18	WOFR	1	1
1	59561	14N	500669	5640738	05/14/10	CS	22:42	BCFR	4	full chorus
1	59561	14N	500669	5640738	05/14/10	CS	22:42	GRTF	1	1
1	59561	14N	500669	5640738	05/14/10	CS	22:42	WOFR	1	1
1	59562	14N	500219	5641188	05/14/10	CS	22:55	BCFR	4	full chorus
1	59562	14N	500219	5641188	05/14/10	CS	22:55	BCFR	2	2
1	59562	14N	500219	5641188	05/14/10	CS	22:55	GRTF	1	1
1	59562	14N	500219	5641188	05/14/10	CS	22:55	WOFR	1	1
1	44582	14N	493166	5642488	05/14/10	CS	23:10	BCFR	4	full chorus
1	44582	14N	493166	5642488	05/14/10	CS	23:10	GRTF	1	1
1	44582	14N	493166	5642488	05/14/10	CS	23:10	WOFR	1	1
1	44582	14N	493166	5642488	05/14/10	CS	23:10	WOFR	1	1
1	44651	14N	485764	5655641	05/14/10	CS	23:37	BCFR	4	full chorus
1	44651	14N	485764	5655641	05/14/10	CS	23:37	BCFR	4	full chorus
1	44651	14N	485764	5655641	05/14/10	CS	23:37	WOFR	1	1
1	44651	14N	485764	5655641	05/14/10	CS	23:37	WOFR	1	1
1	58738	14N	481971	5681878	05/14/10	Recon- Not Done		N/A		
1	58678	14N	493086	5657891	05/15/10	CS	0:06	BCFR	4	full chorus
1	58678	14N	493086	5657891	05/15/10	CS	0:06	BCFR	2	2
1	58686	14N	491069	5665456	05/15/10	CS	0:35	BCFR	4	full chorus
1	58686	14N	491069	5665456	05/15/10	CS	0:35	BCFR	3	
1	58686	14N	491069	5665456	05/15/10	CS	0:35	BCFR	1	1
1	61518	14N	489551	5666389	05/15/10	CS	0:47	BCFR	2	3-4
1	30				05/15/10	Recon	15:05	None	0	0
1	62314	14N	518413	5581795	05/15/10	Recon	16:50	BCFR	1	1
1	59513	14N	518793	5603977	05/15/10	Recon	17:30	None	0	0
1	62312	14N	514036	5604787	05/15/10	Recon	17:43	BCFR	1	1
1	59543	14N	510321	5616259	05/15/10	Recon	18:27	BCFR	1	1
1	62029	14N	502978	5624977	05/15/10	Recon	19:04	BCFR	4	full chorus
1	62029	14N	502978	5624977	05/15/10	Recon	19:04	BCFR	1	1
1	62029	14N	502978	5624977	05/15/10	Recon	19:04	GRTF	4	full chorus
1	62029	14N	502978	5624977	05/15/10	Recon	19:04	GRTF	1	1
1	59556	14N	500903	5627723	05/15/10	Recon	19:20	GRTF	2	2
1	58638	14N	501844	5632131	05/15/10	Recon	19:38	GRTF	2	3

Table A4-2. Continued.

SURVEY PERIOD	SITE ID[1]	ZONE	EASTING	NORTHING	DATE	SURVEY TYPE[2]	START TIME	SPECIES[3]	CALL RANK[4]	# OF INDS
1	58638	14N	501843	5632141	05/15/10	CS	21:25	BCFR	2	2
1	58638	14N	501843	5632141	05/15/10	CS	21:25	GRTF	3	4-5
1	58638	14N	501843	5632141	05/15/10	CS	21:25	GRTF	4	full chorus
1	59556	14N	500945	5627727	05/15/10	CS	21:41	BCFR	4	full chorus
1	59556	14N	500945	5627727	05/15/10	CS	21:41	GRTF	3	
1	63	14N	558090	6128853	05/15/10	CS	21:45	BCFR	4	full chorus
1	63	14N	558090	6128853	05/15/10	CS	21:45	WOFR	4	full chorus
1	62029	14N	502970	5625000	05/15/10	CS	21:53	BCFR	4	full chorus
1	62029	14N	502970	5625000	05/15/10	CS	21:53	GRTF	4	full chorus
1	62029	14N	502970	5625000	05/15/10	CS	21:53	GRTF	1	1
1	15	14N	557037	6127164	05/15/10	CS	21:56	BCFR	4	full chorus
1	15	14N	557037	6127164	05/15/10	CS	21:56	WOFR	1	1
1	62	14N	554588	6124504	05/15/10	CS	22:10	WOFR	2	2
1	14	14N	551833	6122000	05/15/10	CS	22:30	BCFR	2	2
1	59543	14N	510338	5616260	05/15/10	CS	22:30	BCFR	4	full chorus
1	59543	14N	510338	5616260	05/15/10	CS	22:30	BCFR	1	1
1	59543	14N	510338	5616260	05/15/10	CS	22:30	GRTF	3	
1	59543	14N	510338	5616260	05/15/10	CS	22:30	GRTF	1	1
1	14	14N	551833	6122000	05/15/10	CS	22:30	WOFR	3	4
1	59543	14N	510338	5616260	05/15/10	CS	22:30	WOFR	1	1
1	40545	14N	547575	6117420	05/15/10	CS	22:46	None	0	0
1	61	14N	545725	6114315	05/15/10	CS	22:59	BCFR	4	full chorus
1	61	14N	545725	6114315	05/15/10	CS	22:59	WOFR	3	3
1	61	14N	545725	6114315	05/15/10	CS	22:59	WOFR	Seen	1
1	60	14N	544378	6112931	05/15/10	CS	23:09	BCFR	4	full chorus
1	60	14N	544378	6112931	05/15/10	CS	23:09	WOFR	2	2
1	62312	14N	514040	5604786	05/15/10	CS	23:10	BCFR	4	full chorus
1	62312	14N	514040	5604786	05/15/10	CS	23:10	GRTF	3	5
1	62312	14N	514040	5604786	05/15/10	CS	23:10	GRTF	1	1
1	59	14N	536579	6108017	05/15/10	CS	23:28	BCFR	4	full chorus
1	59	14N	536579	6108017	05/15/10	CS	23:28	WOFR	3	4
1	49453	14N	512577	5598208	05/15/10	CS	23:45	BCFR	4	full chorus
1	8	14N	535378	6107365	05/15/10	CS	23:45	BCFR	1	1
1	49453	14N	512577	5598208	05/15/10	CS	23:45	CGTF	2	2
1	49453	14N	512577	5598208	05/15/10	CS	23:45	WOFR	1	1
1	8	14N	535378	6107365	05/15/10	CS	23:45	WOFR	4	full chorus
1	IO	14N	539023	6108998	05/15/10	IO		BCFR		
1	14	14N	551841	6122004	05/15/10	Recon		BCFR	2	2
1	31	14N	472979	6049827	05/15/10	Recon		BCFR	2	2
1	32	14N	513596	6073604	05/15/10	Recon		BCFR	4	full chorus
1	57	14N	488768	6057824	05/15/10	Recon		BCFR	4	full chorus

Table A4-2. Continued.

SURVEY PERIOD	SITE ID[1]	ZONE	EASTING	NORTHING	DATE	SURVEY TYPE[2]	START TIME	SPECIES[3]	CALL RANK[4]	# OF INDS
1	58	14N	514471	6075018	05/15/10	Recon		BCFR	4	full chorus
1	59	14N	536576	6108014	05/15/10	Recon		BCFR	2	3
1	60	14N	544375	6112929	05/15/10	Recon		BCFR	2	2
1	61	14N	545724	6114313	05/15/10	Recon		BCFR	3	4
1	63	14N	558107	6128871	05/15/10	Recon		BCFR	4	full chorus
1	6	14N	515417	6077137	05/15/10	Recon		BCFR		some
1	11				05/15/10	Recon- Not Done		N/A		
1	13				05/15/10	Recon- Not Done		N/A		
1	33				05/15/10	Recon- Not Done		N/A		
1	9	14N	539023	6108998	05/15/10	Recon- Not Done		N/A		
1	15	14N	557053	6127193	05/15/10	Recon		None	0	0
1	40545	14N	547620	6117393	05/15/10	Recon		None	0	0
1	49453	14N	512561	5598204	05/15/10	Recon		None	0	0
1	5	14N	510171	6068068	05/15/10	Recon		None	0	0
1	62	14N	554611	6124476	05/15/10	Recon		None	0	0
1	7	14N	515179	6078920	05/15/10	Recon		None	0	0
1	31	14N	472979	6049827	05/15/10	Recon		WOFR	1	1
1	58	14N	514471	6075018	05/15/10	Recon		WOFR	2	2
1	59	14N	536576	6108014	05/15/10	Recon		WOFR	1	1
1	63	14N	558107	6128871	05/15/10	Recon		WOFR	4	full chorus
1	8	14N	535355	6107348	05/15/10	Recon		WOFR	1	1
1	31	14N	472979	6049827	05/15/10	Recon		WOFR	Seen	1
1	57	14N	488768	6057824	05/15/10	Recon		WOFR	2	2
1	59513	14N	518802	5603979	05/16/10	CS	0:11	BCFR	2	3-4
1	59513	14N	518802	5603979	05/16/10	CS	0:11	BCFR	3	
1	59513	14N	518802	5603979	05/16/10	CS	0:11	GRTF	2	3-4
1	6	14N	515418	6077132	05/16/10	CS	0:26	BCFR	4	full chorus
1	6	14N	515418	6077132	05/16/10	CS	0:26	WOFR	2	2
1	7	14N	515182	6078920	05/16/10	CS	0:39	BCFR	4	full chorus
1	7	14N	515182	6078920	05/16/10	CS	0:39	WOFR	1	1
1	62314	14N	518433	5581797	05/16/10	CS	0:40	BCFR	4	full chorus
1	58	14N	514480	6075029	05/16/10	CS	0:50	BCFR	4	full chorus
1	58	14N	514480	6075029	05/16/10	CS	0:50	WOFR	2	3
1	32	14N	513564	6073608	05/16/10	CS	0:59	BCFR	4	full chorus
1	32	14N	513564	6073608	05/16/10	CS	0:59	WOFR	2	3-4
1	5	14N	510142	6068110	05/16/10	CS	1:16	BCFR	2	3
1	5	14N	510142	6068110	05/16/10	CS	1:16	WOFR	1	1
1	57	14N	488760	6057840	05/16/10	CS	1:49	BCFR	4	full chorus
1	57	14N	488760	6057840	05/16/10	CS	1:49	WOFR	2	2
1	31	14N	472978	6049833	05/16/10	CS	2:10	BCFR	2	2
1	31	14N	472978	6049833	05/16/10	CS	2:10	WOFR	2	2
1	80	14N	536463	6115695	05/16/10	Recon	15:00	BCFR	4	full chorus
1	80	14N	536463	6115695	05/16/10	Recon	15:00	WOFR	1	1
1	49379	14N	557033	5497345	05/16/10	Recon	16:00	None	0	0
1	282	14N	553716	5497744	05/16/10	Recon	16:20	None	0	0

Table A4-2. Continued.

SURVEY PERIOD	SITE ID[1]	ZONE	EASTING	NORTHING	DATE	SURVEY TYPE[2]	START TIME	SPECIES[3]	CALL RANK[4]	# OF INDS
1	49378	14N	537907	5496610	05/16/10	Recon	17:05	BCFR	1	1
1	29672	14N	540558	5505438	05/16/10	Recon	17:41	None	0	0
1	49379	14N	557037	5497342	05/16/10	CS	21:25	BCFR	4	full chorus
1	49379	14N	557037	5497342	05/16/10	CS	21:25	CGTF	4	full chorus
1	282	14N	553753	5497714	05/16/10	CS	21:40	BCFR	4	full chorus
1	282	14N	553753	5497714	05/16/10	CS	21:40	CGTF	2	2
1	282	14N	553753	5497714	05/16/10	CS	21:40	CGTF	1	1
1	49378	14N	537898	5496609	05/16/10	CS	22:15	BCFR	4	full chorus
1	49378	14N	537898	5496609	05/16/10	CS	22:15	BCFR	1	1
1	49378	14N	537898	5496609	05/16/10	CS	22:15	CGTF	2	3
1	49378	14N	537898	5496609	05/16/10	CS	22:15	CGTF	1	1
1	87	14N	577345	6145766	05/16/10	CS	22:22	BCFR	3	4
1	87	14N	577345	6145766	05/16/10	CS	22:22	WOFR	3	5
1	89	14N	575999	6146480	05/16/10	CS	22:30	BCFR	3	6
1	89	14N	575999	6146480	05/16/10	CS	22:30	WOFR	2	2
1	29672	14N	540561	5505424	05/16/10	CS	22:40	BCFR	4	full chorus
1	29672	14N	540561	5505424	05/16/10	CS	22:40	CGTF	2	3-4
1	18	14N	580154	6152024	05/16/10	CS	22:44	BCFR	4	full chorus
1	18	14N	580154	6152024	05/16/10	CS	22:44	WOFR	2	2
1	86	14N	580198	6156653	05/16/10	CS	22:55	BCFR	3	6
1	86	14N	580198	6156653	05/16/10	CS	22:55	WOFR	2	3
1	41176	14N	580310	6168354	05/16/10	CS	23:14	BCFR	4	full chorus
1	41176	14N	580310	6168354	05/16/10	CS	23:14	WOFR	3	7
1	85	14N	563133	6159085	05/16/10	CS	23:42	BCFR	4	full chorus
1	85	14N	563133	6159085	05/16/10	CS	23:42	WOFR	3	5
1	40884	14N	555161	6149797	05/16/10	CS	23:58	BCFR	4	full chorus
1	40884	14N	555161	6149797	05/16/10	CS	23:58	WOFR	3	6
1	40666	14N	540285	6126827	05/16/10	Recon		BCFR	4	full chorus
1	40719	14N	541319	6133447	05/16/10	Recon		BCFR	4	full chorus
1	40738	14N	542900	6135889	05/16/10	Recon		BCFR	4	full chorus
1	40884	14N	555157	6149800	05/16/10	Recon		BCFR	4	full chorus
1	41176	14N	580329	6168350	05/16/10	Recon		BCFR	4	full chorus
1	54118	14N	538572	6120931	05/16/10	Recon		BCFR	4	full chorus
1	61994	14N	544206	6137060	05/16/10	Recon		BCFR	4	full chorus
1	82	14N	546854	6140920	05/16/10	Recon		BCFR	2	2
1	83	14N	552009	6146137	05/16/10	Recon		BCFR	3	4
1	85	14N	563203	6159087	05/16/10	Recon		BCFR	3	4
1	86	14N	580200	6156650	05/16/10	Recon		BCFR	2	3
1	87	14N	577322	6145778	05/16/10	Recon		BCFR	3	5
1	89	14N	575978	6146524	05/16/10	Recon		BCFR	4	full chorus
1	56277	14N	577321	6145780	05/16/10	Recon		BCFR	4	full chorus

Table A4-2. Continued.

SURVEY PERIOD	SITE ID[1]	ZONE	EASTING	NORTHING	DATE	SURVEY TYPE[2]	START TIME	SPECIES[3]	CALL RANK[4]	# OF INDS
1	IO	14N	574517	6169607	05/16/10	IO		Mammal		
1	19				05/16/10	Recon- Not Done		N/A		
1	18	14N	580154	6152016	05/16/10	Recon		None	0	0
1	56277	14N	554010	6149101	05/16/10	Recon		None	0	0
1	40666	14N	540285	6126827	05/16/10	Recon		WOFR	1	1
1	41176	14N	580329	6168350	05/16/10	Recon		WOFR	1	1
1	54118	14N	538572	6120931	05/16/10	Recon		WOFR	2	2
1	56277	14N	577321	6145780	05/16/10	Recon		WOFR	2	3
1	82	14N	546854	6140920	05/16/10	Recon		WOFR	1	1
1	85	14N	563203	6159087	05/16/10	Recon		WOFR	2	2
1	86	14N	580200	6156650	05/16/10	Recon		WOFR	1	1
1	87	14N	577322	6145778	05/16/10	Recon		WOFR	1	1
1	56277	14N	554048	6149060	05/17/10	CS	0:14	BCFR	4	full chorus
1	56277	14N	554048	6149060	05/17/10	CS	0:14	WOFR	4	full chorus
1	56277	14N	554048	6149060	05/17/10	CS	0:14	WOFR	2	3
1	61994	14N	544200	6137104	05/17/10	CS	0:43	BCFR	4	full chorus
1	61994	14N	544200	6137104	05/17/10	CS	0:43	WOFR	2	2
1	40738	14N	542899	6135839	05/17/10	CS	1:00	BCFR	3	4
1	40738	14N	542899	6135839	05/17/10	CS	1:00	WOFR	1	1
1	40719	14N	541370	6133441	05/17/10	CS	1:10	BCFR	4	full chorus
1	40719	14N	541370	6133441	05/17/10	CS	1:10	BCFR	2	2
1	40719	14N	541370	6133441	05/17/10	CS	1:10	WOFR	2	2
1	40666	14N	540273	6126815	05/17/10	CS	1:22	BCFR	4	full chorus
1	40666	14N	540273	6126815	05/17/10	CS	1:22	WOFR	2	2
1	54118	14N	538530	6120935	05/17/10	CS	1:41	BCFR	4	full chorus
1	54118	14N	538530	6120935	05/17/10	CS	1:41	WOFR	2	2
1	105	14N	762187	6268115	05/17/10	Recon	17:45	BCFR	2	2-3
1	104	14N	760760	6268504	05/17/10	Recon	17:50	BCFR	3	4
1	119	14N	769320	6266936	05/17/10	CS (NE)	22:04	BCFR	4	full chorus
1	119	14N	769320	6266936	05/17/10	CS (NE)	22:04	WOFR	3	4
1	119	14N	769320	6266936	05/17/10	CS (NE)	22:04	WOFR	1	1
1	110	14N	769419	6267303	05/17/10	CS (NE)	22:16	BCFR	4	full chorus
1	110	14N	769419	6267303	05/17/10	CS (NE)	22:16	WOFR	2	2
1	110	14N	769419	6267303	05/17/10	CS (NE)	22:16	WOFR	1	1
1	110	14N	769419	6267303	05/17/10	CS (NE)	22:16	WOFR	2	2
1	122	14N	769249	6267424	05/17/10	CS (NE)	22:26	BCFR	2	2
1	122	14N	769249	6267424	05/17/10	CS (NE)	22:26	BCFR	4	full chorus
1	122	14N	769249	6267424	05/17/10	CS (NE)	22:26	WOFR	3	8
1	104	14N	760761	6268531	05/17/10	CS (NE)	22:45	BCFR	4	full chorus
1	104	14N	760761	6268531	05/17/10	CS (NE)	22:45	WOFR	2	2
1	105	14N	762174	6268087	05/17/10	CS (NE)	22:55	BCFR	4	full chorus
1	105	14N	762174	6268087	05/17/10	CS (NE)	22:55	BCFR	2	2
1	105	14N	762174	6268087	05/17/10	CS (NE)	22:55	WOFR	1	1
1	105	14N	762174	6268087	05/17/10	CS (NE)	22:55	WOFR	1	1

Table A4-2.   Continued.

SURVEY PERIOD	SITE ID[1]	ZONE	EASTING	NORTHING	DATE	SURVEY TYPE[2]	START TIME	SPECIES[3]	CALL RANK[4]	# OF INDS
1	106	14N	763677	6267959	05/17/10	CS (NE)	23:06	BCFR	2	3
1	106	14N	763677	6267959	05/17/10	CS (NE)	23:06	WOFR	2	2
1	107	14N	764441	6268067	05/17/10	CS (NE)	23:17	BCFR	4	full chorus
1	107	14N	764441	6268067	05/17/10	CS (NE)	23:17	WOFR	2	2
1	107	14N	764441	6268067	05/17/10	CS (NE)	23:17	WOFR	1	1
1	108	14N	766712	6267921	05/17/10	CS (NE)	23:29	BCFR	4	full chorus
1	108	14N	766712	6267921	05/17/10	CS (NE)	23:29	WOFR	4	full chorus
1	109	14N	768003	6267700	05/17/10	CS (NE)	23:40	BCFR	3	4
1	109	14N	768003	6267700	05/17/10	CS (NE)	23:40	WOFR	1	1
1	111	14N	770556	6267297	05/17/10	CS (NE)	23:52	WOFR	3	6
1	IO	14N	785678	6261368	05/17/10	IO		Aves		
1	112.5	14N	772337	6266965	05/17/10	Recon		BCFR	4	full chorus
1	112	14N	772240	6266974	05/17/10	Recon		BCFR	4	full chorus
1	114	14N	777201	6265549	05/17/10	Recon		BCFR	1	1
1	115	14N	783125	6262412	05/17/10	Recon		BCFR	4	full chorus
1	116	14N	784626	6262271	05/17/10	Recon		BCFR	3	4
1	119	14N	769340	6266933	05/17/10	Recon		BCFR	3	
1	106	14N	763673	6267925	05/17/10	Recon		None	0	0
1	108	14N	766710	6267909	05/17/10	Recon		None	0	0
1	109	14N	768008	6267714	05/17/10	Recon		None	0	0
1	110	14N	769417	6267297	05/17/10	Recon		None	0	0
1	111	14N	770551	6267321	05/17/10	Recon		None	0	0
1	113	14N	774808	6266758	05/17/10	Recon		None	0	0
1	121	14N	769353	6267407	05/17/10	Recon		None	0	0
1	107	14N	764436	6268085	05/17/10	Recon		WOFR	1	1
1	112.5	14N	772337	6266965	05/17/10	Recon		WOFR	2	2
1	112	14N	772240	6266974	05/17/10	Recon		WOFR	2	2
1	114	14N	777201	6265549	05/17/10	Recon		WOFR	1	1
1	115	14N	783125	6262412	05/17/10	Recon		WOFR	1	1
1	116	14N	784626	6262271	05/17/10	Recon		WOFR	1	1
1	122	14N	769255	6267418	05/17/10	Recon		WOFR	2	2
1	112	14N	772232	6266989	05/18/10	CS (NE)	0:02	BCFR	4	full chorus
1	112	14N	772232	6266989	05/18/10	CS (NE)	0:02	WOFR	3	8
1	113	14N	774810	6266738	05/18/10	CS (NE)	0:15	BCFR	4	full chorus
1	113	14N	774810	6266738	05/18/10	CS (NE)	0:15	WOFR	2	2
1	114	14N	777209	6265539	05/18/10	CS (NE)	0:25	BCFR	2	2
1	114	14N	777209	6265539	05/18/10	CS (NE)	0:25	WOFR	2	4
1	115	14N	783128	6262424	05/18/10	CS (NE)	0:39	BCFR	3	4-6
1	115	14N	783128	6262424	05/18/10	CS (NE)	0:39	BCFR	1	1
1	115	14N	783128	6262424	05/18/10	CS (NE)	0:39	WOFR	2	2
1	116	14N	784616	6262270	05/18/10	CS (NE)	0:49	BCFR	4	full chorus
1	116	14N	784616	6262270	05/18/10	CS (NE)	0:49	WOFR	2	3
1	117	14N	785431	6262155	05/18/10	CS (NE)	0:58	BCFR	3	4
1	117	14N	785431	6262155	05/18/10	CS (NE)	0:58	WOFR	2	3

Table A4-2. Continued.

SURVEY PERIOD	SITE ID[1]	ZONE	EASTING	NORTHING	DATE	SURVEY TYPE[2]	START TIME	SPECIES[3]	CALL RANK[4]	# OF INDS
1	117				05/18/10	Recon	12:15	BCFR	2	3
1	31835	14N	628426	6218242	05/18/10	CS	22:20	None	0	0
1	14510	14N	625343	6216239	05/18/10	CS	22:30	BCFR	3	5
1	143	14N	622208	6215705	05/18/10	CS	22:38	BCFR	4	full chorus
1	143	14N	622208	6215705	05/18/10	CS	22:38	WOFR	2	2
1	21	14N	621465	6215112	05/18/10	CS	22:48	BCFR	4	full chorus
1	21	14N	621465	6215112	05/18/10	CS	22:48	WOFR	3	4
1	20	14N	614731	6210787	05/18/10	CS	23:01	BCFR	2	2
1	20	14N	614731	6210787	05/18/10	CS	23:01	WOFR	1	1
1	145	14N	606824	6207978	05/18/10	CS	23:14	BCFR	4	full chorus
1	145	14N	606824	6207978	05/18/10	CS	23:14	WOFR	2	3
1	56466	14N	605752	6207790	05/18/10	CS	23:22	BCFR	4	full chorus
1	56466	14N	605752	6207790	05/18/10	CS	23:22	WOFR	3	4
1	56465	14N	604328	6207721	05/18/10	CS	23:31	BCFR	4	full chorus
1	56465	14N	604328	6207721	05/18/10	CS	23:31	WOFR	2	2
1	143	14N	622199	6215706	05/18/10	Recon		BCFR	4	full chorus
1	145	14N	606816	6207984	05/18/10	Recon		BCFR	4	full chorus
1	148	14N	570008	6187170	05/18/10	Recon		BCFR	2	2
1	149	14N	561708	6189060	05/18/10	Recon		BCFR	3	5
1	20	14N	614729	6210786	05/18/10	Recon		BCFR	1	1
1	21	14N	621489	6215113	05/18/10	Recon		BCFR	4	full chorus
1	21	14N	621365	6215079	05/18/10	Recon		BCFR	4	full chorus
1	56409	14N	559903	6190339	05/18/10	Recon		BCFR	2	3
1	56465	14N	604340	6207737	05/18/10	Recon		BCFR	3	6
1	27708				05/18/10	Recon- Not Done		N/A		
1	14510	14N	625363	6216258	05/18/10	Recon		None	0	0
1	150	14N	571807	6175944	05/18/10	Recon		None	0	0
1	31835	14N	628449	6218213	05/18/10	Recon		None	0	0
1	41328	14N	569082	6172157	05/18/10	Recon		None	0	0
1	41338	14N	568966	6172707	05/18/10	Recon		None	0	0
1	56466	14N	605735	6207835	05/18/10	Recon		None	0	0
1	143	14N	622199	6215706	05/18/10	Recon		WOFR	1	1
1	21	14N	621365	6215079	05/18/10	Recon		WOFR	1	1
1	56409	14N	559903	6190339	05/18/10	Recon		WOFR	1	1
1	148	14N	569976	6187155	05/19/10	CS	0:07	BCFR	3	4
1	148	14N	569976	6187155	05/19/10	CS	0:07	WOFR	2	2
1	149	14N	561693	6189061	05/19/10	CS	0:20	BCFR	4	full chorus
1	149	14N	561693	6189061	05/19/10	CS	0:20	WOFR	2	2
1	56409	14N	559849	6190267	05/19/10	CS	0:29	BCFR	4	full chorus
1	56409	14N	559849	6190267	05/19/10	CS	0:29	WOFR	3	4
1	41338	14N	568994	6172690	05/19/10	CS	1:00	BCFR	3	4
1	41338	14N	568994	6172690	05/19/10	CS	1:00	WOFR	3	3
1	41328	14N	569007	6172188	05/19/10	CS	1:15	BCFR	2	
1	59225	14N	362892	5851632	05/19/10	CS	23:25	None	0	0

Table A4-2. Continued.

SURVEY PERIOD	SITE ID[1]	ZONE	EASTING	NORTHING	DATE	SURVEY TYPE[2]	START TIME	SPECIES[3]	CALL RANK[4]	# OF INDS
1	46383	14N	364396	5852363	05/19/10	CS	23:59	BCFR	2	2
1	46383	14N	364396	5852363	05/19/10	CS	23:59	NLFR	2	2
1	46383	14N	364392	5852364	05/19/10	Recon		None	0	0
1	59225	14N	362895	5851550	05/19/10	Recon		None	0	0
1	51497	14N	361194	5858009	05/20/10	CS	0:22	BCFR	3	3
1	51497	14N	361194	5858009	05/20/10	CS	0:22	NLFR	2	2
1	51497	14N	361194	5858009	05/20/10	CS	0:22	WOFR	1	1
1	52460	14N	362523	5860030	05/20/10	CS	0:37	BCFR	3	6
1	52460	14N	362523	5860030	05/20/10	CS	0:37	NLFR	2	2
1	59771	14N	362037	5861335	05/20/10	CS	0:58	BCFR	2	2
1	59771	14N	362037	5861335	05/20/10	CS	0:58	NLFR	1	1
1	51782	14N	362371	5861505	05/20/10	CS	1:12	BCFR	2	2
1	52441	14N	363015	5862045	05/20/10	CS	1:27	BCFR	2	3
1	58878	14N	363981	5862356	05/20/10	CS	1:42	None	0	0
1	51788	14N	363964	5863848	05/20/10	CS	1:54	None	0	0
1	51790	14N	364088	5864761	05/20/10	CS	2:01	BCFR	1	1
1	51790	14N	364088	5864761	05/20/10	CS	2:01	WOFR	1	1
1	39715	14N	364152	5866010	05/20/10	CS	2:10	BCFR	1	1
1	39715	14N	364152	5866010	05/20/10	CS	2:10	WOFR	1	1
2	3	14N	678400	5532836	05/28/10	CS (SE)	21:50	GRTF	1	1
2	IO	14N	679858	5533728	05/28/10	IO	22:35	NLFR	Seen	1
2	9	14N	681444	5533795	05/28/10	CS (SE)	22:44	AMTO	1	1
2	9	14N	681444	5533795	05/28/10	CS (SE)	22:44	BCFR	3	4
2	9	14N	681444	5533795	05/28/10	CS (SE)	22:44	GRTF	3	8
2	10	14N	682871	5532195	05/28/10	CS (SE)	23:11	AMTO	2	2
2	10	14N	682871	5532195	05/28/10	CS (SE)	23:11	BCFR	3	6
2	10	14N	682871	5532195	05/28/10	CS (SE)	23:11	GRTF	3	5
2	10	14N	682871	5532195	05/28/10	CS (SE)	23:11	SPPE	1	1
2	8	14N	679635	5523841	05/28/10	CS (SE)	23:45	GRTF	2	2
2	8	14N	679635	5523841	05/28/10	CS (SE)	23:45	GRTF	1	1
2	8	14N	679139	5523834	05/28/10	CS (SE)	23:52	GRTF	2	2
2	2				05/28/10	CS- Not Done		N/A		
2	8	14N	678009	5523802	05/29/10	CS (SE)	0:00	BCFR	2	2
2	8	14N	678009	5523802	05/29/10	CS (SE)	0:00	GRTF	2	2
2	11	14N	674778	5521864	05/29/10	CS (SE)	0:14	BCFR	3	4
2	11	14N	674778	5521864	05/29/10	CS (SE)	0:14	GRTF	3	4
2	11	14N	674791	5521244	05/29/10	CS (SE)	0:20	GRTF	1	1
2	11	14N	674811	5520562	05/29/10	CS (SE)	0:28	AMTO	2	2
2	11	14N	674811	5520562	05/29/10	CS (SE)	0:28	BCFR	2	2
2	11	14N	674811	5520562	05/29/10	CS (SE)	0:28	CGTF	1	1
2	11	14N	674811	5520562	05/29/10	CS (SE)	0:28	GRTF	2	2
2	7	14N	665841	5533336	05/29/10	CS (SE)	0:59	AMTO	2	2
2	7	14N	665841	5533336	05/29/10	CS (SE)	0:59	BCFR	3	4
2	7	14N	665841	5533336	05/29/10	CS (SE)	0:59	GRTF	3	4
2	IO	14N	348842	5794476	06/04/10	IO	13:56	Mammal		
2	51795				06/04/10	Recon	16:32	WOFR	Seen	2
2	58881				06/04/10	Recon	16:50	BCFR	3	3
2	58881				06/04/10	Recon	16:50	WOFR	Seen	1
2	51976				06/04/10	Recon	17:28	BCFR	3	3

Table A4-2. Continued.

SURVEY PERIOD	SITE ID[1]	ZONE	EASTING	NORTHING	DATE	SURVEY TYPE[2]	START TIME	SPECIES[3]	CALL RANK[4]	# OF INDS
2	58852				06/04/10	Recon	18:15	BCFR	3	
2	58881	14N	365048	5871154	06/04/10	CS	22:42	BCFR	3	4
2	51792	14N	363532	5868932	06/04/10	CS	23:04	BCFR	2	2
2	49770	14N	386786	5770071	06/04/10	CS	23:06	BCFR	3	6
2	49770	14N	386786	5770071	06/04/10	CS	23:06	GRTF	4	full chorus
2	49770	14N	386786	5770071	06/04/10	CS	23:06	NLFR	1	1
2	49770	14N	386786	5770071	06/04/10	CS	23:06	WOFR	1	1
2	49775	14N	386187	5771089	06/04/10	CS	23:20	BCFR	3	4
2	49775	14N	386187	5771089	06/04/10	CS	23:20	GRTF	3	5
2	51795	14N	363356	5870380	06/04/10	CS	23:21	None	0	0
2	51517	14N	362896	5876790	06/04/10	CS	23:43	BCFR	3	5
2	51517	14N	362896	5876790	06/04/10	CS	23:43	BCFR	2	2
2	23533	14N	362259	5876859	06/04/10	CS	23:55	BCFR	3	3
2	23533	14N	362259	5876859	06/04/10	CS	23:55	BCFR	3	3
2	58849				06/04/10	Recon		AMTO		
2	IO	14N	387419	5767724	06/04/10	IO		Aves		
2	59594	14N	388783	5770431	06/04/10	CS		BCFR	2	3
2	49775				06/04/10	Recon		BCFR	3	4
2	58849				06/04/10	Recon		BCFR		
2	59594				06/04/10	Recon		BCFR	2	3
2	59594	14N	388783	5770431	06/04/10	CS		GRTF	2	3
2	IO	14N	388411	5768824	06/04/10	IO		GRTF	Seen	1
2	49770				06/04/10	Recon		GRTF	3	7
2	49775				06/04/10	Recon		GRTF	3	5
2	58849				06/04/10	Recon		GRTF		
2	59594				06/04/10	Recon		GRTF	2	3
2	58849	14N	367047	5798241	06/05/10	CS	0:04	BCFR	3	5
2	58849	14N	367047	5798241	06/05/10	CS	0:04	CATO	3	3
2	58849	14N	367047	5798241	06/05/10	CS	0:04	GRTF	1	1
2	51806	14N	360155	5879332	06/05/10	CS	0:12	BCFR	3	4
2	51806	14N	360155	5879332	06/05/10	CS	0:12	BCFR	2	2
2	51973	14N	358936	5881680	06/05/10	CS	0:26	BCFR	3	2
2	51973	14N	358936	5881680	06/05/10	CS	0:26	BCFR	3	3
2	58852	14N	370357	5801360	06/05/10	CS	0:26	BCFR	3	4
2	58852	14N	370357	5801360	06/05/10	CS	0:26	CATO	2	2
2	58852	14N	370357	5801360	06/05/10	CS	0:26	GRTF	2	2
2	51976	14N	358648	5882037	06/05/10	CS	0:36	BCFR	4	full chorus
2	51979	14N	358602	5883146	06/05/10	CS	0:48	BCFR	4	full chorus
2	51979	14N	358602	5883146	06/05/10	CS	0:48	BCFR	3	3
2	51533	14N	358644	5883719	06/05/10	CS	1:00	BCFR	4	full chorus
2	58882	14N	358659	5884854	06/05/10	CS	1:15	BCFR	1	1
2	58882	14N	358659	5884854	06/05/10	CS	1:15	BCFR	3	2
2	59780	14N	358648	5888177	06/05/10	CS	1:30	BCFR	4	full chorus
2	59780	14N	358648	5888177	06/05/10	CS	1:30	BCFR	2	2
2	46383				06/05/10	Recon	18:08	GRTF	3	4
2	28724				06/05/10	Recon	18:30	GRTF	3	4
2	28724				06/05/10	Recon	18:30	Treefrog spp	Seen	1
2	51497				06/05/10	Recon	18:58	GRTF	3	3
2	52460				06/05/10	Recon	19:11	BCFR	3	2

Table A4-2. Continued.

SURVEY PERIOD	SITE ID[1]	ZONE	EASTING	NORTHING	DATE	SURVEY TYPE[2]	START TIME	SPECIES[3]	CALL RANK[4]	# OF INDS
2	52460				06/05/10	Recon	19:11	GRTF	3	5
2	52460				06/05/10	Recon	19:11	NLFR	Seen	1
2	59771				06/05/10	Recon	19:32	GRTF	4	full chorus
2	59771				06/05/10	Recon	19:32	NLFR	Seen	1
2	51782				06/05/10	Recon	19:45	GRTF	3	3
2	52441				06/05/10	Recon	19:57	BCFR	3	3
2	52441				06/05/10	Recon	19:57	GRTF	3	4
2	58878				06/05/10	Recon	20:11	BCFR	1	1
2	58878				06/05/10	Recon	20:11	NLFR	Seen	1
2	59800				06/05/10	Recon	20:34	None	0	0
2	51788				06/05/10	Recon	20:54	GRTF	3	4
2	51790				06/05/10	Recon	20:59	GRTF	3	5
2	51790				06/05/10	Recon	20:59	GRTF	3	3
2	39715				06/05/10	Recon	21:05	GRTF	3	9
2	49378	14N	537898	5496611	06/05/10	CS	22:03	BCFR	2	2
2	49378	14N	537898	5496611	06/05/10	CS	22:03	CATO	2	2
2	49378	14N	537898	5496611	06/05/10	CS	22:03	CGTF	2	2
2	49378	14N	537898	5496611	06/05/10	CS	22:03	CGTF	2	2
2	49378	14N	537898	5496611	06/05/10	CS	22:03	NLFR	1	1
2	49379	14N	557036	5497371	06/05/10	CS	22:10	CGTF	4	full chorus
2	282	14N	553753	5497729	06/05/10	CS	22:27	BCFR	1	1
2	282	14N	553753	5497729	06/05/10	CS	22:27	BCFR	2	2
2	282	14N	553753	5497729	06/05/10	CS	22:27	CGTF	3	4
2	59225	14N	362762	5851463	06/05/10	CS	22:37	GRTF	2	3
2	46383	14N	364365	5852386	06/05/10	CS	23:10	BCFR	3	2
2	46383	14N	364365	5852386	06/05/10	CS	23:10	GRTF	3	5
2	62140	14N	542565	5496663	06/05/10	CS	23:27	BCFR	2	2
2	62140	14N	542565	5496663	06/05/10	CS	23:27	BCFR	3	3
2	62140	14N	542565	5496663	06/05/10	CS	23:27	CATO	3	3
2	62140	14N	542565	5496663	06/05/10	CS	23:27	CGTF	3	4
2	28724	14N	361592	5852417	06/05/10	CS	23:43	BCFR	3	3
2	28724	14N	361592	5852417	06/05/10	CS	23:43	GRTF	2	2
2	29672	14N	540544	5505435	06/05/10	CS	23:46	BCFR	2	2
2	29672	14N	540544	5505435	06/05/10	CS	23:46	CATO	3	3
2	29672	14N	540544	5505435	06/05/10	CS	23:46	CGTF	2	2
2	59494	14N	540513	5509097	06/05/10	CS	23:59	BCFR	3	3
2	59494	14N	540513	5509097	06/05/10	CS	23:59	CATO	2	2
2	59494	14N	540513	5509097	06/05/10	CS	23:59	CGTF	3	4
2	IO	14N	465772	5612824	06/05/10	IO		Aves		
2	49378				06/05/10	Recon		BCFR	2	2
2	49379				06/05/10	Recon		BCFR	1	1
2	59252				06/05/10	Recon		BCFR	2	2
2	59494				06/05/10	Recon		BCFR	1	1
2	62140	14N	542565	5496663	06/05/10	Recon		BCFR	2	2
2	49378				06/05/10	Recon		CGTF	2	2
2	282				06/05/10	Recon		None	0	0
2	29672				06/05/10	Recon		None	0	0
2	49393				06/05/10	Recon		None	0	0
2	59252				06/05/10	Recon		WOFR	1	1
2	51497	14N	361183	5858006	06/06/10	CS	0:05	BCFR	4	full chorus
2	51497	14N	361183	5858006	06/06/10	CS	0:05	GRTF	4	full chorus
2	59252	14N	536518	5499932	06/06/10	CS	0:17	BCFR	3	4

Table A4-2. Continued.

SURVEY PERIOD	SITE ID[1]	ZONE	EASTING	NORTHING	DATE	SURVEY TYPE[2]	START TIME	SPECIES[3]	CALL RANK[4]	# OF INDS
2	59252	14N	536518	5499932	06/06/10	CS	0:17	CATO	2	2
2	59252	14N	536518	5499932	06/06/10	CS	0:17	CGTF	3	4
2	52460	14N	362531	5860036	06/06/10	CS	0:26	BCFR	4	full chorus
2	52460	14N	362531	5860036	06/06/10	CS	0:26	BCFR	3	2-3
2	52460	14N	362531	5860036	06/06/10	CS	0:26	GRTF	3	3
2	49393	14N	525758	5511970	06/06/10	CS	0:44	None	0	0
2	59771	14N	362038	5861329	06/06/10	CS	0:51	BCFR	2	2
2	59771	14N	362038	5861329	06/06/10	CS	0:51	GRTF	3	2
2	51782	14N	362348	5861521	06/06/10	CS	1:06	BCFR	1	1
2	51782	14N	362348	5861521	06/06/10	CS	1:06	GRTF	1	1
2	52441	14N	363000	5862008	06/06/10	CS	1:23	BCFR	3	5
2	58878	14N	363993	5862364	06/06/10	CS	1:41	BCFR	3	3
2	58878	14N	363993	5862364	06/06/10	CS	1:41	WOFR	1	1
2	51788	14N	363964	5863857	06/06/10	CS	1:58	BCFR	2	3
2	51790	14N	364076	5864771	06/06/10	CS	2:07	BCFR	2	2
2	51790	14N	364076	5864771	06/06/10	CS	2:07	GRTF	1	1
2	39715	14N	364153	5866003	06/06/10	CS	2:18	BCFR	1	1
2	39715	14N	364153	5866003	06/06/10	CS	2:18	GRTF	1	1
2	8738				06/06/10	Recon	14:05	Unkn FR	Seen	1
2	8774				06/06/10	Recon	14:45	None	0	0
2	464281				06/06/10	Recon	15:08	None	0	0
2	51833				06/06/10	Recon	16:03	None	0	0
2	46468				06/06/10	Recon	16:13	None	0	0
2	52177				06/06/10	Recon	16:23	N/A		
2	30798				06/06/10	Recon	16:57	None	0	0
2	51987				06/06/10	Recon	17:16	None	0	0
2	51988				06/06/10	Recon	17:21	None	0	0
2	59519				06/06/10	Recon	18:26	None	0	0
2	61334	14N	519060	5568644	06/06/10	CS	22:26	CGTF	4	full chorus
2	61334	14N	519060	5568644	06/06/10	CS	22:26	None	0	0
2	51988	14N	391988	6003016	06/06/10	CS	22:35	BCFR	1	1
2	51987	14N	390051	6000468	06/06/10	CS	22:50	BCFR	1	1
2	62005	14N	520852	5581799	06/06/10	CS	22:51	BCFR	1	1
2	62005	14N	520852	5581799	06/06/10	CS	22:51	CGTF	4	full chorus
2	62005	14N	520852	5581799	06/06/10	CS	22:51	GRTF	1	1
2	62314	14N	518401	5581795	06/06/10	CS	23:01	BCFR	1	1
2	62314	14N	518401	5581795	06/06/10	CS	23:01	CGTF	4	full chorus
2	49440	14N	517481	5581799	06/06/10	CS	23:14	BCFR	2	2
2	49440	14N	517481	5581799	06/06/10	CS	23:14	CGTF	4	full chorus
2	30798	14N	380589	5989167	06/06/10	CS	23:16	BCFR	3	2
2	1833	14N	522643	5585605	06/06/10	CS	23:25	BCFR	1	1
2	1833	14N	522643	5585605	06/06/10	CS	23:25	CGTF	4	full chorus
2	1833	14N	522643	5585605	06/06/10	CS	23:25	GRTF	1	1
2	IO	14N	520088	5581798	06/06/10	IO	23:25	Mammal		
2	52177	14N	370686	5983226	06/06/10	CS	23:39	BCFR	3	2
2	59503	14N	521723	5590776	06/06/10	CS	23:39	BCFR	1	1
2	59503	14N	521723	5590776	06/06/10	CS	23:39	CGTF	4	full chorus
2	59503	14N	521723	5590776	06/06/10	CS	23:39	GRTF	2	2
2	46468	14N	372867	5979733	06/06/10	CS	23:53	BCFR	3	5
2	46468	14N	372867	5979733	06/06/10	CS	23:53	BCFR	1	1

Table A4-2. Continued.

SURVEY PERIOD	SITE ID[1]	ZONE	EASTING	NORTHING	DATE	SURVEY TYPE[2]	START TIME	SPECIES[3]	CALL RANK[4]	# OF INDS
2	62012	14N	517071	5594949	06/06/10	CS	23:58	BCFR	1	1
2	62012	14N	517071	5594949	06/06/10	CS	23:58	CGTF	4	full chorus
2	62012	14N	517071	5594949	06/06/10	CS	23:58	GRTF	1	1
2	59503				06/06/10	Recon		BCFR	1	1
2	61334				06/06/10	Recon		CGTF	1	1
2	62012				06/06/10	Recon		CGTF	1	1
2	49453				06/06/10	Recon		GRTF	2	2
2	59503				06/06/10	Recon		GRTF	3	3
2	59508				06/06/10	Recon		GRTF	2	2
2	59513				06/06/10	Recon		GRTF	2	2
2	62012				06/06/10	Recon		GRTF	3	4
2	61334				06/06/10	Recon		NLFR	1	1
2	1833				06/06/10	Recon		None	0	0
2	49440				06/06/10	Recon		None	0	0
2	62005				06/06/10	Recon		None	0	0
2	62314				06/06/10	Recon		None	0	0
2	51833	14N	368389	5982203	06/07/10	CS	0:11	BCFR	3	3
2	51833	14N	368389	5982203	06/07/10	CS	0:11	WOFR	1	1
2	49453	14N	512574	5598206	06/07/10	CS	0:16	BCFR	1	1
2	49453	14N	512574	5598206	06/07/10	CS	0:16	CGTF	4	full chorus
2	59508	14N	519520	5601704	06/07/10	CS	0:33	CGTF	3	4
2	59513	14N	518779	5604026	06/07/10	CS	0:44	CGTF	3	4
2	59513	14N	518779	5604026	06/07/10	CS	0:44	GRTF	1	1
2	59519	14N	518068	5604806	06/07/10	CS	0:56	BCFR	2	2
2	59519	14N	518068	5604806	06/07/10	CS	0:56	CGTF	3	4
2	59519	14N	518068	5604806	06/07/10	CS	0:56	GRTF	2	2
2	8774	14N	361233	5965107	06/07/10	CS	1:02	BCFR	4	full chorus
2	62312	14N	514043	5604786	06/07/10	CS	1:10	BCFR	1	1
2	62312	14N	514043	5604786	06/07/10	CS	1:10	CGTF	2	3
2	62312	14N	514043	5604786	06/07/10	CS	1:10	GRTF	2	2
2	46428	14N	364138	5969146	06/07/10	CS	1:31	BCFR	3	3
2	8738	14N	353619	5954519	06/07/10	CS	2:22	BCFR	4	full chorus
2	31				06/07/10	Recon	15:39	BCFR	2	2
2	61899				06/07/10	Recon	15:52	None	0	0
2	57				06/07/10	Recon	16:07	BCFR	3	3
2	53135	14N	505971	6061800	06/07/10	Recon	16:35	None	0	0
2	5				06/07/10	Recon	16:57	None	0	0
2	53178				06/07/10	Recon	17:11	None	0	0
2	1				06/07/10	Recon	17:25	None	0	0
2	2				06/07/10	Recon	17:31	None	0	0
2	23640				06/07/10	Recon	17:45	None	0	0
2	32				06/07/10	Recon	17:48	None	0	0
2	58				06/07/10	Recon	17:54	None	0	0
2	6				06/07/10	Recon	17:58	BCFR	1	1
2	6				06/07/10	Recon	17:58	WOFR	Seen	1
2	49584				06/07/10	Recon	18:00	GRTF	2	2
2	59543	14N	510329	5616256	06/07/10	CS	22:10	CGTF	1	1
2	59543	14N	510329	5616256	06/07/10	CS	22:10	GRTF	3	4
2	IO	14N	510728	5616268	06/07/10	IO	22:10	WOFR	Seen	1
2	IO	14N	510509	5616261	06/07/10	IO	22:10	WOFR	Seen	1
2	31	14N	473042	6049695	06/07/10	CS	22:45	BCFR	4	full chorus
2	31	14N	473042	6049695	06/07/10	CS	22:45	Unkn FR	Seen	1

Table A4-2. Continued.

SURVEY PERIOD	SITE ID[1]	ZONE	EASTING	NORTHING	DATE	SURVEY TYPE[2]	START TIME	SPECIES[3]	CALL RANK[4]	# OF INDS
2	31	14N	473042	6049695	06/07/10	CS	22:45	WOFR	Seen	1
2	59520	14N	509609	5604770	06/07/10	CS	22:57	BCFR	2	2
2	59520	14N	509609	5604770	06/07/10	CS	22:57	CGTF	2	2
2	59520	14N	509609	5604770	06/07/10	CS	22:57	GRTF	1	1
2	61899	14N	474390	6052061	06/07/10	CS	23:02	BCFR	3	5
2	57	14N	488774	6057852	06/07/10	CS	23:22	BCFR	4	full chorus
2	53135	14N	505964	6061815	06/07/10	CS	23:52	BCFR	2	2
2	IO	14N	510627	5616263	06/07/10	IO		BCFR	Seen	2
2	49485				06/07/10	Recon		BCFR	2	2
2	IO	14N	511771	5606102	06/07/10	IO		GRTF	3	4
2	49583				06/07/10	Recon		GRTF	1	1
2	58638				06/07/10	Recon		GRTF	1	1
2	59520				06/07/10	Recon		GRTF	3	3
2	59543				06/07/10	Recon		GRTF	2	2
2	59556				06/07/10	Recon		GRTF	2	2
2	62029				06/07/10	Recon		GRTF	3	3
2	62312				06/07/10	Recon		GRTF	1	1
2	IO	14N	511786	5605592	06/07/10	IO		Mammal		
2	59526				06/07/10	Recon- Not Done		N/A		
2	61295				06/07/10	Recon		None	0	0
2	IO	14N	510607	5616266	06/07/10	IO		Unkn FR	Seen	many
2	IO	14N	511771	5605884	06/07/10	IO		WOFR	Seen	5
2	IO	14N	510607	5616266	06/07/10	IO		WOFR	Seen	1
2	IO	14N	510627	5616263	06/07/10	IO		WOFR	Seen	6
2	61295				06/08/10	CS- Not Done	0:00	None	0	0
2	5	14N	510073	6068099	06/08/10	CS	0:12	BCFR	1	1
2	53178	14N	514197	6072175	06/08/10	CS	0:29	BCFR	2	2
2	59556				06/08/10	CS- Not Done	0:35	BCFR	1	1
2	59556				06/08/10	CS- Not Done	0:35	GRTF	1	1
2	1	14N	522767	6073875	06/08/10	CS	0:44	AM/CATO	1	1
2	1	14N	522767	6073875	06/08/10	CS	0:44	BCFR	1	1
2	1	14N	522767	6073875	06/08/10	CS	0:44	BCFR	3	3
2	2	14N	525411	6075201	06/08/10	CS	0:57	AM/CATO	1	1
2	2	14N	525411	6075201	06/08/10	CS	0:57	BCFR	3	6
2	23640	14N	513445	6073411	06/08/10	CS	1:24	BCFR	3	6
2	32	14N	513563	6073614	06/08/10	CS	1:35	BCFR	3	5
2	32	14N	513563	6073614	06/08/10	CS	1:35	WOFR	1	1
2	58	14N	514475	6075017	06/08/10	CS	1:52	BCFR	2	2
2	6	14N	515439	6077204	06/08/10	CS	2:03	BCFR	3	8
2	44651	14N	494489	5653985	06/08/10	Recon	21:00	GRTF	3	3
2	61295	14N	508536	5604768	06/08/10	CS	22:18	BCFR	2	2
2	61295	14N	508536	5604768	06/08/10	CS	22:18	CGTF	2	2
2	49485	14N	507234	5608035	06/08/10	CS	22:32	BCFR	2	2
2	49485	14N	507234	5608035	06/08/10	CS	22:32	CGTF	3	3
2	IO	14N	508477	5606080	06/08/10	IO	22:32	WOFR	Seen	1
2	IO	14N	513624	5604785	06/08/10	CS	22:51	Aves		
2	59520	14N	509620	5604766	06/08/10	CS	22:51	BCFR	2	2
2	59520	14N	509620	5604766	06/08/10	CS	22:51	CGTF	1	1
2	59520	14N	509620	5604766	06/08/10	CS	22:51	CGTF	1	1
2	59520	14N	509620	5604766	06/08/10	CS	22:51	GRTF	1	1
2	62029	14N	502981	5624966	06/08/10	CS	23:33	BCFR	2	2
2	62029	14N	502981	5624966	06/08/10	CS	23:33	CGTF	1	1
2	62029	14N	502981	5624966	06/08/10	CS	23:33	GRTF	2	2
2	IO	14N	506327	5627726	06/08/10	CS	23:47	Aves		

Table A4-2. Continued.

SURVEY PERIOD	SITE ID[1]	ZONE	EASTING	NORTHING	DATE	SURVEY TYPE[2]	START TIME	SPECIES[3]	CALL RANK[4]	# OF INDS
2	59556	14N	500929	5627721	06/08/10	CS	23:47	BCFR	2	2
2	59556	14N	500929	5627721	06/08/10	CS	23:47	GRTF	1	1
2	49617				06/08/10	Recon		GRTF	3	4
2	59561				06/08/10	Recon		GRTF	3	4
2	59562				06/08/10	Recon		GRTF	3	3
2	49584	14N	504086	5635929	06/09/10	CS	0:11	BCFR	2	2
2	49584	14N	504086	5635929	06/09/10	CS	0:11	GRTF	1	1
2	49583	14N	503087	5635928	06/09/10	CS	0:22	None	0	0
2	58638	14N	501867	5632031	06/09/10	CS	0:40	GRTF	1	1
2	40884				06/09/10	Recon	19:41	None	0	0
2	56277				06/09/10	Recon	19:50	BCFR	3	4
2	61994				06/09/10	Recon	20:10	None	0	0
2	40738				06/09/10	Recon	20:25	BCFR	1	1
2	40719				06/09/10	Recon	20:35	None	0	0
2	40666				06/09/10	Recon	20:44	BCFR	3	4
2	54118				06/09/10	Recon	21:01	None	0	0
2	4				06/09/10	Recon	21:27	None	0	0
2	3				06/09/10	Recon	21:36	None	0	0
2	52079				06/09/10	Recon	21:52	None	0	0
2	7				06/09/10	Recon	22:06	None	0	0
2	7	14N	515177	6078920	06/09/10	CS	22:37	BCFR	3	2
2	52079	14N	517965	6080906	06/09/10	CS	22:53	BCFR	3	2
2	3	14N	527402	6095718	06/09/10	CS	23:14	BCFR	1	1
2	4	14N	531244	6101017	06/09/10	CS	23:30	None	0	0
2	51850				06/09/10	Recon- Not Done		N/A		
2	54118	14N	538539	6120933	06/10/10	CS	0:00	BCFR	3	2
2	40666	14N	540277	6126835	06/10/10	CS	0:22	BCFR	3	6
2	40719	14N	541344	6133441	06/10/10	CS	0:38	BCFR	1	1
2	40719	14N	541344	6133441	06/10/10	CS	0:38	WOFR	1	1
2	40738	14N	542875	6135815	06/10/10	CS	0:48	BCFR	1	1
2	61994	14N	544196	6137107	06/10/10	CS	1:14	BCFR	2	2
2	56277	14N	554020	6149040	06/10/10	CS	1:38	BCFR	3	7-8
2	40884	14N	555168	6149815	06/10/10	CS	1:52	BCFR	2	3
2	8				06/10/10	Recon	19:30	None	0	0
2	59				06/10/10	Recon	19:41	None	0	0
2	60				06/10/10	Recon	19:56	None	0	0
2	61				06/10/10	Recon	20:01	None	0	0
2	40545				06/10/10	Recon	20:10	None	0	0
2	14				06/10/10	Recon	20:23	None	0	0
2	62				06/10/10	Recon	20:32	None	0	0
2	62	14N	554604	6124490	06/10/10	Recon	20:32	WOFR	Seen	2
2	15				06/10/10	Recon	20:46	None	0	0
2	63				06/10/10	Recon	20:53	BCFR	3	5
2	63	14N	558177	6128967	06/10/10	Recon	20:53	WOFR	Seen	2
2	63	14N	558107	6128877	06/10/10	CS	22:33	BCFR	4	full chorus
2	63	14N	558107	6128877	06/10/10	CS	22:33	BCFR	3	4
2	63	14N	558107	6128877	06/10/10	CS	22:33	BCFR	3	4-5
2	15	14N	557044	6127169	06/10/10	CS	22:48	BCFR	1	1
2	62	14N	554613	6124486	06/10/10	CS	23:02	BCFR	3	2
2	14	14N	551799	6121923	06/10/10	CS	23:19	BCFR	3	3
2	40545	14N	547593	6117404	06/10/10	CS	23:35	BCFR	1	1
2	61	14N	545726	6114313	06/10/10	CS	23:48	BCFR	1	1
2	60	14N	544375	6112931	06/11/10	CS	0:04	BCFR	1	1
2	59	14N	536578	6108014	06/11/10	CS	0:26	BCFR	3	5

Table A4-2. Continued.

SURVEY PERIOD	SITE ID[1]	ZONE	EASTING	NORTHING	DATE	SURVEY TYPE[2]	START TIME	SPECIES[3]	CALL RANK[4]	# OF INDS
2	8	14N	535391	6107362	06/11/10	CS	0:43	BCFR	3	5
2	40666	14N	540273	6126830	06/11/10	CS	1:16	BCFR	3	6-7
2	40719	14N	541354	6133442	06/11/10	CS	1:39	BCFR	2	2
2	41338				06/11/10	Recon	18:29	None	0	0
2	41328				06/11/10	Recon	18:46	None	0	0
2	85				06/11/10	Recon	19:07	None	0	0
2	41176				06/11/10	Recon	19:36	None	0	0
2	86				06/11/10	Recon	19:52	None	0	0
2	18				06/11/10	Recon	20:02	None	0	0
2	18	14N	541354	6133441	06/11/10	Recon	20:02	WOFR	Seen	4
2	89				06/11/10	Recon	20:16	None	0	0
2	87				06/11/10	Recon	20:22	BCFR	1	1
2	87	14N	577310	6145712	06/11/10	Recon	20:22	WOFR	Seen	1
2	87	14N	577341	6145777	06/11/10	CS	22:34	BCFR	2	2
2	87	14N	577341	6145777	06/11/10	CS	22:34	WOFR	1	1
2	89	14N	575975	6146524	06/11/10	CS	22:46	BCFR	3	4-5
2	18	14N	580153	6152013	06/11/10	CS	23:01	BCFR	2	2
2	86	14N	580203	6156654	06/11/10	CS	23:14	BCFR	3	3
2	41176	14N	580312	6168351	06/11/10	CS	23:36	BCFR	3	3-4
2	41176	14N	580312	6168351	06/11/10	CS	23:36	WOFR	1	1
2	41328	14N	569053	6172187	06/12/10	CS	0:07	None	0	0
2	41338	14N	569004	6172688	06/12/10	CS	0:26	BCFR	2	2
2	85	14N	563170	6159056	06/12/10	CS	0:53	BCFR	3	3
2	40884	14N	555155	6149785	06/12/10	CS	1:13	BCFR	3	2
2	56277	14N	554020	6149043	06/12/10	CS	1:27	BCFR	3	9-11
2	104				06/12/10	Recon	16:00	BCFR	2	2
2	104	14N	554004	6149029	06/12/10	Recon	16:00	WOFR	Seen	1
2	105				06/12/10	Recon	16:20	None	0	0
2	106				06/12/10	Recon	16:30	None	0	0
2	107	14N	764466	6267998	06/12/10	Recon	16:38	BCFR	1	1
2	107	14N	764466	6267998	06/12/10	Recon	16:38	WOFR	Seen	1
2	108				06/12/10	Recon	16:46	None	0	0
2	109				06/12/10	Recon	16:53	None	0	0
2	122				06/12/10	Recon	16:57	BCFR	3	3-4
2	110				06/12/10	Recon	17:02	None	0	0
2	110	14N	769428	6267320	06/12/10	Recon	17:02	WOFR	Seen	1
2	119				06/12/10	Recon	17:09	None	0	0
2	111				06/12/10	Recon	17:22	None	0	0
2	112				06/12/10	Recon	17:27	None	0	0
2	44651				06/12/10	Recon	17:30	None	0	0
2	113				06/12/10	Recon	17:30	None	0	0
2	114				06/12/10	Recon	17:40	None	0	0
2	115				06/12/10	Recon	17:49	None	0	0
2	116				06/12/10	Recon	17:59	BCFR	2	2
2	117				06/12/10	Recon	18:08	BCFR	3	2-3
2	117	14N	785411	6262156	06/12/10	Recon	18:08	Tadpole	Seen	1
2	IO	14N	493178	5642485	06/12/10	IO	19:40	GASN		
2	58638	14N	501859	5632109	06/12/10	CS	22:20	None	0	0
2	49583	14N	503064	5635933	06/12/10	CS	22:35	GRTF	2	2
2	104	14N	785481	6260610	06/12/10	CS (NE)	22:38	None	0	0
2	105	14N	762183	6268124	06/12/10	CS (NE)	22:51	BCFR	3	3
2	59561	14N	500642	5640738	06/12/10	CS	22:54	GRTF	2	3
2	59561	14N	500694	5640901	06/12/10	CS	23:02	GRTF	3	4
2	106	14N	763695	6267921	06/12/10	CS (NE)	23:04	BCFR	1	1
2	59562	14N	500228	5641184	06/12/10	CS	23:10	GRTF	3	3

Table A4-2. Continued.

SURVEY PERIOD	SITE ID[1]	ZONE	EASTING	NORTHING	DATE	SURVEY TYPE[2]	START TIME	SPECIES[3]	CALL RANK[4]	# OF INDS
2	107	14N	764436	6268073	06/12/10	CS (NE)	23:19	BCFR	4	full chorus
2	107	14N	764436	6268073	06/12/10	CS (NE)	23:19	BCFR	1	1
2	44582	14N	493178	5642485	06/12/10	CS	23:25	None	0	0
2	108	14N	766710	6267910	06/12/10	CS (NE)	23:32	BCFR	2	2-3
2	109	14N	768008	6267704	06/12/10	CS (NE)	23:44	BCFR	3	3
2	122	14N	769253	6267422	06/12/10	CS (NE)	23:54	BCFR	3	8-9
2	49617	14N	498607	5645784	06/12/10	CS	23:55	BCFR	1	1
2	49617	14N	498607	5645784	06/12/10	CS	23:55	GRTF	1	1
2	44582	14N	493178	5642485	06/12/10	Recon		None	0	0
2	58678				06/12/10	Recon		None	0	0
2	58686				06/12/10	Recon		None	0	0
2	61518				06/12/10	Recon		None	0	0
2	62152				06/12/10	Recon		None	0	0
2	110	14N	769422	6267307	06/13/10	CS (NE)	0:03	BCFR	4	full chorus
2	119	14N	769340	6266930	06/13/10	CS (NE)	0:16	BCFR	1	1
2	44651	14N	485769	5655620	06/13/10	CS	0:20	BCFR	1	1
2	111	14N	770560	6267311	06/13/10	CS (NE)	0:34	BCFR	3	3
2	58678	14N	493088	5657904	06/13/10	CS	0:43	None	0	0
2	112	14N	772245	6266980	06/13/10	CS (NE)	0:46	None	0	0
2	113	14N	774804	6266801	06/13/10	CS (NE)	0:58	None	0	0
2	58686	14N	491056	5665458	06/13/10	CS	1:10	None	0	0
2	58686	14N	491056	5665458	06/13/10	CS	1:10	None	0	0
2	114	14N	777195	6265545	06/13/10	CS (NE)	1:15	BCFR	1	1
2	61518	14N	489555	5666391	06/13/10	CS	1:22	None	0	0
2	115	14N	783120	6262411	06/13/10	CS (NE)	1:32	BCFR	2	2
2	116	14N	784623	6262268	06/13/10	CS (NE)	1:43	BCFR	3	3-4
2	117	14N	785427	6262211	06/13/10	CS (NE)	1:55	BCFR	3	5
2	117	14N	785427	6262211	06/13/10	CS (NE)	1:55	WOFR	1	1
2	31835				06/13/10	Recon	15:16	None	0	0
2	14510				06/13/10	Recon	15:23	None	0	0
2	143				06/13/10	Recon	15:33	None	0	0
2	21				06/13/10	Recon	15:40	None	0	0
2	20				06/13/10	Recon	15:53	None	0	0
2	20	14N	785766	6259280	06/13/10	Recon	15:53	WOFR	Seen	1
2	145				06/13/10	Recon	16:06	None	0	0
2	56466				06/13/10	Recon	16:11	None	0	0
2	56465				06/13/10	Recon	16:16	None	0	0
2	148				06/13/10	Recon	16:45	None	0	0
2	149				06/13/10	Recon	16:55	None	0	0
2	56409				06/13/10	Recon	17:04	None	0	0
2	61560				06/13/10	Recon	18:45	CGTF	3	4
2	52712	14N	441264	5709835	06/13/10	CS	22:25	BCFR	2	2
2	52712	14N	441264	5709835	06/13/10	CS	22:25	GRTF	4	full chorus
2	58957	14N	443541	5709794	06/13/10	CS	22:34	BCFR	2	2
2	58957	14N	443541	5709794	06/13/10	CS	22:34	GRTF	4	full chorus
2	34532	14N	442278	5712240	06/13/10	CS	22:46	BCFR	1	1
2	34532	14N	442278	5712240	06/13/10	CS	22:46	GRTF	4	full chorus
2	31835	14N	571637	6178165	06/13/10	CS	22:52	None	0	0
2	52915	14N	444600	5713029	06/13/10	CS	22:57	BCFR	3	3
2	52915	14N	444600	5713029	06/13/10	CS	22:57	GRTF	4	full chorus
2	14510	14N	625369	6216252	06/13/10	CS	23:04	None	0	0

Table A4-2. Continued.

SURVEY PERIOD	SITE ID[1]	ZONE	EASTING	NORTHING	DATE	SURVEY TYPE[2]	START TIME	SPECIES[3]	CALL RANK[4]	# OF INDS
2	51409	14N	444979	5712997	06/13/10	CS	23:05	BCFR	3	3
2	51409	14N	444979	5712997	06/13/10	CS	23:05	GRTF	3	5
2	61287	14N	446134	5712982	06/13/10	CS	23:15	BCFR	2	2
2	61287	14N	446134	5712982	06/13/10	CS	23:15	GRTF	4	full chorus
2	143	14N	622193	6215702	06/13/10	CS	23:16	BCFR	1	1
2	62304	14N	447101	5713000	06/13/10	CS	23:24	BCFR	2	2
2	62304	14N	447101	5713000	06/13/10	CS	23:24	GRTF	3	4
2	21	14N	621359	6215084	06/13/10	CS	23:28	BCFR	3	4-5
2	12915	14N	448527	5712995	06/13/10	CS	23:32	BCFR	1	1
2	12915	14N	448527	5712995	06/13/10	CS	23:32	GRTF	3	3
2	12915	14N	448527	5712995	06/13/10	CS	23:32	GRTF	3	3
2	20	14N	614726	6210780	06/13/10	CS	23:47	None	0	0
2	IO	14N	455260	5706937	06/13/10	IO		Aves		
2	12915				06/13/10	Recon		GRTF	3	3
2	34532				06/13/10	Recon		GRTF	3	4
2	51409				06/13/10	Recon		GRTF	3	3
2	52712				06/13/10	Recon		GRTF	4	full chorus
2	58957				06/13/10	Recon		GRTF	3	4
2	61287				06/13/10	Recon		GRTF	3	3
2	62304				06/13/10	Recon		GRTF	2	2
2	52915				06/13/10	Recon		None	0	0
2	145	14N	606821	6207976	06/14/10	CS	0:02	None	0	0
2	61560	14N	463313	5694073	06/14/10	CS	0:10	BCFR	3	3
2	61560	14N	463313	5694073	06/14/10	CS	0:10	GRTF	2	2
2	61560	14N	463313	5694073	06/14/10	CS	0:10	WOFR	1	1
2	56466	14N	605746	6207797	06/14/10	CS	0:14	None	0	0
2	56465	14N	604463	6207775	06/14/10	CS	0:25	BCFR	1	1
2	148	14N	570006	6187160	06/14/10	CS	1:00	None	0	0
2	62152	14N	486144	5680217	06/14/10	CS	1:11	GRTF	2	2
2	149	14N	561707	6189065	06/14/10	CS	1:15	BCFR	2	2
2	61518	14N	489555	5666373	06/14/10	CS	1:27	GRTF	1	1
2	56409	14N	559912	6190310	06/14/10	CS	1:29	BCFR	1	1
2	58686	14N	491040	5665456	06/14/10	CS	1:39	GRTF	1	1
2	58686	14N	491040	5665456	06/14/10	CS	1:39	WOFR	1	1
2	58678	14N	493090	5657903	06/14/10	CS	2:09	GRTF	1	1
2	44651	14N	485781	5655616	06/14/10	CS	2:30	BCFR	1	1
2	59574				06/14/10	Recon	19:15	BCFR	1	1
2	59574				06/14/10	Recon	19:15	GRTF	2	2
2	IO	14N	442360	5714227	06/14/10	IO	21:45	NLFR	Seen	1
2	52853	14N	440836	5716315	06/14/10	CS	22:37	BCFR	2	2
2	52853	14N	440836	5716315	06/14/10	CS	22:37	GRTF	4	full chorus
2	58936	14N	436349	5720601	06/14/10	CS	22:52	BCFR	1	1
2	58936	14N	436349	5720601	06/14/10	CS	22:52	GRTF	3	5
2	62305	14N	436800	5721415	06/14/10	CS	23:03	GRTF	3	5
2	58938	14N	438002	5721334	06/14/10	CS	23:18	BCFR	1	1
2	58938	14N	438002	5721334	06/14/10	CS	23:18	GRTF	3	4
2	58935	14N	435998	5719608	06/14/10	CS	23:31	GRTF	4	full chorus
2	58930	14N	434300	5714020	06/14/10	CS	23:47	GRTF	3	4
2	58938				06/14/10	Recon		BCFR	1	1
2	59826	14N	442357	5714150	06/14/10	CS		GRTF	3	4
2	52853				06/14/10	Recon		GRTF	4	full chorus
2	58529				06/14/10	Recon		GRTF	1	1

Table A4-2. Continued.

SURVEY PERIOD	SITE ID[1]	ZONE	EASTING	NORTHING	DATE	SURVEY TYPE[2]	START TIME	SPECIES[3]	CALL RANK[4]	# OF INDS
2	58930				06/14/10	Recon		GRTF	3	5
2	58935				06/14/10	Recon		GRTF	3	3
2	58936				06/14/10	Recon		GRTF	3	4
2	59575				06/14/10	Recon		GRTF	1	1
2	59826				06/14/10	Recon		GRTF	3	3
2	62210				06/14/10	Recon		GRTF	1	1
2	62305				06/14/10	Recon		GRTF	3	4
2	IO	14N	436367	5721212	06/14/10	IO		NLFR	Seen	1
2	62210	14N	435201	5719601	06/15/10	CS	0:04	GRTF	2	2
2	59575	14N	429840	5722924	06/15/10	CS	0:24	BCFR	2	2
2	59575	14N	429840	5722924	06/15/10	CS	0:24	BCFR	1	1
2	59575	14N	429840	5722924	06/15/10	CS	0:24	GRTF	2	2
2	59574	14N	427977	5722954	06/15/10	CS	0:44	BCFR	2	2
2	59574	14N	427977	5722954	06/15/10	CS	0:44	GRTF	3	5
2	58529	14N	433582	5719627	06/15/10	CS	1:07	BCFR	1	1
2	58529	14N	433582	5719627	06/15/10	CS	1:07	GRTF	3	3
2	59218				06/15/10	Recon	19:45	BCFR	1	1
2	58874	14N	371849	5819146	06/15/10	CS	22:37	GRTF	3	4
2	233	14N	371233	5819160	06/15/10	CS	22:52	GRTF	4	full chorus
2	51727	14N	370685	5819179	06/15/10	CS	23:04	GRTF	1	1
2	62212	14N	372191	5817886	06/15/10	CS	23:29	BCFR	1	1
2	62212	14N	372191	5817886	06/15/10	CS	23:29	GRTF	3	4
2	62211	14N	372939	5818562	06/15/10	CS	23:39	GRTF	2	3
2	IO	14N	369546	5817578	06/15/10	IO		Aves		
2	IO	14N	371679	5819153	06/15/10	IO		Aves		
2	233	14N	371233	5819160	06/15/10	Recon		GRTF	4	full chorus
2	51721				06/15/10	Recon		GRTF	3	3
2	52155				06/15/10	Recon		GRTF	2	2
2	58874				06/15/10	Recon		GRTF	3	3
2	62211				06/15/10	Recon		GRTF	3	3
2	62212				06/15/10	Recon		GRTF	2	2
2	59218				06/15/10	CS- Not Done		N/A		
2	62211				06/15/10	Recon		NLFR	1	1
2	51727				06/15/10	Recon		None	0	0
2	IO	14N	371710	5819149	06/15/10	IO		WOFR	Seen	1
2	52155	14N	370559	5815923	06/16/10	CS	0:02	BCFR	2	2
2	52155	14N	370559	5815923	06/16/10	CS	0:02	GRTF	2	2
2	51721	14N	369168	5815977	06/16/10	CS	0:15	BCFR	1	1
2	51721	14N	369168	5815977	06/16/10	CS	0:15	GRTF	2	2

[1]IO - Incidental observation
[2]CS – Call survey, SE – South electrode, NE – North electrode
[3]AMTO – American toad, BCFR – Boreal chorus frog, CATO – Canadian toad, CGTR – Cope's gray treefrog, GASN – Garter snake, GRTF – Grey treefrog, NLFR – Northern leopard frog, SPPE – Spring peeper, WOFR – Wood frog
[4]When several groups of the same species were heard, the highest ranking group was entered

Table A4-3. Incidental observations of TIAR species within the Bipole III Transmission Project Study Area, 2010.

ID	ZONE	EASTING	NORTHING	DATE	COMPANY[1]	SPECIES[2]	# OF INDS	COMMENTS
IO-CC-2010-001	14U	682901	5532194	05/12/10	CC	NLFR	1	Email received from Calyx Consulting May 21, 2010; heard; 3m error; photo taken; S electrode 10
IO-CC-2010-002	14U	682901	5532194	05/12/10	CC	BCFR	several	Email received from Calyx Consulting May 21, 2010; heard; 3m error; photo taken; S electrode 10
IO-CC-2010-003	14U	636267	5487314	05/13/10	CC	NLFR	1	Email received from Calyx Consulting May 21, 2010; seen; 3m error, photo take; FRI/LCC Type: Riparian; LK MB Plain; Priv land site 9
IO-CC-2010-004	14U	629700	5489448	05/13/10	CC	WOFR	1	Email received from Calyx Consulting May 21, 2010; seen; m error; photo taken; FRI/LCC Type: Oak, Riparian; LK MB Plain Ecoregion; Priv land site 11
IO-CC-2010-005	14U	629700	5489448	05/13/10	CC	BCFR	several	Email received from Calyx Consulting May 21, 2010; heard; 3m error; photo taken; FRI/LCC Type: Oak, Riparian; LK MB Plain Ecoregion; Priv land site 11
IO-CDC-9999-001				01/01/71	CDC	GASN_Hibern		CDC BP3 data sharing agreement 2009
IO-CDC-9999-002				01/01/01	CDC	GASN_Hibern		CDC BP3 data sharing agreement 2009
IO-CDC-9999-003				10/07/72	CDC	GASN_Hibern		CDC BP3 data sharing agreement 2009
IO-CDC-9999-004				01/01/71	CDC	GASN_Hibern		CDC BP3 data sharing agreement 2009
IO-CDC-9999-005				01/01/72	CDC	GASN_Hibern		CDC BP3 data sharing agreement 2009
IO-CDC-9999-006				05/05/72	CDC	GASN_Hibern		CDC BP3 data sharing agreement 2009
IO-CDC-9999-007				09/17/72	CDC	GASN_Hibern		CDC BP3 data sharing agreement 2009
IO-CDC-9999-008				10/07/71	CDC	GASN_Hibern		CDC BP3 data sharing agreement 2009
IO-CDC-9999-009				07/21/71	CDC	GASN_Hibern		CDC BP3 data sharing agreement 2009
IO-CDC-9999-010				01/01/73	CDC	GASN_Hibern		CDC BP3 data sharing agreement 2009
IO-CDC-9999-011				05/03/72	CDC	GASN_Hibern		CDC BP3 data sharing agreement 2009
IO-CDC-9999-012				10/07/72	CDC	GASN_Hibern		CDC BP3 data sharing agreement 2009
IO-CDC-9999-013				01/01/00	CDC	GASN_Hibern		CDC BP3 data sharing agreement 2009

Table A4-3. Continued.

ID	ZONE	EASTING	NORTHING	DATE	COMPANY[1]	SPECIES[2]	# OF INDS	COMMENTS
IO-CDC-9999-014				09/01/70	CDC	GASN_Hibern		CDC BP3 data sharing agreement 2009
IO-CDC-9999-015				06/01/95	CDC	GASN_Hibern		CDC BP3 data sharing agreement 2009
IO-CDC-9999-016				01/01/73	CDC	GASN_Hibern		CDC BP3 data sharing agreement 2009
IO-CDC-9999-017				01/01/89	CDC	GASN_Hibern		CDC BP3 data sharing agreement 2009
IO-CDC-9999-018				01/01/69	CDC	GASN_Hibern		CDC BP3 data sharing agreement 2009
IO-CDC-9999-019-020				04/18/05	CDC	GASN_Hibern		CDC BP3 data sharing agreement 2009
IO-CDC-9999-021				01/01/41	CDC	GASN_Hibern		CDC BP3 data sharing agreement 2009
IO-CDC-9999-022				07/29/08	CDC	GASN_Hibern		CDC BP3 data sharing agreement 2009
IO-CDC-9999-023				07/15/27	CDC	MOTH		CDC BP3 data sharing agreement 2009
IO-CDC-9999-024				07/29/04	CDC	MOTH		CDC BP3 data sharing agreement 2009
IO-CDC-9999-025				08/17/31	CDC	DDMO		CDC BP3 data sharing agreement 2009
IO-CDC-9999-026				07/29/04	CDC	DDMO		CDC BP3 data sharing agreement 2009
IO-CDC-9999-027				07/30/19	CDC	DDMO		CDC BP3 data sharing agreement 2009
IO-CDC-9999-028				06/24/91	CDC	DASK		CDC BP3 data sharing agreement 2009
IO-CDC-9999-029				07/18/50	CDC	DASK		CDC BP3 data sharing agreement 2009
IO-CDC-9999-030				07/12/02	CDC	DASK		CDC BP3 data sharing agreement 2009
IO-CDC-9999-031				07/13/02	CDC	DASK		CDC BP3 data sharing agreement 2009
IO-CDC-9999-032				07/16/07	CDC	WFMO		CDC BP3 data sharing agreement 2009
IO-CDC-9999-034				05/27/03	CDC	VEG		CDC BP3 data sharing agreement 2009

Table A4-3. Continued.

ID	ZONE	EASTING	NORTHING	DATE	COMPANY[1]	SPECIES[2]	# OF INDS	COMMENTS
IO-CDC-9999-040				06/13/05	CDC	VEG		CDC BP3 data sharing agreement 2009
IO-CDC-9999-041				06/13/05	CDC	VEG		CDC BP3 data sharing agreement 2009
IO-CDC-9999-042				06/10/75	CDC	SNTU		CDC BP3 data sharing agreement 2009
IO-CDC-9999-043				08/10/00	CDC	SNTU		CDC BP3 data sharing agreement 2009
IO-CDC-9999-044				06/01/02	CDC	SNTU		CDC BP3 data sharing agreement 2009
IO-CDC-9999-045				06/10/07	CDC	SNTU		CDC BP3 data sharing agreement 2009
IO-CDC-9999-046				09/01/92	CDC	SNTU		CDC BP3 data sharing agreement 2009
IO-CDC-9999-047-050				06/10/05	CDC	PRSK		CDC BP3 data sharing agreement 2009
IO-CDC-9999-051				08/02/07	CDC	PRSK		CDC BP3 data sharing agreement 2009
IO-CDC-9999-052				07/30/07	CDC	PRSK		CDC BP3 data sharing agreement 2009
IO-CDC-9999-053				06/23/05	CDC	PRSK		CDC BP3 data sharing agreement 2009
IO-CDC-9999-054				09/20/07	CDC	PRSK		CDC BP3 data sharing agreement 2009
IO-CDC-9999-055				06/10/05	CDC	PRSK		CDC BP3 data sharing agreement 2009
IO-CDC-9999-056-057				08/04/07	CDC	PRSK		CDC BP3 data sharing agreement 2009
IO-CDC-9999-058				06/10/05	CDC	PRSK		CDC BP3 data sharing agreement 2009
IO-CDC-9999-059				06/05/04	CDC	PRSK		CDC BP3 data sharing agreement 2009
IO-CDC-9999-060				06/10/05	CDC	PRSK		CDC BP3 data sharing agreement 2009
IO-CDC-9999-061				06/24/05	CDC	PRSK		CDC BP3 data sharing agreement 2009
IO-CDC-9999-062				08/24/08	CDC	PRSK		CDC BP3 data sharing agreement 2009
IO-CDC-9999-063				09/02/03	CDC	PRSK		CDC BP3 data sharing agreement 2009

Table A4-3. Continued.

ID	ZONE	EASTING	NORTHING	DATE	COMPANY[1]	SPECIES[2]	# OF INDS	COMMENTS
IO-CDC-9999-064				06/10/05	CDC	PRSK		CDC BP3 data sharing agreement 2009
IO-CDC-9999-065				07/28/07	CDC	PRSK		CDC BP3 data sharing agreement 2009
IO-CDC-9999-066				06/25/05	CDC	PRSK		CDC BP3 data sharing agreement 2009
IO-CDC-9999-067				07/28/01	CDC	PRSK		CDC BP3 data sharing agreement 2009
IO-CDC-9999-068				06/16/07	CDC	PRSK		CDC BP3 data sharing agreement 2009
IO-CDC-9999-069				07/25/01	CDC	PRSK		CDC BP3 data sharing agreement 2009
IO-CDC-9999-070				06/10/05	CDC	PRSK		CDC BP3 data sharing agreement 2009
IO-CDC-9999-071				05/15/05	CDC	PRSK		CDC BP3 data sharing agreement 2009
IO-CDC-9999-072				07/03/07	CDC	PRSK		CDC BP3 data sharing agreement 2009
IO-CDC-9999-073				05/10/07	CDC	PRSK		CDC BP3 data sharing agreement 2009
IO-CDC-9999-074				08/30/07	CDC	PRSK		CDC BP3 data sharing agreement 2009
IO-CDC-9999-075				numerous	CDC	PRSK		CDC BP3 data sharing agreement 2009
IO-CDC-9999-076				various	CDC	PRSK		CDC BP3 data sharing agreement 2009
IO-CDC-9999-077				08/03/07	CDC	PRSK		CDC BP3 data sharing agreement 2009
IO-CDC-9999-078				various	CDC	PRSK		CDC BP3 data sharing agreement 2009
IO-CDC-9999-079				07/30/07	CDC	PRSK		CDC BP3 data sharing agreement 2009
IO-CDC-9999-080				07/29/07	CDC	PRSK		CDC BP3 data sharing agreement 2009
IO-CDC-9999-081				06/09/07	CDC	PRSK		CDC BP3 data sharing agreement 2009
IO-CDC-9999-082				07/29/07	CDC	PRSK		CDC BP3 data sharing agreement 2009
IO-CDC-9999-083				09/25/07	CDC	HNSN		CDC BP3 data sharing agreement 2009
IO-CDC-9999-084				09/13/07	CDC	HNSN		CDC BP3 data sharing agreement 2009
IO-CDC-9999-085				09/04/07	CDC	HNSN		CDC BP3 data sharing agreement 2009
IO-CDC-9999-086				07/12/07	CDC	HNSN		CDC BP3 data sharing agreement 2009

Table A4-3. Continued.

ID	ZONE	EASTING	NORTHING	DATE	COMPANY[1]	SPECIES[2]	# OF INDS	COMMENTS
IO-CDC-9999-087				06/23/98	CDC	SGSN		CDC BP3 data sharing agreement 2009
IO-CDC-9999-088				06/05/04	CDC	SGSN		CDC BP3 data sharing agreement 2009
IO-CDC-9999-089				08/01/02	CDC	NLFR		CDC BP3 data sharing agreement 2009
IO-CDC-9999-090-091				07/31/02	CDC	NLFR		CDC BP3 data sharing agreement 2009.
IO-CDC-9999-092				08/02/02	CDC	NLFR		CDC BP3 data sharing agreement 2009
IO-CDC-9999-093				07/30/02	CDC	NLFR		CDC BP3 data sharing agreement 2009
IO-CDC-9999-094				06/23/98	CDC	RBSN		CDC BP3 data sharing agreement 2009
IO-CDC-9999-095				07/27/08	CDC	PGASN		CDC BP3 data sharing agreement 2009
IO-CDC-9999-096				04/04/72	CDC	RGASN		CDC BP3 data sharing agreement 2009
IO-WRCS-0206_001				05/09/02	WRCS	GASN_Hibern	2000	From CDC
IO-WRCS-0206_002-027				2002-2006	WRCS	GASN_Hibern	0-400	From CDC
IO-WRCS-0206_028-049				2002-2006	WRCS	GASN_Hibern	0-600	From CDC
IO-WRCS-0206_050-081				2002-2006	WRCS	GASN_Hibern	0-300	From CDC
IO-WRCS-0206_082-101				2002-2006	WRCS	GASN_Hibern	0-50	From CDC
IO-WRCS-0206_102-129				2002-2006	WRCS	GASN_Hibern	0-500	From CDC
IO-WRCS-0206_130-148				2002-2006	WRCS	GASN_Hibern	0-150	From CDC
IO-WRCS-0206_149-170				2002-2006	WRCS	GASN_Hibern	0-100	From CDC
IO-WRCS-2009-001	14 N	317115	6075025	06/17/09	WRCS	BCFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-002	14 N	317379	6079351	06/17/09	WRCS	BCFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-003	14 N	318169	5959129	06/16/09	WRCS	BCFR	8	WRCS incidental observations from point counts
IO-WRCS-2009-004	14 N	318193	6077688	06/17/09	WRCS	BCFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-005	14 N	320005	5856729	06/07/09	WRCS	BCFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-006	14 N	323741	5801757	06/05/09	WRCS	BCFR	3	WRCS incidental observations from point counts
IO-WRCS-2009-007	14 N	323804	5738521	06/05/09	WRCS	BCFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-008	14 N	324498	5800831	06/05/09	WRCS	BCFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-009	14 N	324651	5956402	06/15/09	WRCS	BCFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-010	14 N	325212	5741115	06/05/09	WRCS	BCFR	3	WRCS incidental observations from point counts
IO-WRCS-2009-011	14 N	328326	5799636	06/05/09	WRCS	BCFR	4	WRCS incidental observations from point counts
IO-WRCS-2009-012	14 N	329318	5796753	06/05/09	WRCS	BCFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-013	14 N	329757	6040074	06/14/09	WRCS	BCFR	8	WRCS incidental observations from point counts
IO-WRCS-2009-014	14 N	330342	5715967	06/12/09	WRCS	BCFR	3	WRCS incidental observations from point counts
IO-WRCS-2009-015	14 N	336100	5940463	06/14/09	WRCS	BCFR	1	WRCS incidental observations from point counts

Table A4-3. Continued.

ID	ZONE	EASTING	NORTHING	DATE	COMPANY[1]	SPECIES[2]	# OF INDS	COMMENTS
IO-WRCS-2009-016	14 N	340916	5945272	06/15/09	WRCS	BCFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-017	14 N	341934	6046928	06/14/09	WRCS	BCFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-018	14 N	344693	5791812	06/05/09	WRCS	CATO	1	WRCS incidental observations from point counts
IO-WRCS-2009-019	14 N	345076	6026382	06/14/09	WRCS	BCFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-020	14 N	345518	6009155	06/16/09	WRCS	BCFR	3	WRCS incidental observations from point counts
IO-WRCS-2009-021	14 N	345527	5946340	06/15/09	WRCS	BCFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-022	14 N	345778	6014000	06/14/09	WRCS	BCFR	3	WRCS incidental observations from point counts
IO-WRCS-2009-023	14 N	346363	6012495	06/16/09	WRCS	BCFR	4	WRCS incidental observations from point counts
IO-WRCS-2009-024	14 N	348997	5975305	06/16/09	WRCS	BCFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-025	14 N	349015	5975330	06/17/09	WRCS	BCFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-026	14 N	349912	5960128	06/23/09	WRCS	BCFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-027	14 N	349943	5982355	06/16/09	WRCS	BCFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-028	14 N	350151	5821507	06/10/09	WRCS	BCFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-029	14 N	350197	5820594	06/10/09	WRCS	BCFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-030	14 N	350405	5917516	06/14/09	WRCS	BCFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-031	14 N	352421	5916858	06/14/09	WRCS	BCFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-032	14 N	352566	5970444	06/17/09	WRCS	BCFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-033	14 N	354483	5805216	06/10/09	WRCS	BCFR	3	WRCS incidental observations from point counts
IO-WRCS-2009-035	14 N	354935	5968243	06/17/09	WRCS	BCFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-036	14 N	355972	5915009	06/14/09	WRCS	BCFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-037	14 N	356262	5914914	06/13/09	WRCS	BCFR	5	WRCS incidental observations from point counts
IO-WRCS-2009-038	14 N	359894	5914544	06/13/09	WRCS	BCFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-039	14 N	361219	5914003	06/13/09	WRCS	BCFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-040	14 N	361375	5877413	06/23/09	WRCS	BCFR	8	WRCS incidental observations from point counts
IO-WRCS-2009-041	14 N	361784	5858127	06/08/09	WRCS	BCFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-042	14 N	362325	5903727	06/23/09	WRCS	BCFR	3	WRCS incidental observations from point counts
IO-WRCS-2009-043	14 N	362374	5851183	06/08/09	WRCS	BCFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-044	14 N	362430	5912711	06/13/09	WRCS	BCFR	3	WRCS incidental observations from point counts
IO-WRCS-2009-045	14 N	362922	5911784	06/13/09	WRCS	BCFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-046	14 N	363342	5819386	06/09/09	WRCS	NLFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-047	14 N	363742	5910581	06/13/09	WRCS	BCFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-048	14 N	363934	5913008	06/14/09	WRCS	BCFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-049	14 N	364119	5907373	06/23/09	WRCS	BCFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-050	14 N	364351	5908820	06/23/09	WRCS	BCFR	3	WRCS incidental observations from point counts
IO-WRCS-2009-051	14 N	365960	5874651	06/23/09	WRCS	BCFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-052	14 N	367491	5660775	06/12/09	WRCS	BCFR	3	WRCS incidental observations from point counts
IO-WRCS-2009-053	14 N	367981	5820099	06/05/09	WRCS	BCFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-054	14 N	368036	5821512	06/05/09	WRCS	BCFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-055	14 N	368070	5821141	06/05/09	WRCS	BCFR	2	WRCS incidental observations from point counts

Table A4-3. Continued.

ID	ZONE	EASTING	NORTHING	DATE	COMPANY[1]	SPECIES[2]	# OF INDS	COMMENTS
IO-WRCS-2009-056	14 N	370337	5679834	06/12/09	WRCS	BCFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-057	14 N	371470	5817529	06/05/09	WRCS	BCFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-058	14 N	371866	5679092	05/27/09	WRCS	BCFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-059	14 N	375144	5975340	06/25/09	WRCS	BCFR	3	WRCS incidental observations from point counts
IO-WRCS-2009-060	14 N	376273	5970182	06/25/09	WRCS	BCFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-061	14 N	380300	5676637	05/27/09	WRCS	BCFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-062	14 N	383058	5766274	06/06/09	WRCS	AMTO	1	WRCS incidental observations from point counts
IO-WRCS-2009-063	14 N	384284	5688136	05/28/09	WRCS	BCFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-064	14 N	384639	5958794	06/25/09	WRCS	BCFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-065	14 N	389102	5732584	06/12/09	WRCS	BCFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-066	14 N	395169	5733081	06/12/09	WRCS	BCFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-067	14 N	398243	5617209	06/10/09	WRCS	BCFR	3	WRCS incidental observations from point counts
IO-WRCS-2009-068	14 N	401749	5739827	06/12/09	WRCS	BCFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-069	14 N	402052	5957138	06/25/09	WRCS	BCFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-070	14 N	406974	5664612	05/27/09	WRCS	BCFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-071	14 N	408211	5952531	06/15/09	WRCS	BCFR	3	WRCS incidental observations from point counts
IO-WRCS-2009-072	14 N	408860	5599428	06/11/09	WRCS	BCFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-073	14 N	414158	5739558	06/12/09	WRCS	BCFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-074	14 N	417255	5970935	06/15/09	WRCS	BCFR	4	WRCS incidental observations from point counts
IO-WRCS-2009-075	14 N	419648	5613620	06/11/09	WRCS	BCFR	3	WRCS incidental observations from point counts
IO-WRCS-2009-076	14 N	423641	5615228	06/11/09	WRCS	BCFR	3	WRCS incidental observations from point counts
IO-WRCS-2009-077	14 N	424746	5615658	06/11/09	WRCS	BCFR	3	WRCS incidental observations from point counts
IO-WRCS-2009-078	14 N	428207	5551678	05/24/09	WRCS	BCFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-079	14 N	428334	5608675	06/10/09	WRCS	BCFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-080	14 N	430534	5560911	06/04/09	WRCS	AMTO	1	WRCS incidental observations from point counts
IO-WRCS-2009-081	14 N	434398	5552666	05/24/09	WRCS	BCFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-082	14 N	438799	5546074	05/24/09	WRCS	NLFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-083	14 N	438799	5546074	05/24/09	WRCS	BCFR	4	WRCS incidental observations from point counts
IO-WRCS-2009-084	14 N	439668	5557011	05/24/09	WRCS	BCFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-085	14 N	439687	5555333	05/24/09	WRCS	BCFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-086	14 N	439780	5564871	05/24/09	WRCS	BCFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-087	14 N	439780	5561179	05/24/09	WRCS	BCFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-088	14 N	443566	5570037	05/24/09	WRCS	BCFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-089	14 N	444724	5706587	06/08/09	WRCS	AMTO	1	WRCS incidental observations from point counts
IO-WRCS-2009-090	14 N	446251	5552181	05/24/09	WRCS	BCFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-091	14 N	447836	5547901	05/24/09	WRCS	BCFR	4	WRCS incidental observations from point counts
IO-WRCS-2009-092	14 N	458570	5716119	06/23/09	WRCS	BCFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-093	14 N	470561	5709565	06/22/09	WRCS	BCFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-094	14 N	483222	5611368	05/25/09	WRCS	BCFR	2	WRCS incidental observations from point counts

Table A4-3. Continued.

ID	ZONE	EASTING	NORTHING	DATE	COMPANY[1]	SPECIES[2]	# OF INDS	COMMENTS
IO-WRCS-2009-095	14 N	485446	5609226	05/25/09	WRCS	BCFR	3	WRCS incidental observations from point counts
IO-WRCS-2009-096	14 N	488322	5594911	05/25/09	WRCS	BCFR	3	WRCS incidental observations from point counts
IO-WRCS-2009-097	14 N	492042	5690462	06/22/09	WRCS	BCFR	4	WRCS incidental observations from point counts
IO-WRCS-2009-098	14 N	493044	5594902	05/25/09	WRCS	BCFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-099	14 N	521434	5578517	05/25/09	WRCS	BCFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-100	14 N	521447	5581810	05/25/09	WRCS	BCFR	4	WRCS incidental observations from point counts
IO-WRCS-2009-101	14 N	524468	5578526	05/25/09	WRCS	BCFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-102	14 N	537228	5504919	05/22/09	WRCS	BCFR	4	WRCS incidental observations from point counts
IO-WRCS-2009-103	14 N	537320	5500194	05/22/09	WRCS	NLFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-104	14 N	537320	5500194	05/22/09	WRCS	BCFR	4	WRCS incidental observations from point counts
IO-WRCS-2009-105	14 N	537320	5500194	05/22/09	WRCS	WOFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-106	14 N	537362	5497539	06/22/09	WRCS	BCFR	4	WRCS incidental observations from point counts
IO-WRCS-2009-107	14 N	537897	5501552	05/22/09	WRCS	NLFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-108	14 N	537897	5501552	05/22/09	WRCS	BCFR	3	WRCS incidental observations from point counts
IO-WRCS-2009-109	14 N	537897	5501552	05/22/09	WRCS	WOFR	3	WRCS incidental observations from point counts
IO-WRCS-2009-110	14 N	540612	5497522	05/22/09	WRCS	AM/CATO	4	WRCS incidental observations from point counts
IO-WRCS-2009-111	14 N	540612	5497522	05/22/09	WRCS	BCFR	4	WRCS incidental observations from point counts
IO-WRCS-2009-112	14 N	540612	5497522	05/22/09	WRCS	WOFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-113	14 N	540631	5495751	05/21/09	WRCS	AM/CATO	4	WRCS incidental observations from point counts
IO-WRCS-2009-114	14 N	540631	5495751	05/21/09	WRCS	BCFR	4	WRCS incidental observations from point counts
IO-WRCS-2009-115	14 N	540631	5495751	05/21/09	WRCS	WOFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-116	14 N	542188	5506819	05/22/09	WRCS	BCFR	4	WRCS incidental observations from point counts
IO-WRCS-2009-117	14 N	542188	5506819	05/22/09	WRCS	WOFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-118	14 N	542618	5506478	05/22/09	WRCS	BCFR	4	WRCS incidental observations from point counts
IO-WRCS-2009-119	14 N	542618	5506478	05/22/09	WRCS	WOFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-120	14 N	542646	5496647	05/21/09	WRCS	AM/CATO	3	WRCS incidental observations from point counts
IO-WRCS-2009-121	14 N	542646	5496647	05/21/09	WRCS	BCFR	4	WRCS incidental observations from point counts
IO-WRCS-2009-122	14 N	544506	5501605	05/22/09	WRCS	BCFR	4	WRCS incidental observations from point counts
IO-WRCS-2009-123	14 N	547016	5510136	05/22/09	WRCS	BCFR	4	WRCS incidental observations from point counts
IO-WRCS-2009-124	14 N	547060	5511206	05/22/09	WRCS	BCFR	4	WRCS incidental observations from point counts
IO-WRCS-2009-125	14 N	550405	5502232	05/22/09	WRCS	BCFR	4	WRCS incidental observations from point counts
IO-WRCS-2009-126	14 N	553717	5494624	05/21/09	WRCS	AM/CATO	4	WRCS incidental observations from point counts
IO-WRCS-2009-127	14 N	553717	5494624	05/21/09	WRCS	BCFR	4	WRCS incidental observations from point counts
IO-WRCS-2009-128	14 N	553717	5494624	05/21/09	WRCS	PSFO	1	WRCS incidental observations from point counts
IO-WRCS-2009-129	14 N	553717	5494624	05/21/09	WRCS	WOFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-130	14 N	553776	5493471	05/21/09	WRCS	BCFR	4	WRCS incidental observations from point counts
IO-WRCS-2009-131	14 N	553776	5493471	05/21/09	WRCS	WOFR	1	WRCS incidental observations from point counts
IO-WRCS-2009-132	14 N	555555	5555555	06/02/09	WRCS	AMTO	1	WRCS incidental observations from point counts
IO-WRCS-2009-133	14 N	555555	5555555		WRCS	BCFR	4	WRCS incidental observations from point counts

Table A4-3. Continued.

ID	ZONE	EASTING	NORTHING	DATE	COMPANY[1]	SPECIES[2]	# OF INDS	COMMENTS
IO-WRCS-2009-134	14 N	557045	5497326	05/21/09	WRCS	AM/CATO	2	WRCS incidental observations from point counts
IO-WRCS-2009-135	14 N	557045	5497326	05/21/09	WRCS	BCFR	4	WRCS incidental observations from point counts
IO-WRCS-2009-136	14 N	557045	5497326	05/21/09	WRCS	WOFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-137	14 N	5.56E+13	5.56E+17	06/05/09	WRCS	BCFR	2	WRCS incidental observations from point counts
IO-WRCS-2009-138				04/25/09	WRCS	WOFR	1	WRCS incidental observations from bird surveys
IO-WRCS-2009-139				04/26/09	WRCS	BCFR	10	WRCS incidental observations from bird surveys
IO-WRCS-2009-140				04/26/09	WRCS	NLFR	1	WRCS incidental observations from bird surveys
IO-WRCS-2009-141				04/27/09	WRCS	WOFR	5	WRCS incidental observations from bird surveys
IO-WRCS-2009-142				04/28/09	WRCS	BCFR	20	WRCS incidental observations from bird surveys
IO-WRCS-2009-143				04/30/09	WRCS	BCFR	20	WRCS incidental observations from bird surveys
IO-WRCS-2009-144				05/02/09	WRCS	BCFR	30	WRCS incidental observations from bird surveys
IO-WRCS-2009-145				05/02/09	WRCS	WOFR	4	WRCS incidental observations from bird surveys
IO-WRCS-2009-146				05/03/09	WRCS	BCFR	50	WRCS incidental observations from bird surveys
IO-WRCS-2009-147				05/03/09	WRCS	WOFR	2	WRCS incidental observations from bird surveys
IO-WRCS-2009-148				05/03/09	WRCS	PGASN	2	WRCS incidental observations from bird surveys
IO-WRCS-2009-149				05/04/09	WRCS	BCFR	100	WRCS incidental observations from bird surveys
IO-WRCS-2009-150				05/04/09	WRCS	WOFR	5	WRCS incidental observations from bird surveys
IO-WRCS-2009-151				05/04/09	WRCS	PGASN	12	WRCS incidental observations from bird surveys
IO-WRCS-2009-152				05/04/09	WRCS	RGASN	1	WRCS incidental observations from bird surveys
IO-WRCS-2009-153				05/05/09	WRCS	BCFR	100	WRCS incidental observations from bird surveys
IO-WRCS-2009-154				05/05/09	WRCS	WOFR	2	WRCS incidental observations from bird surveys
IO-WRCS-2009-155				05/05/09	WRCS	NLFR	20	WRCS incidental observations from bird surveys
IO-WRCS-2009-156				05/05/09	WRCS	PGASN	1	WRCS incidental observations from bird surveys
IO-WRCS-2009-157				05/06/09	WRCS	BCFR	35	WRCS incidental observations from bird surveys
IO-WRCS-2009-158				05/06/09	WRCS	WOFR	20	WRCS incidental observations from bird surveys
IO-WRCS-2009-159				05/06/09	WRCS	NLFR	1	WRCS incidental observations from bird surveys
IO-WRCS-2009-160				05/06/09	WRCS	PGASN	4	WRCS incidental observations from bird surveys
IO-WRCS-2009-161				05/07/09	WRCS	BCFR	5	WRCS incidental observations from bird surveys
IO-WRCS-2009-162				05/09/09	WRCS	BCFR	1	WRCS incidental observations from bird surveys
IO-WRCS-2009-163				05/10/09	WRCS	BCFR	40	WRCS incidental observations from bird surveys
IO-WRCS-2009-164				05/10/09	WRCS	WOFR	2	WRCS incidental observations from bird surveys
IO-WRCS-2009-165				05/10/09	WRCS	NLFR	2	WRCS incidental observations from bird surveys
IO-WRCS-2009-166				05/10/09	WRCS	RGASN	3	WRCS incidental observations from bird surveys
IO-WRCS-2009-167				05/11/09	WRCS	BCFR	100	WRCS incidental observations from bird surveys
IO-WRCS-2009-168				05/11/09	WRCS	WOFR	50	WRCS incidental observations from bird surveys
IO-WRCS-2009-169				05/11/09	WRCS	RGASN	1	WRCS incidental observations from bird surveys
IO-WRCS-2009-170				05/17/09	WRCS	BCFR	50	WRCS incidental observations from bird surveys
IO-WRCS-2009-171				05/18/09	WRCS	BCFR	75	WRCS incidental observations from bird surveys
IO-WRCS-2009-172				05/18/09	WRCS	WOFR	20	WRCS incidental observations from bird surveys

Table A4-3. Continued.

ID	ZONE	EASTING	NORTHING	DATE	COMPANY[1]	SPECIES[2]	# OF INDS	COMMENTS
IO-WRCS-2009-173				05/18/09	WRCS	NLFR	10	WRCS incidental observations from bird surveys
IO-WRCS-2009-174				05/18/09	WRCS	CATO	4	WRCS incidental observations from bird surveys
IO-WRCS-2009-175				05/19/09	WRCS	BCFR	50	WRCS incidental observations from bird surveys
IO-WRCS-2009-176				05/19/09	WRCS	WOFR	20	WRCS incidental observations from bird surveys
IO-WRCS-2009-177				05/19/09	WRCS	NLFR	15	WRCS incidental observations from bird surveys
IO-WRCS-2009-178				05/19/09	WRCS	CATO	1	WRCS incidental observations from bird surveys
IO-WRCS-2009-179				05/20/09	WRCS	GRTF	1	WRCS incidental observations from bird surveys
IO-WRCS-2009-180				05/20/09	WRCS	BCFR	300	WRCS incidental observations from bird surveys
IO-WRCS-2009-181				05/20/09	WRCS	WOFR	50	WRCS incidental observations from bird surveys
IO-WRCS-2009-182				05/20/09	WRCS	NLFR	30	WRCS incidental observations from bird surveys
IO-WRCS-2009-183				05/21/09	WRCS	BCFR	300	WRCS incidental observations from bird surveys
IO-WRCS-2009-184				05/21/09	WRCS	WOFR	20	WRCS incidental observations from bird surveys
IO-WRCS-2009-185				05/21/09	WRCS	NLFR	10	WRCS incidental observations from bird surveys
IO-WRCS-2009-186				05/21/09	WRCS	CATO	5	WRCS incidental observations from bird surveys
IO-WRCS-2009-187				05/22/09	WRCS	BCFR	200	WRCS incidental observations from bird surveys
IO-WRCS-2009-188				05/22/09	WRCS	WOFR	20	WRCS incidental observations from bird surveys
IO-WRCS-2009-189				05/22/09	WRCS	NLFR	50	WRCS incidental observations from bird surveys
IO-WRCS-2009-190				05/22/09	WRCS	PGASN	3	WRCS incidental observations from bird surveys
IO-WRCS-2009-191				05/23/09	WRCS	BCFR	300	WRCS incidental observations from bird surveys
IO-WRCS-2009-192				05/23/09	WRCS	WOFR	20	WRCS incidental observations from bird surveys
IO-WRCS-2009-193				05/24/09	WRCS	BCFR	100	WRCS incidental observations from bird surveys
IO-WRCS-2009-194				05/24/09	WRCS	WOFR	10	WRCS incidental observations from bird surveys
IO-WRCS-2009-195	14U	448839	5526301	June 2009	WRCS	NLFR	1	WRCS 2009 NLFR Obs
IO-WRCS-2009-196	14U	479964	5573652	June 2009	WRCS	NLFR	2	WRCS 2009 NLFR Obs
IO-WRCS-2009-197	14U	481372	5579808	June 2009	WRCS	NLFR	1	WRCS 2009 NLFR Obs
IO-WRCS-2009-198	14U	482649	5522696	June 2009	WRCS	NLFR	1	WRCS 2009 NLFR Obs
IO-WRCS-2009-199	14U	483595	5524402	June 2009	WRCS	NLFR	1	WRCS 2009 NLFR Obs
IO-WRCS-2009-200	14U	487456	5691399	June 2009	WRCS	NLFR	1	WRCS 2009 NLFR Obs
IO-WRCS-2009-201	14U	489062	5690770	June 2009	WRCS	NLFR	1	WRCS 2009 NLFR Obs
IO-WRCS-2009-202	14U	492042	5690462	June 2009	WRCS	NLFR	1	WRCS 2009 NLFR Obs
IO-WRCS-2009-203	14U	492462	5683481	June 2009	WRCS	NLFR	2	WRCS 2009 NLFR Obs
IO-WRCS-2009-204	14U	493052	5553848	June 2009	WRCS	NLFR	1	WRCS 2009 NLFR Obs
IO-WRCS-2009-205	14U	494201	5683478	June 2009	WRCS	NLFR	1	WRCS 2009 NLFR Obs
IO-WRCS-2009-206	14U	494477	5532719	June 2009	WRCS	NLFR	1	WRCS 2009 NLFR Obs
IO-WRCS-2009-207	14U	495323	5536765	June 2009	WRCS	NLFR	1	WRCS 2009 NLFR Obs
IO-WRCS-2009-208	14U	498735	5539093	June 2009	WRCS	NLFR	1	WRCS 2009 NLFR Obs
IO-WRCS-2009-209	14U	500329	5529793	June 2009	WRCS	NLFR	1	WRCS 2009 NLFR Obs
IO-WRCS-2009-210	14U	337470	5663027	June 2009	WRCS	NLFR	1	WRCS 2009 NLFR Obs
IO-WRCS-2009-211	14U	340004	5661299	June 2009	WRCS	NLFR	1	WRCS 2009 NLFR Obs

Table A4-3. Continued.

ID	ZONE	EASTING	NORTHING	DATE	COMPANY[1]	SPECIES[2]	# OF INDS	COMMENTS
IO-WRCS-2009-212	14U	364212	5665569	June 2009	WRCS	NLFR	1	WRCS 2009 NLFR Obs
IO-WRCS-2009-213	14U	408133	5684288	June 2009	WRCS	NLFR	1	WRCS 2009 NLFR Obs
IO-WRCS-2009-214	14U	434827	5706652	June 2009	WRCS	NLFR	1	WRCS 2009 NLFR Obs
IO-WRCS-2009-215	14U	455242	5680673	June 2009	WRCS	NLFR	1	WRCS 2009 NLFR Obs
IO-WRCS-2009-216	14U	467223	5703114	June 2009	WRCS	NLFR	1	WRCS 2009 NLFR Obs
IO-WRCS-2009-217	14U	468133	5637660	June 2009	WRCS	NLFR	1	WRCS 2009 NLFR Obs
IO-WRCS-2009-218	14U	468248	5703110	June 2009	WRCS	NLFR	1	WRCS 2009 NLFR Obs
IO-WRCS-2009-219	14U	470867	5559590	June 2009	WRCS	NLFR	1	WRCS 2009 NLFR Obs
IO-WRCS-2009-220	14U	472294	5555523	June 2009	WRCS	NLFR	1	WRCS 2009 NLFR Obs
IO-WRCS-2009-221	14U	474130	5637788	June 2009	WRCS	NLFR	1	WRCS 2009 NLFR Obs
IO-WRCS-2009-222	14U	366768	5769070	06/14/09	WRCS	NLFR	1	WRCS 2009 NLFR Obs
IO-WRCS-2009-223	14U	450232	5647640	05/04/09	WRCS	PSFO	unk#	WRCS email
IO-WRCS-2009-224	14U	450232	5647640	05/04/09	WRCS	BCFR	unk#	WRCS email
IO-WRCS-2009-225	14U	450232	5647640	05/04/09	WRCS	WOFR	unk#	WRCS email
IO-WRCS-2009-226	14U	459539	5693455	05/05/09	WRCS	BCFR	unk#	WRCS email
IO-WRCS-2009-227	14U	459539	5693455	05/05/09	WRCS	PSFO	unk#	WRCS email
IO-WRCS-2009-228	14U	419289	5692695	05/06/09	WRCS	BCFR	unk#	WRCS email
IO-WRCS-2009-229	14U	419289	5692695	05/06/09	WRCS	PSFO	unk#	WRCS email
IO-WRCS-2009-230		516794	5609239	09/20/09	WRCS	GASN	1	WRCS Bird Field Sept 20_09; live
IO-WRCS-2009-231		516325	5610583	09/20/09	WRCS	GASN	6	WRCS Bird Field Sept 20_09; dead
IO-WRCS-2009-232		515321	5613450	09/20/09	WRCS	GASN		WRCS Bird Field Sept 20_09; multiple dead
IO-WRCS-2009-233		511767	5616472	09/20/09	WRCS	GASN	85	WRCS Bird Field Sept 20_09; 2 live, rest dead
IO-WRCS-2009-234		509706	5626513	09/20/09	WRCS	GASN	10	WRCS Bird Field Sept 20_09; dead
IO-WRCS-2009-235		509688	5626543	09/20/09	WRCS	PGASN	1	WRCS Bird Field Sept 20_09; photo, dead
IO-WRCS-2009-236		504051	5627735	09/20/09	WRCS	GASN	7	WRCS Bird Field Sept 20_09; dead, corner to way 15
IO-WRCS-2009-237		493680	5626136	09/20/09	WRCS	GASN	60	WRCS Bird Field Sept 20_09; dead, between waypoints 19-20
IO-WRCS-2009-238		493682	5625135	09/20/09	WRCS	GASN	4	WRCS Bird Field Sept 20_09; live, between waypoints 19-20
IO-WRCS-2009-239		482468	5624493	09/20/09	WRCS	GASN	15	WRCS Bird Field Sept 20_09; dead, between waypoints 24-25
IO-WRCS-2009-240		480150	5624500	09/20/09	WRCS	GASN	2	WRCS Bird Field Sept 20_09; live, between waypoints 24-26
IO-WRCS-2009-241		460360	5672332	09/20/09	WRCS	GASN	3	WRCS Bird Field Sept 20_09; live, on road within 1 km of this waypoint west
IO-WRCS-2009-242		464866	5686939	09/20/09	WRCS	RGASN	1	WRCS Bird Field Sept 20_09; 2 year old, photo
IO-WRCS-2009-243		479708	5655643	09/20/09	WRCS	GASN		WRCS Bird Field Sept 20_09; start logging
IO-WRCS-2009-244		482037	5655634	09/20/09	WRCS	GASN	13	WRCS Bird Field Sept 20_09; dead
IO-WRCS-2009-245		486427	5655630	09/20/09	WRCS	GASN	100	WRCS Bird Field Sept 20_09; dead
IO-WRCS-2009-246		487884	5655622	09/20/09	WRCS	GASN		WRCS Bird Field Sept 20_09
IO-WRCS-2009-247		495199	5653990	09/20/09	WRCS	GASN		WRCS Bird Field Sept 20_09WRCS Bird Field Sept 20_09;
IO-WRCS-2009-248		497488	5652033	09/20/09	WRCS	GASN	33	WRCS Bird Field Sept 20_09; dead
IO-WRCS-2009-249		485456	5613850	09/20/09	WRCS	GASN	7	WRCS Bird Field Sept 20_09; dead

Table A4-3. Continued.

ID	ZONE	EASTING	NORTHING	DATE	COMPANY[1]	SPECIES[2]	# OF INDS	COMMENTS
IO-WRCS-2009-250		515146	5581792	09/20/09	WRCS	GASN		WRCS Bird Field Sept 20_09; start logging
IO-WRCS-2009-251		518107	5581796	09/20/09	WRCS	GASN	26	WRCS Bird Field Sept 20_09; dead
IO-WRCS-2009-252		520802	5581799	09/20/09	WRCS	GASN	7	WRCS Bird Field Sept 20_09; dead
IO-WRCS-2009-253		522719	5581803	09/20/09	WRCS	GASN		WRCS Bird Field Sept 20_09; langruth turn approx. Still logging snakes, turn south
IO-WRCS-2009-254		522662	5574883	09/20/09	WRCS	GASN	29	WRCS Bird Field Sept 20_09; dead, few live, end logging
IO-WRCS-2010-001	14U	350862	5952651	06/12/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-002	14U	351385	5953061	06/12/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-003	14U	351632	5953069	06/12/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-004	14U	351737	5953294	06/12/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-005	14U	351947	5953478	06/12/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-006	14U	352143	5953707	06/12/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-007	14U	352559	5953864	06/12/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-008	14U	355079	5840394	06/06/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-009	14U	355147	5936287	06/11/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-010	14U	355373	5839468	06/06/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-011	14U	357859	5935362	06/11/10	WRCS	NLFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-012	14U	358032	5935454	06/11/10	WRCS	NLFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-013	14U	358321	5936258	06/11/10	WRCS	NLFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-014	14U	358365	5936027	06/11/10	WRCS	NLFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-015	14U	359580	5945836	06/12/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-016	14U	359583	5946065	06/12/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-017	14U	359702	5946339	06/12/10	WRCS	BCFR	2	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-018	14U	359702	5945372	06/12/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-019	14U	359752	5946467	06/12/10	WRCS	NLFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-020	14U	359910	5945030	06/12/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-021	14U	360188	5946587	06/12/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-022	14U	360200	5944549	06/12/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-023	14U	360417	5944618	06/12/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-024	14U	362987	5904665	06/09/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-025	14U	363947	5910284	06/09/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-026	14U	364439	5862963	06/07/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-027	14U	364700	5922530	06/10/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-028	14U	364764	5922704	06/10/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-029	14U	364905	5922384	06/10/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-030	14U	365004	5922805	06/10/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-031	14U	365163	5922478	06/10/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-032	14U	366365	5866396	06/09/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-033	14U	366517	5866109	06/09/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys

Table A4-3. Continued.

ID	ZONE	EASTING	NORTHING	DATE	COMPANY[1]	SPECIES[2]	# OF INDS	COMMENTS
IO-WRCS-2010-034	14U	367450	5852783		WRCS	PGASN	1	WRCS Birders
IO-WRCS-2010-035	14U	368316	5811126	06/07/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-036	14U	369452	5811086	06/07/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-037	14U	374402	5792447	06/05/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-038	14U	374880	5791756	06/05/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-039	14U	375185	5791975	06/05/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-040	14U	375567	5793402	06/05/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-041	14U	375819	5793647	06/05/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-042	14U	375997	5793791	06/05/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-043	14U	376237	5792496	06/05/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-044	14U	377926	5788943	06/05/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-045	14U	378427	5789661	06/05/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-046	14U	401064	5739446	06/04/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-047	14U	402039	5740473	06/04/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-048	14U	413307	5741003	06/04/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-049	14U	413638	5741489	06/04/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-050	14U	413853	5739698	06/04/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-051	14U	414196	5742170	06/04/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-052	14U	414631	5742870	06/04/10	WRCS	BCFR	2	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-053	14U	415219	5741463	06/04/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-054	14U	415286	5741988	06/04/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-055	14U	425538	6025876	06/17/10	WRCS	NLFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-056	14U	437163	6034872	06/17/10	WRCS	NLFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-057	14U	437293	6035124	06/17/10	WRCS	NLFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-058	14U	462142	5703824	06/02/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-059	14U	462444	5703732	06/02/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-060	14U	462488	5704678	06/02/10	WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-061	14U	462796	5668648	06/06/10	WRCS	BCFR	2	WRCS Bird Surveys Automated Recorder
IO-WRCS-2010-062	14U	462796	5668648	06/06/10	WRCS	GRTF	1	WRCS Bird Surveys Automated Recorder
IO-WRCS-2010-063	14U	473948	5637620	06/05/10	WRCS	NLFR	1	WRCS Bird Surveys Automated Recorder
IO-WRCS-2010-064	14U	473948	5637620	06/05/10	WRCS	WOFR	2	WRCS Bird Surveys Automated Recorder
IO-WRCS-2010-065	14U	473948	5637620	06/05/10	WRCS	GRTF	1	WRCS Bird Surveys Automated Recorder
IO-WRCS-2010-066	14U	479038	5615773	06/06/10	WRCS	BCFR	1	WRCS Bird Surveys Automated Recorder
IO-WRCS-2010-067	14U	479038	5615773	06/06/10	WRCS	NLFR	1	WRCS Bird Surveys Automated Recorder
IO-WRCS-2010-068	14U	479038	5615773	06/06/10	WRCS	WOFR	1	WRCS Bird Surveys Automated Recorder
IO-WRCS-2010-069	14U	479038	5615773	06/06/10	WRCS	CGTF	1	WRCS Bird Surveys Automated Recorder
IO-WRCS-2010-070	14U	485363	5655451	06/06/10	WRCS	BCFR	2	WRCS Bird Surveys Automated Recorder
IO-WRCS-2010-071	14U	485363	5655451	06/06/10	WRCS	GRTF	3	WRCS Bird Surveys Automated Recorder
IO-WRCS-2010-072	14U	485419	5589891	05/24/10	WRCS	BCFR	2	WRCS Bird Surveys Automated Recorder

Table A4-3. Continued.

ID	ZONE	EASTING	NORTHING	DATE	COMPANY[1]	SPECIES[2]	# OF INDS	COMMENTS
IO-WRCS-2010-073	14U	485419	5589891	05/24/10	WRCS	WOFR	1	WRCS Bird Surveys Automated Recorder
IO-WRCS-2010-074	14U	485419	5589891	05/24/10	WRCS	GRTF	2	WRCS Bird Surveys Automated Recorder
IO-WRCS-2010-075	14U	488027	5657407	06/04/10	WRCS	BCFR	2	WRCS Bird Surveys Automated Recorder
IO-WRCS-2010-076	14U	488027	5657407	06/04/10	WRCS	GRTF	2	WRCS Bird Surveys Automated Recorder
IO-WRCS-2010-077	14U	503216	5635673	06/16/10	WRCS	NLFR	1	WRCS Bird Surveys Automated Recorder
IO-WRCS-2010-078	14U	503216	5635673	06/16/10	WRCS	GRTF	2	WRCS Bird Surveys Automated Recorder
IO-WRCS-2010-079	14U	506225	5585063	05/24/10	WRCS	BCFR	3	WRCS Bird Surveys Automated Recorder
IO-WRCS-2010-080	14U	506225	5585063	05/24/10	WRCS	CATO	3	WRCS Bird Surveys Automated Recorder
IO-WRCS-2010-081	14U	509261	5581777	05/23/10	WRCS	BCFR	3	WRCS Bird Surveys Automated Recorder
IO-WRCS-2010-082	14U	509261	5581777	05/23/10	WRCS	WOFR	2	WRCS Bird Surveys Automated Recorder
IO-WRCS-2010-083	14U	509911	5604781	05/23/10	WRCS	BCFR	2	WRCS Bird Surveys Automated Recorder
IO-WRCS-2010-084	14U	509911	5604781	05/23/10	WRCS	NLFR	1	WRCS Bird Surveys Automated Recorder
IO-WRCS-2010-085	14U	509911	5604781	05/23/10	WRCS	WOFR	1	WRCS Bird Surveys Automated Recorder
IO-WRCS-2010-086	14U	509911	5604781	05/23/10	WRCS	GRTF	3	WRCS Bird Surveys Automated Recorder
IO-WRCS-2010-087	14U	519620	5585683	05/27/10	WRCS	BCFR	2	WRCS Bird Surveys Automated Recorder
IO-WRCS-2010-088	14U	519620	5585683	05/27/10	WRCS	CGTF	2	WRCS Bird Surveys Automated Recorder
IO-WRCS-2010-089	14U	532913	5513293		WRCS	BCFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-090	14U	638164	5485416		WRCS	NLFR	1	WRCS Handheld Recorder Bird Surveys
IO-WRCS-2010-091	14N	681313	5531285	07/02/10	WRCS	NLFR	1	WRCS email; seen; very large
IO-WRCS-2010-092	14N	511382	5617903	11/05/10	WRCS	PGASN	1	2010 email from WRCS; seen sunning in the middle of a gravel rd; ~1.3-2.3 yrs old; lateral band on scute #4; 2nd snake ~100m away but no confirmed ID; site located ~15km NW of Amaranth
IO-WRCS-2010-093	14N	509418	5615826	11/05/10	WRCS	GASN_Hibern	1	2010 email from WRCS; LK; property owner at these UTMs indicated he removed snakes from his basement
IO-WRCS-2010-094	14N	522937	5512922	07/22/10	WRCS	SGSN	1	2010 email from WRCS; seen; property well outside the 3 mile buffer
IO-WRCS-2010-095	14N	539343	5498189	10/15/10	WRCS	PRSK	1	2010 email from WRCS; potential prairie skink track seen; trail drag visible in photo; too small for an adult- juvenile maybe?; 7 photos available; property at edge of skink country

[1]CC – Calyx Consulting, CDC – Conservation Data Centre, WRCS – Wildlife Resource Consulting Services MB Inc.

[1]AMTO – Eastern American toad, BCFR – Boreal chorus frog, CATO – Canadian toad, CGTR – Cope's gray treefrog, DASK – Dakota skipper, DDMO – Dusky Dune moth, GASN_Hibern – Garter snake hibernacula, GRTF – Gray treefrog, HNSN – Plains hognose snake, NLFR – Northern leopard frog, PGASN – Plains garter snake, PRSK – Northern prairie skink, PSFO – Plains spadefoot, RBSN – Northern redbelly snake, RGASN – Red-sided garter snake, SGSN – Smooth green snake, SNTU –Common snapping turtle, WFMO – White flower moth, WOFR – Wood frog

Table A4-4. Raw data for skink coverboard surveys conducted in suitable sandy-soil habitat within the Bipole III Transmission Project Study Area, 2010.

SAMPLE ID	(UTM ZONE 14U) EASTING	NORTHING	DATE	SITE ID	TRACK	CB #	VISIT	SPECIES	# OF INDS
T04-CB04-1	539800	5498364	07/06/10	SE-11-008-08W1	04	4	1		Set CB
T04-CB01-1	539800	5498354	07/06/10	SE-11-008-08W1	04	1	1		Set CB
T04-CB03-1	539811	5498394	07/06/10	SE-11-008-08W1	04	3	1		Set CB
T04-CB02-1	539814	5498379	07/06/10	SE-11-008-08W1	04	2	1		Set CB
T04-CB05-1	539812	5498376	07/06/10	SE-11-008-08W1	04	5	1		Set CB
T03-CB10-1	539794	5498516	07/06/10	SE-11-008-08W1	03	10	1		Set CB
T03-CB07-1	539811	5498493	07/06/10	SE-11-008-08W1	03	7	1		Set CB
T03-CB09-1	539791	5498491	07/06/10	SE-11-008-08W1	03	9	1		Set CB
T03-CB08-1	539782	5498469	07/06/10	SE-11-008-08W1	03	8	1		Set CB
T03-CB06-1	539775	5498447	07/06/10	SE-11-008-08W1	03	6	1		Set CB
T01-CB11-01-1	539773	5499067	07/06/10	SE-11-008-08W1	01	11	1		Set CB
T01-CB12-1	539784	5499042	07/06/10	SE-11-008-08W1	01	12	1		Set CB
T01-CB13-1	539776	5499028	07/06/10	SE-11-008-08W1	01	13	1		Set CB
T01-CB14-1	539787	5498987	07/06/10	SE-11-008-08W1	01	14	1		Set CB
T01-CB15-1	539788	5498997	07/06/10	SE-11-008-08W1	01	15	1		Set CB
T01-CB16-1	539792	5499013	07/06/10	SE-11-008-08W1	01	16	1		Set CB
T02-CB17-1	539760	5498953	07/06/10	SE-11-008-08W1	02	17	1		Set CB
T02-CB19-1	539765	5498861	07/06/10	SE-11-008-08W1	02	19	1		Set CB
T02-CB20-1	539764	5498831	07/06/10	SE-11-008-08W1	02	20	1		Set CB
T02-CB21-1	539776	5498803	07/06/10	SE-11-008-08W1	02	21	1		Set CB
T02-CB22-1	539782	5498754	07/06/10	SE-11-008-08W1	02	22	1		Set CB
IO-T02-CB-01	539791	5498790	07/06/10	SE-11-008-08W1	02	IO	1	Nest- Mammal?	1
T02-CB23-1	539814	5498800	07/06/10	SE-11-008-08W1	02	23	1		Set CB
T02-CB24-1	539812	5498772	07/06/10	SE-11-008-08W1	02	24	1		Set CB
T02-CB25-1	539795	5498750	07/06/10	SE-11-008-08W1	02	25	1		Set CB
T02-CB26-1	539798	5498714	07/06/10	SE-11-008-08W1	02	26	1		Set CB
T02-CB27-1	539806	5498739	07/06/10	SE-11-008-08W1	02	27	1		Set CB
T02-CB28-1	539790	5498834	07/06/10	SE-11-008-08W1	02	28	1		Set CB
IO-T02-CB-02	539806	5498739	07/06/10	SE-11-008-08W1	02	IO	1	Lepidoptera-Satyridae	1
T02-CB29-1	539790	5498867	07/06/10	SE-11-008-08W1	02	29	1		Set CB
T02-CB30-1	539790	5498867	07/06/10	SE-11-008-08W1	02	30	1		Set CB
T02-CB18-1	539789	5498917	07/06/10	SE-11-008-08W1	02	18	1		Set CB
T08-CB01-1	536600	5509709	07/16/10	NE-09-009-08W1	08	1	1		Set CB
T08-CB02-1	536617	5509710	07/16/10	NE-09-009-08W1	08	2	1		Set CB
T08-CB03-1	536630	5509711	07/16/10	NE-09-009-08W1	08	3	1		Set CB
IO-T08-CB-01	536630	5509711	07/16/10	NE-09-009-08W1	08	IO	1	Tracks- Skink?	1
T08-CB04-1	536627	5509712	07/16/10	NE-09-009-08W1	08	4	1		Set CB
T08-CB05-1	536657	5509738	07/16/10	NE-09-009-08W1	08	5	1		Set CB
T08-CB06-1	536670	5509756	07/16/10	NE-09-009-08W1	08	6	1		Set CB
T08-CB07-1	536614	5509729	07/16/10	NE-09-009-08W1	08	7	1		Set CB
T08-CB08-1	536610	5509724	07/16/10	NE-09-009-08W1	08	8	1		Set CB
T08-CB09-1	536617	5509722	07/16/10	NE-09-009-08W1	08	9	1		Set CB
T08-CB10-1	536601	5509721	07/16/10	NE-09-009-08W1	08	10	1		Set CB
T08-CB11-1	536592	5509733	07/16/10	NE-09-009-08W1	08	11	1		Set CB
T08-CB12-1	536589	5509726	07/16/10	NE-09-009-08W1	08	12	1		Set CB
T08-CB13-1	536589	5509720	07/16/10	NE-09-009-08W1	08	13	1		Set CB
T08-CB14-1	536591	5509669	07/16/10	NE-09-009-08W1	08	14	1		Set CB
T08-CB15-1	536598	5509666	07/16/10	NE-09-009-08W1	08	15	1		Set CB
T08-CB16-1	536540	5509656	07/16/10	NE-09-009-08W1	08	16	1		Set CB
T08-CB17-1	536591	5509625	07/16/10	NE-09-009-08W1	08	17	1		Set CB
T08-CB18-1	536609	5509631	07/16/10	NE-09-009-08W1	08	18	1		Set CB
T08-CB19-1	536627	5509636	07/16/10	NE-09-009-08W1	08	19	1		Set CB

Table A4-4. Continued.

	(UTM ZONE 14U)								
SAMPLE ID	EASTING	NORTHING	DATE	SITE ID	TRACK	CB #	VISIT	SPECIES	# OF INDS
T08-CB20-1	536638	5509602	07/16/10	NE-09-009-08W1	08	20	1		Set CB
T04-CB01-2	539800	5498354	07/16/10	SE-11-008-08W1	04	1	2		0
T04-CB02-2	539814	5498379	07/16/10	SE-11-008-08W1	04	2	2		0
T04-CB04-2	539800	5498364	07/16/10	SE-11-008-08W1	04	4	2		0
T04-CB05-2	539812	5498376	07/16/10	SE-11-008-08W1	04	5	2		0
T04-CB03-2	539811	5498394	07/16/10	SE-11-008-08W1	04	3	2		0
T03-CB06-2	539775	5498447	07/16/10	SE-11-008-08W1	03	6	2		0
T03-CB07-2	539811	5498493	07/16/10	SE-11-008-08W1	03	7	2		0
T03-CB08-2	539782	5498469	07/16/10	SE-11-008-08W1	03	8	2		0
T03-CB09-2	539791	5498491	07/16/10	SE-11-008-08W1	03	9	2		0
T03-CB10-2	539794	5498516	07/16/10	SE-11-008-08W1	03	10	2		0
T02-CB17-2	539760	5498953	07/16/10	SE-11-008-08W1	02	17	2		0
T02-CB18-2	539789	5498917	07/16/10	SE-11-008-08W1	02	18	2		0
T02-CB19-2	539765	5498861	07/16/10	SE-11-008-08W1	02	19	2		0
T02-CB20-2	539764	5498831	07/16/10	SE-11-008-08W1	02	20	2		0
T02-CB21-2	539776	5498803	07/16/10	SE-11-008-08W1	02	21	2		0
T02-CB22-2	539782	5498754	07/16/10	SE-11-008-08W1	02	22	2		0
T02-CB23-2	539814	5498800	07/16/10	SE-11-008-08W1	02	23	2		0
T02-CB24-2	539812	5498772	07/16/10	SE-11-008-08W1	02	24	2		0
T02-CB25-2	539795	5498750	07/16/10	SE-11-008-08W1	02	25	2		0
T02-CB26-2	539798	5498714	07/16/10	SE-11-008-08W1	02	26	2		0
T02-CB27-2	539806	5498739	07/16/10	SE-11-008-08W1	02	27	2		0
T02-CB28-2	539790	5498834	07/16/10	SE-11-008-08W1	02	28	2		0
T02-CB29-2	539790	5498867	07/16/10	SE-11-008-08W1	02	29	2		0
T02-CB30-2	539790	5498867	07/16/10	SE-11-008-08W1	02	30	2		0
T01-CB11-02-2	539773	5499067	07/16/10	SE-11-008-08W1	01	11	2		0
T01-CB12-2	539784	5499042	07/16/10	SE-11-008-08W1	01	12	2		0
T01-CB13-2	539776	5499028	07/16/10	SE-11-008-08W1	01	13	2		0
T01-CB14-2	539787	5498987	07/16/10	SE-11-008-08W1	01	14	2		0
T01-CB15-2	539788	5498997	07/16/10	SE-11-008-08W1	01	15	2		0
T01-CB16-2	539792	5499013	07/16/10	SE-11-008-08W1	01	16	2		0
IO-T07-CB-01	539783	5500599	07/16/10	SW-14-008-08W1	07	IO	1	Aves- Red Winged Blackbird	1
T08-CB01-2	536600	5509709	07/23/10	NE-09-009-08W1	08	1	2		0
T08-CB02-2	536617	5509710	07/23/10	NE-09-009-08W1	08	2	2		0
T08-CB03-2	536630	5509711	07/23/10	NE-09-009-08W1	08	3	2		0
T08-CB04-2	536627	5509712	07/23/10	NE-09-009-08W1	08	4	2		0
T08-CB05-2	536657	5509738	07/23/10	NE-09-009-08W1	08	5	2		0
T08-CB06-2	536670	5509756	07/23/10	NE-09-009-08W1	08	6	2		0
T08-CB07-2	536614	5509729	07/23/10	NE-09-009-08W1	08	7	2		0
T08-CB08-2	536610	5509724	07/23/10	NE-09-009-08W1	08	8	2		0
T08-CB09-2	536617	5509722	07/23/10	NE-09-009-08W1	08	9	2		0
T08-CB10-2	536601	5509721	07/23/10	NE-09-009-08W1	08	10	2		0
T08-CB11-2	536592	5509733	07/23/10	NE-09-009-08W1	08	11	2		0
T08-CB12-2	536589	5509726	07/23/10	NE-09-009-08W1	08	12	2		0
T08-CB13-2	536589	5509720	07/23/10	NE-09-009-08W1	08	13	2		0
T08-CB14-2	536591	5509669	07/23/10	NE-09-009-08W1	08	14	2		0
T08-CB15-2	536598	5509666	07/23/10	NE-09-009-08W1	08	15	2		0
T08-CB16-2	536540	5509656	07/23/10	NE-09-009-08W1	08	16	2		0
T08-CB17-2	536591	5509625	07/23/10	NE-09-009-08W1	08	17	2		0
T08-CB18-2	536609	5509631	07/23/10	NE-09-009-08W1	08	18	2		0
T08-CB19-2	536627	5509636	07/23/10	NE-09-009-08W1	08	19	2		0
T08-CB20-2	536638	5509602	07/23/10	NE-09-009-08W1	08	20	2		0
T08-CB21-1	536598	5509674	07/23/10	NE-09-009-08W1	08	21	1		Set CB

Table A4-4. Continued.

	(UTM ZONE 14U)								
SAMPLE ID	EASTING	NORTHING	DATE	SITE ID	TRACK	CB #	VISIT	SPECIES	# OF INDS
T08-CB22-1	536628	5509604	07/23/10	NE-09-009-08W1	08	22	1		Set CB
T08-CB23-1	536631	5509609	07/23/10	NE-09-009-08W1	08	23	1		Set CB
T08-CB24-1	536632	5509618	07/23/10	NE-09-009-08W1	08	24	1		Set CB
T08-CB25-1	536569	5509647	07/23/10	NE-09-009-08W1	08	25	1		Set CB
T04-CB01-3	539800	5498354	07/23/10	SE-11-008-08W1	04	1	3		0
T04-CB02-3	539814	5498379	07/23/10	SE-11-008-08W1	04	2	3		0
T04-CB03-3	539811	5498394	07/23/10	SE-11-008-08W1	04	3	3		0
T04-CB04-3	539800	5498364	07/23/10	SE-11-008-08W1	04	4	3		0
T04-CB05-3	539812	5498376	07/23/10	SE-11-008-08W1	04	5	3		0
T03-CB06-3	539775	5498447	07/23/10	SE-11-008-08W1	03	6	3		0
T03-CB07-3	539811	5498493	07/23/10	SE-11-008-08W1	03	7	3		0
T03-CB08-3	539782	5498469	07/23/10	SE-11-008-08W1	03	8	3		0
T03-CB09-3	539791	5498491	07/23/10	SE-11-008-08W1	03	9	3		0
T03-CB10-3	539794	5498516	07/23/10	SE-11-008-08W1	03	10	3		0
T02-CB17-3	539760	5498953	07/23/10	SE-11-008-08W1	02	17	3		0
T02-CB18-3	539789	5498917	07/23/10	SE-11-008-08W1	02	18	3		0
T02-CB19-3	539765	5498861	07/23/10	SE-11-008-08W1	02	19	3		0
T02-CB20-3	539764	5498831	07/23/10	SE-11-008-08W1	02	20	3		0
T02-CB21-3	539776	5498803	07/23/10	SE-11-008-08W1	02	21	3		0
T02-CB22-3	539782	5498754	07/23/10	SE-11-008-08W1	02	22	3		0
T02-CB23-3	539814	5498800	07/23/10	SE-11-008-08W1	02	23	3		0
T02-CB24-3	539812	5498772	07/23/10	SE-11-008-08W1	02	24	3		0
T02-CB25-3	539795	5498750	07/23/10	SE-11-008-08W1	02	25	3		0
T02-CB26-3	539798	5498714	07/23/10	SE-11-008-08W1	02	26	3		0
T02-CB27-3	539806	5498739	07/23/10	SE-11-008-08W1	02	27	3		0
T02-CB28-3	539790	5498834	07/23/10	SE-11-008-08W1	02	28	3		0
T02-CB29-3	539790	5498867	07/23/10	SE-11-008-08W1	02	29	3		0
T02-CB30-3	539790	5498867	07/23/10	SE-11-008-08W1	02	30	3		0
T01-CB11-03-3	539773	5499067	07/23/10	SE-11-008-08W1	01	11	3		0
T01-CB12-3	539784	5499042	07/23/10	SE-11-008-08W1	01	12	3		0
T01-CB13-3	539776	5499028	07/23/10	SE-11-008-08W1	01	13	3		0
T01-CB14-3	539787	5498987	07/23/10	SE-11-008-08W1	01	14	3		0
T01-CB15-3	539788	5498997	07/23/10	SE-11-008-08W1	01	15	3		0
T01-CB16-3	539792	5499013	07/23/10	SE-11-008-08W1	01	16	3		0
T08-CB01-3	536600	5509709	07/26/10	NE-09-009-08W1	08	1	3		0
T08-CB02-3	536617	5509710	07/26/10	NE-09-009-08W1	08	2	3		0
T08-CB03-3	536630	5509711	07/26/10	NE-09-009-08W1	08	3	3		0
T08-CB04-3	536627	5509712	07/26/10	NE-09-009-08W1	08	4	3		0
T08-CB05-3	536657	5509738	07/26/10	NE-09-009-08W1	08	5	3		0
T08-CB06-3	536670	5509756	07/26/10	NE-09-009-08W1	08	6	3		0
T08-CB07-3	536614	5509729	07/26/10	NE-09-009-08W1	08	7	3		0
T08-CB08-3	536610	5509724	07/26/10	NE-09-009-08W1	08	8	3		0
T08-CB09-3	536617	5509722	07/26/10	NE-09-009-08W1	08	9	3		0
T08-CB10-3	536601	5509721	07/26/10	NE-09-009-08W1	08	10	3	Burrow-mammal	1
T08-CB11-3	536592	5509733	07/26/10	NE-09-009-08W1	08	11	3		0
T08-CB12-3	536589	5509726	07/26/10	NE-09-009-08W1	08	12	3		0
T08-CB13-3	536589	5509720	07/26/10	NE-09-009-08W1	08	13	3		0
T08-CB14-3	536591	5509669	07/26/10	NE-09-009-08W1	08	14	3		0
T08-CB15-3	536598	5509666	07/26/10	NE-09-009-08W1	08	15	3		0
T08-CB16-3	536540	5509656	07/26/10	NE-09-009-08W1	08	16	3		0
T08-CB17-3	536591	5509625	07/26/10	NE-09-009-08W1	08	17	3		0
T08-CB18-3	536609	5509631	07/26/10	NE-09-009-08W1	08	18	3		0
T08-CB19-3	536627	5509636	07/26/10	NE-09-009-08W1	08	19	3		0

Table A4-4. Continued.

SAMPLE ID	(UTM ZONE 14U) EASTING	NORTHING	DATE	SITE ID	TRACK	CB #	VISIT	SPECIES	# OF INDS
T08-CB20-3	536638	5509602	07/26/10	NE-09-009-08W1	08	20	3		0
T08-CB21-2	536598	5509674	07/26/10	NE-09-009-08W1	08	21	2		0
T08-CB22-2	536628	5509604	07/26/10	NE-09-009-08W1	08	22	2		0
T08-CB23-2	536631	5509609	07/26/10	NE-09-009-08W1	08	23	2		0
T08-CB24-2	536632	5509618	07/26/10	NE-09-009-08W1	08	24	2		0
T08-CB25-2	536569	5509647	07/26/10	NE-09-009-08W1	08	25	2		0
T08-CB26-1	536606	5509716	07/26/10	NE-09-009-08W1	08	26	1		Set CB
T08-CB27-1	536598	5509666	07/26/10	NE-09-009-08W1	08	27	1		Set CB
T08-CB28-1	536582	5509658	07/26/10	NE-09-009-08W1	08	28	1		Set CB
T08-CB29-1	536581	5509633	07/26/10	NE-09-009-08W1	08	29	1		Set CB
T08-CB30-1	536597	5509623	07/26/10	NE-09-009-08W1	08	30	1		Set CB
T08-CB31-1	536619	5509616	07/26/10	NE-09-009-08W1	08	31	1		Set CB
T08-CB32-1	536630	5509612	07/26/10	NE-09-009-08W1	08	32	1		Set CB
T08-CB33-1	536641	5509599	07/26/10	NE-09-009-08W1	08	33	1		Set CB
T08-CB34-1	536652	5509585	07/26/10	NE-09-009-08W1	08	34	1		Set CB
T08-CB35-1	536661	5509604	07/26/10	NE-09-009-08W1	08	35	1		Set CB
IO-T04-CB-01	539800	5498364	07/29/10	SE-11-008-08W1	04	IO	4	Lepidoptera-Danaidae-Danaus plexippus (monarch)	2
T04-CB01-4	539800	5498354	07/29/10	SE-11-008-08W1	04	1	4		0
T04-CB02-4	539814	5498379	07/29/10	SE-11-008-08W1	04	2	4		0
T04-CB03-4	539811	5498394	07/29/10	SE-11-008-08W1	04	3	4	anthill	1
T04-CB04-4	539800	5498364	07/29/10	SE-11-008-08W1	04	4	4		0
T04-CB05-4	539812	5498376	07/29/10	SE-11-008-08W1	04	5	4		0
T03-CB06-4	539775	5498447	07/29/10	SE-11-008-08W1	03	6	4		0
T03-CB07-4	539811	5498493	07/29/10	SE-11-008-08W1	03	7	4		0
T03-CB08-4	539782	5498469	07/29/10	SE-11-008-08W1	03	8	4		0
T03-CB09-4	539791	5498491	07/29/10	SE-11-008-08W1	03	9	4		0
T03-CB10-4	539794	5498516	07/29/10	SE-11-008-08W1	03	10	4		0
T02-CB17-4	539760	5498953	07/29/10	SE-11-008-08W1	02	17	4		0
T02-CB18-4	539789	5498917	07/29/10	SE-11-008-08W1	02	18	4		0
T02-CB19-4	539765	5498861	07/29/10	SE-11-008-08W1	02	19	4		0
T02-CB20-4	539764	5498831	07/29/10	SE-11-008-08W1	02	20	4		0
T02-CB21-4	539776	5498803	07/29/10	SE-11-008-08W1	02	21	4		0
T02-CB22-4	539782	5498754	07/29/10	SE-11-008-08W1	02	22	4		0
T02-CB23-4	539814	5498800	07/29/10	SE-11-008-08W1	02	23	4		0
T02-CB24-4	539812	5498772	07/29/10	SE-11-008-08W1	02	24	4		0
T02-CB25-4	539795	5498750	07/29/10	SE-11-008-08W1	02	25	4		0
T02-CB26-4	539798	5498714	07/29/10	SE-11-008-08W1	02	26	4		0
T02-CB27-4	539806	5498739	07/29/10	SE-11-008-08W1	02	27	4		0
T02-CB28-4	539790	5498834	07/29/10	SE-11-008-08W1	02	28	4		0
T02-CB29-4	539790	5498867	07/29/10	SE-11-008-08W1	02	29	4	Anura- BCFR	1
T02-CB30-4	539790	5498867	07/29/10	SE-11-008-08W1	02	30	4		0
IO-T02-CB-03	539800	5498364	07/29/10	SE-11-008-08W1	02	IO	4	Lepidoptera-Danaidae-Danaus plexippus (monarch catterpillar)	1
T01-CB11-04-4	539773	5499067	07/29/10	SE-11-008-08W1	01	11	4		0
T01-CB12-4	539784	5499042	07/29/10	SE-11-008-08W1	01	12	4		0
T01-CB13-4	539776	5499028	07/29/10	SE-11-008-08W1	01	13	4		0
T01-CB14-4	539787	5498987	07/29/10	SE-11-008-08W1	01	14	4		0
T01-CB15-4	539788	5498997	07/29/10	SE-11-008-08W1	01	15	4		0

Table A4-4. Continued.

SAMPLE ID	(UTM ZONE 14U) EASTING	NORTHING	DATE	SITE ID	TRACK	CB #	VISIT	SPECIES	# OF INDS
T01-CB16-4	539792	5499013	07/29/10	SE-11-008-08W1	01	16	4		0
T08-CB01-4	536600	5509709	07/29/10	NE-09-009-08W1	08	1	4		0
T08-CB02-4	536617	5509710	07/29/10	NE-09-009-08W1	08	2	4		0
T08-CB03-4	536630	5509711	07/29/10	NE-09-009-08W1	08	3	4		0
T08-CB04-4	536627	5509712	07/29/10	NE-09-009-08W1	08	4	4		0
T08-CB05-4	536657	5509738	07/29/10	NE-09-009-08W1	08	5	4		0
T08-CB06-4	536670	5509756	07/29/10	NE-09-009-08W1	08	6	4		0
T08-CB07-4	536614	5509729	07/29/10	NE-09-009-08W1	08	7	4		0
T08-CB08-4	536610	5509724	07/29/10	NE-09-009-08W1	08	8	4		0
T08-CB09-4	536617	5509722	07/29/10	NE-09-009-08W1	08	9	4		0
T08-CB10-4	536601	5509721	07/29/10	NE-09-009-08W1	08	10	4		0
T08-CB11-4	536592	5509733	07/29/10	NE-09-009-08W1	08	11	4		0
T08-CB12-4	536589	5509726	07/29/10	NE-09-009-08W1	08	12	4		0
T08-CB13-4	536589	5509720	07/29/10	NE-09-009-08W1	08	13	4		0
T08-CB14-4	536591	5509669	07/29/10	NE-09-009-08W1	08	14	4		0
T08-CB15-4	536598	5509666	07/29/10	NE-09-009-08W1	08	15	4		0
T08-CB16-4	536540	5509656	07/29/10	NE-09-009-08W1	08	16	4		0
T08-CB17-4	536591	5509625	07/29/10	NE-09-009-08W1	08	17	4		0
T08-CB18-4	536609	5509631	07/29/10	NE-09-009-08W1	08	18	4		0
T08-CB19-4	536627	5509636	07/29/10	NE-09-009-08W1	08	19	4		0
T08-CB20-4	536638	5509602	07/29/10	NE-09-009-08W1	08	20	4		0
T08-CB21-3	536598	5509674	07/29/10	NE-09-009-08W1	08	21	3		0
T08-CB22-3	536628	5509604	07/29/10	NE-09-009-08W1	08	22	3		0
T08-CB23-3	536631	5509609	07/29/10	NE-09-009-08W1	08	23	3		0
T08-CB24-3	536632	5509618	07/29/10	NE-09-009-08W1	08	24	3		0
T08-CB25-3	536569	5509647	07/29/10	NE-09-009-08W1	08	25	3		0
T08-CB26-2	536606	5509716	07/29/10	NE-09-009-08W1	08	26	2	Burrow	1
T08-CB27-2	536598	5509666	07/29/10	NE-09-009-08W1	08	27	2		0
T08-CB28-2	536582	5509658	07/29/10	NE-09-009-08W1	08	28	2		0
T08-CB29-2	536581	5509633	07/29/10	NE-09-009-08W1	08	29	2		0
T08-CB30-2	536597	5509623	07/29/10	NE-09-009-08W1	08	30	2		0
T08-CB31-2	536619	5509616	07/29/10	NE-09-009-08W1	08	31	2		0
T08-CB32-2	536630	5509612	07/29/10	NE-09-009-08W1	08	32	2		0
T08-CB33-2	536641	5509599	07/29/10	NE-09-009-08W1	08	33	2		0
T08-CB34-2	536652	5509585	07/29/10	NE-09-009-08W1	08	34	2		0
T08-CB35-2	536661	5509604	07/29/10	NE-09-009-08W1	08	35	2	Aves- mourning dove	1
T08-CB01-5	536600	5509709	08/03/10	NE-09-009-08W1	08	1	5		0
T08-CB02-5	536617	5509710	08/03/10	NE-09-009-08W1	08	2	5		0
T08-CB03-5	536630	5509711	08/03/10	NE-09-009-08W1	08	3	5		0
T08-CB04-5	536627	5509712	08/03/10	NE-09-009-08W1	08	4	5		0
T08-CB05-5	536657	5509738	08/03/10	NE-09-009-08W1	08	5	5		0
T08-CB06-5	536670	5509756	08/03/10	NE-09-009-08W1	08	6	5		0
T08-CB07-5	536614	5509729	08/03/10	NE-09-009-08W1	08	7	5		0
T08-CB08-5	536610	5509724	08/03/10	NE-09-009-08W1	08	8	5		0
T08-CB09-5	536617	5509722	08/03/10	NE-09-009-08W1	08	9	5		0
T08-CB10-5	536601	5509721	08/03/10	NE-09-009-08W1	08	10	5		0
T08-CB11-5	536592	5509733	08/03/10	NE-09-009-08W1	08	11	5		0
T08-CB12-5	536589	5509726	08/03/10	NE-09-009-08W1	08	12	5		0
T08-CB13-5	536589	5509720	08/03/10	NE-09-009-08W1	08	13	5		0
T08-CB14-5	536591	5509669	08/03/10	NE-09-009-08W1	08	14	5		0
T08-CB15-5	536598	5509666	08/03/10	NE-09-009-08W1	08	15	5		0
T08-CB16-5	536540	5509656	08/03/10	NE-09-009-08W1	08	16	5		0
T08-CB17-5	536591	5509625	08/03/10	NE-09-009-08W1	08	17	5		0

Table A4-4. Continued.

SAMPLE ID	(UTM ZONE 14U) EASTING	NORTHING	DATE	SITE ID	TRACK	CB #	VISIT	SPECIES	# OF INDS
T08-CB18-5	536609	5509631	08/03/10	NE-09-009-08W1	08	18	5		0
T08-CB19-5	536627	5509636	08/03/10	NE-09-009-08W1	08	19	5		0
T08-CB20-5	536638	5509602	08/03/10	NE-09-009-08W1	08	20	5		0
T08-CB21-4	536598	5509674	08/03/10	NE-09-009-08W1	08	21	4		0
T08-CB22-4	536628	5509604	08/03/10	NE-09-009-08W1	08	22	4		0
T08-CB23-4	536631	5509609	08/03/10	NE-09-009-08W1	08	23	4		0
T08-CB24-4	536632	5509618	08/03/10	NE-09-009-08W1	08	24	4		0
T08-CB25-4	536569	5509647	08/03/10	NE-09-009-08W1	08	25	4		0
T08-CB26-3	536606	5509716	08/03/10	NE-09-009-08W1	08	26	3		0
T08-CB27-3	536598	5509666	08/03/10	NE-09-009-08W1	08	27	3		0
T08-CB28-3	536582	5509658	08/03/10	NE-09-009-08W1	08	28	3		0
T08-CB29-3	536581	5509633	08/03/10	NE-09-009-08W1	08	29	3		0
T08-CB30-3	536597	5509623	08/03/10	NE-09-009-08W1	08	30	3		0
T08-CB31-3	536619	5509616	08/03/10	NE-09-009-08W1	08	31	3		0
T08-CB32-3	536630	5509612	08/03/10	NE-09-009-08W1	08	32	3		0
T08-CB33-3	536641	5509599	08/03/10	NE-09-009-08W1	08	33	3		0
T08-CB34-3	536652	5509585	08/03/10	NE-09-009-08W1	08	34	3		0
T08-CB35-3	536661	5509604	08/03/10	NE-09-009-08W1	08	35	3	Aves- mourning dove	1
T04-CB01-5	539800	5498354	08/03/10	SE-11-008-08W1	04	1	5		0
T04-CB02-5	539814	5498379	08/03/10	SE-11-008-08W1	04	2	5		0
T04-CB03-5	539811	5498394	08/03/10	SE-11-008-08W1	04	3	5		0
T04-CB04-5	539800	5498364	08/03/10	SE-11-008-08W1	04	4	5		0
T04-CB05-5	539812	5498376	08/03/10	SE-11-008-08W1	04	5	5		0
T03-CB06-5	539775	5498447	08/03/10	SE-11-008-08W1	03	6	5		0
T03-CB07-5	539811	5498493	08/03/10	SE-11-008-08W1	03	7	5		0
T03-CB08-5	539782	5498469	08/03/10	SE-11-008-08W1	03	8	5		0
T03-CB09-5	539791	5498491	08/03/10	SE-11-008-08W1	03	9	5		0
T03-CB10-5	539794	5498516	08/03/10	SE-11-008-08W1	03	10	5		0
T02-CB17-5	539760	5498953	08/03/10	SE-11-008-08W1	02	17	5		0
T02-CB18-5	539789	5498917	08/03/10	SE-11-008-08W1	02	18	5		0
T02-CB19-5	539765	5498861	08/03/10	SE-11-008-08W1	02	19	5		0
T02-CB20-5	539764	5498831	08/03/10	SE-11-008-08W1	02	20	5		0
T02-CB21-5	539776	5498803	08/03/10	SE-11-008-08W1	02	21	5		0
T02-CB22-5	539782	5498754	08/03/10	SE-11-008-08W1	02	22	5		0
T02-CB23-5	539814	5498800	08/03/10	SE-11-008-08W1	02	23	5		0
T02-CB24-5	539812	5498772	08/03/10	SE-11-008-08W1	02	24	5		0
T02-CB25-5	539795	5498750	08/03/10	SE-11-008-08W1	02	25	5		0
T02-CB26-5	539798	5498714	08/03/10	SE-11-008-08W1	02	26	5	Lepidoptera- moth	1
T02-CB27-5	539806	5498739	08/03/10	SE-11-008-08W1	02	27	5		0
T02-CB28-5	539790	5498834	08/03/10	SE-11-008-08W1	02	28	5		0
T02-CB29-5	539790	5498867	08/03/10	SE-11-008-08W1	02	29	5		0
T02-CB30-5	539790	5498867	08/03/10	SE-11-008-08W1	02	30	5		0
T01-CB11-05-5	539773	5499067	08/03/10	SE-11-008-08W1	01	11	5		0
T01-CB12-5	539784	5499042	08/03/10	SE-11-008-08W1	01	12	5		0
T01-CB13-5	539776	5499028	08/03/10	SE-11-008-08W1	01	13	5		0
T01-CB14-5	539787	5498987	08/03/10	SE-11-008-08W1	01	14	5	Anura- BCFR	1
T01-CB15-5	539788	5498997	08/03/10	SE-11-008-08W1	01	15	5		0
T01-CB16-5	539792	5499013	08/03/10	SE-11-008-08W1	01	16	5		0
T09-CB36-1	538966	5504523	08/05/10	NW-26-008-08W1	09	36	1		Set CB
T09-CB37-1	538982	5504517	08/05/10	NW-26-008-08W1	09	37	1		Set CB
T09-CB38-1	539029	5504523	08/05/10	NW-26-008-08W1	09	38	1		Set CB
T09-CB39-1	539068	5504520	08/05/10	NW-26-008-08W1	09	39	1		Set CB

Table A4-4. Continued.

SAMPLE ID	(UTM ZONE 14U) EASTING	NORTHING	DATE	SITE ID	TRACK	CB #	VISIT	SPECIES	# OF INDS
T09-CB40-1	539177	5504368	08/05/10	NW-26-008-08W1	09	40	1		Set CB
T09-CB41-1	539307	5504396	08/05/10	NW-26-008-08W1	09	41	1		Set CB
T09-CB42-1	539323	5504383	08/05/10	NW-26-008-08W1	09	42	1		Set CB
T09-CB43-1	539322	5504374	08/05/10	NW-26-008-08W1	09	43	1		Set CB
T09-CB44-1	539389	5504536	08/05/10	NW-26-008-08W1	09	44	1		Set CB
T09-CB45-1	539417	5504543	08/05/10	NW-26-008-08W1	09	45	1		Set CB
T09-CB46-1	539323	5504410	08/05/10	NW-26-008-08W1	09	46	1		Set CB
T09-CB47-1	539329	5504449	08/05/10	NW-26-008-08W1	09	47	1		Set CB
T09-CB48-1	539131	5504378	08/05/10	NW-26-008-08W1	09	48	1		Set CB
T09-CB49-1	539127	5504175	08/05/10	NW-26-008-08W1	10	49	1		Set CB
T09-CB50-1	539147	5504165	08/05/10	NW-26-008-08W1	10	50	1		Set CB
T09-CB51-1	539232	5504116	08/05/10	NW-26-008-08W1	10	51	1		Set CB
T09-CB52-1	539238	5504104	08/05/10	NW-26-008-08W1	10	52	1		Set CB
T09-CB53-1	539049	5504084	08/05/10	NW-26-008-08W1	10	53	1		Set CB
IO-T10-CB-01	539081	5504159	08/05/10	NW-26-008-08W1	10	IO	1	WOFR	1
T09-CB54-1	539238	5504098	08/05/10	NW-26-008-08W1	10	54	1		Set CB
T09-CB55-1	539232	5504087	08/05/10	NW-26-008-08W1	10	55	1		Set CB
T08-CB01-6	536600	5509709	08/10/10	NE-09-009-08W1	08	1	6		0
T08-CB02-6	536617	5509710	08/10/10	NE-09-009-08W1	08	2	6		0
T08-CB03-6	536630	5509711	08/10/10	NE-09-009-08W1	08	3	6		0
T08-CB04-6	536627	5509712	08/10/10	NE-09-009-08W1	08	4	6		0
T08-CB05-6	536657	5509738	08/10/10	NE-09-009-08W1	08	5	6		0
T08-CB06-6	536670	5509756	08/10/10	NE-09-009-08W1	08	6	6		0
T08-CB07-6	536614	5509729	08/10/10	NE-09-009-08W1	08	7	6		0
T08-CB08-6	536610	5509724	08/10/10	NE-09-009-08W1	08	8	6		0
T08-CB09-6	536617	5509722	08/10/10	NE-09-009-08W1	08	9	6		0
T08-CB10-6	536601	5509721	08/10/10	NE-09-009-08W1	08	10	6	Anura- Toad	2
T08-CB11-6	536592	5509733	08/10/10	NE-09-009-08W1	08	11	6		0
T08-CB12-6	536589	5509726	08/10/10	NE-09-009-08W1	08	12	6		0
T08-CB13-6	536589	5509720	08/10/10	NE-09-009-08W1	08	13	6		0
T08-CB14-6	536591	5509669	08/10/10	NE-09-009-08W1	08	14	6		0
T08-CB15-6	536598	5509666	08/10/10	NE-09-009-08W1	08	15	6		0
T08-CB16-6	536540	5509656	08/10/10	NE-09-009-08W1	08	16	6		0
T08-CB17-6	536591	5509625	08/10/10	NE-09-009-08W1	08	17	6		0
T08-CB18-6	536609	5509631	08/10/10	NE-09-009-08W1	08	18	6	Mammal-mouse	2
T08-CB19-6	536627	5509636	08/10/10	NE-09-009-08W1	08	19	6		0
T08-CB20-6	536638	5509602	08/10/10	NE-09-009-08W1	08	20	6		0
T08-CB21-5	536598	5509674	08/10/10	NE-09-009-08W1	08	21	5		0
T08-CB22-5	536628	5509604	08/10/10	NE-09-009-08W1	08	22	5		0
T08-CB23-5	536631	5509609	08/10/10	NE-09-009-08W1	08	23	5	Burrow/Hole	1
T08-CB24-5	536632	5509618	08/10/10	NE-09-009-08W1	08	24	5		0
T08-CB25-5	536569	5509647	08/10/10	NE-09-009-08W1	08	25	5		0
T08-CB26-4	536606	5509716	08/10/10	NE-09-009-08W1	08	26	4		0
T08-CB27-4	536598	5509666	08/10/10	NE-09-009-08W1	08	27	4		0
T08-CB28-4	536582	5509658	08/10/10	NE-09-009-08W1	08	28	4	Mammal-mouse	1
T08-CB29-4	536581	5509633	08/10/10	NE-09-009-08W1	08	29	4		0
T08-CB30-4	536597	5509623	08/10/10	NE-09-009-08W1	08	30	4		0
T08-CB31-4	536619	5509616	08/10/10	NE-09-009-08W1	08	31	4		0
T08-CB32-4	536630	5509612	08/10/10	NE-09-009-08W1	08	32	4		0
T08-CB33-4	536641	5509599	08/10/10	NE-09-009-08W1	08	33	4		0
T08-CB34-4	536652	5509585	08/10/10	NE-09-009-08W1	08	34	4		0
T08-CB35-4	536661	5509604	08/10/10	NE-09-009-08W1	08	35	4		0
T04-CB01-6	539800	5498354	08/10/10	SE-11-008-08W1	04	1	6		0

Table A4-4.   Continued.

SAMPLE ID	(UTM ZONE 14U) EASTING	NORTHING	DATE	SITE ID	TRACK	CB #	VISIT	SPECIES	# OF INDS
T04-CB02-6	539814	5498379	08/10/10	SE-11-008-08W1	04	2	6		0
T04-CB03-6	539811	5498394	08/10/10	SE-11-008-08W1	04	3	6		0
T04-CB04-6	539800	5498364	08/10/10	SE-11-008-08W1	04	4	6		0
T04-CB05-6	539812	5498376	08/10/10	SE-11-008-08W1	04	5	6		0
T03-CB06-6	539775	5498447	08/10/10	SE-11-008-08W1	03	6	6		0
T03-CB07-6	539811	5498493	08/10/10	SE-11-008-08W1	03	7	6		0
T03-CB08-6	539782	5498469	08/10/10	SE-11-008-08W1	03	8	6		0
T03-CB09-6	539791	5498491	08/10/10	SE-11-008-08W1	03	9	6		0
T03-CB10-6	539794	5498516	08/10/10	SE-11-008-08W1	03	10	6		0
T02-CB17-6	539760	5498953	08/10/10	SE-11-008-08W1	02	17	6		0
T02-CB18-6	539789	5498917	08/10/10	SE-11-008-08W1	02	18	6		0
T02-CB19-6	539765	5498861	08/10/10	SE-11-008-08W1	02	19	6		0
T02-CB20-6	539764	5498831	08/10/10	SE-11-008-08W1	02	20	6		0
T02-CB21-6	539776	5498803	08/10/10	SE-11-008-08W1	02	21	6		0
T02-CB22-6	539782	5498754	08/10/10	SE-11-008-08W1	02	22	6		0
T02-CB23-6	539814	5498800	08/10/10	SE-11-008-08W1	02	23	6		0
T02-CB24-6	539812	5498772	08/10/10	SE-11-008-08W1	02	24	6		0
T02-CB25-6	539795	5498750	08/10/10	SE-11-008-08W1	02	25	6		0
T02-CB26-6	539798	5498714	08/10/10	SE-11-008-08W1	02	26	6		0
T02-CB27-6	539806	5498739	08/10/10	SE-11-008-08W1	02	27	6		0
T02-CB28-6	539790	5498834	08/10/10	SE-11-008-08W1	02	28	6		0
T02-CB29-6	539790	5498867	08/10/10	SE-11-008-08W1	02	29	6		0
T02-CB30-6	539790	5498867	08/10/10	SE-11-008-08W1	02	30	6		0
T01-CB11-06-6	539773	5499067	08/10/10	SE-11-008-08W1	01	11	6		0
T01-CB12-6	539784	5499042	08/10/10	SE-11-008-08W1	01	12	6		0
T01-CB13-6	539776	5499028	08/10/10	SE-11-008-08W1	01	13	6		0
T01-CB14-6	539787	5498987	08/10/10	SE-11-008-08W1	01	14	6		0
T01-CB15-6	539788	5498997	08/10/10	SE-11-008-08W1	01	15	6		0
T01-CB16-6	539792	5499013	08/10/10	SE-11-008-08W1	01	16	6		0
T09-CB36-2	538966	5504523	08/10/10	NW-26-008-08W1	09	36	2		0
T09-CB37-2	538982	5504517	08/10/10	NW-26-008-08W1	09	37	2		0
T09-CB38-2	539029	5504523	08/10/10	NW-26-008-08W1	09	38	2		0
T09-CB39-2	539068	5504520	08/10/10	NW-26-008-08W1	09	39	2		0
T09-CB40-2	539177	5504368	08/10/10	NW-26-008-08W1	09	40	2		0
T09-CB41-2	539307	5504396	08/10/10	NW-26-008-08W1	09	41	2		0
T09-CB42-2	539323	5504383	08/10/10	NW-26-008-08W1	09	42	2		0
T09-CB43-2	539322	5504374	08/10/10	NW-26-008-08W1	09	43	2		0
T09-CB44-2	539389	5504536	08/10/10	NW-26-008-08W1	09	44	2		0
T09-CB45-2	539417	5504543	08/10/10	NW-26-008-08W1	09	45	2		0
T09-CB46-2	539323	5504410	08/10/10	NW-26-008-08W1	09	46	2		0
T09-CB47-2	539329	5504449	08/10/10	NW-26-008-08W1	09	47	2		0
T09-CB48-2	539131	5504378	08/10/10	NW-26-008-08W1	09	48	2		0
IO-T09-CB-01	539357	5504527	08/10/10	NW-26-008-08W1	09	IO	2	Lepidoptera- Nymphalidae- Nymphalis antiopa (mourning cloak)	1
IO-T09-CB-02	539312	5504553	08/10/10	NW-26-008-08W1	09	IO	2	Anura- Toad	1
T09-CB49-2	539127	5504175	08/10/10	NW-26-008-08W1	10	49	2		0
T09-CB50-2	539147	5504165	08/10/10	NW-26-008-08W1	10	50	2		0
T09-CB51-2	539232	5504116	08/10/10	NW-26-008-08W1	10	51	2		0
T09-CB52-2	539238	5504104	08/10/10	NW-26-008-08W1	10	52	2		0
T09-CB53-2	539049	5504084	08/10/10	NW-26-008-08W1	10	53	2		0

Table A4-4. Continued.

SAMPLE ID	(UTM ZONE 14U) EASTING	NORTHING	DATE	SITE ID	TRACK	CB #	VISIT	SPECIES	# OF INDS
T09-CB54-2	539238	5504098	08/10/10	NW-26-008-08W1	10	54	2		0
T09-CB55-2	539232	5504087	08/10/10	NW-26-008-08W1	10	55	2		0
IO-T10-CB-02	539336	5504499	08/10/10	NW-26-008-08W1	10	IO	2	Anura- WOFR	2
IO-T10-CB-03	539357	5504526	08/10/10	NW-26-008-08W1	10	IO	2	Anura- Toad	1
IO-T10-CB-04	539209	5504331	08/10/10	NW-26-008-08W1	10	IO	2	Nymphalidae-Viceroy-Limenitis archippus	1
T08-CB01-7	536600	5509709	08/16/10	NE-09-009-08W1	08	1	7		0
T08-CB02-7	536617	5509710	08/16/10	NE-09-009-08W1	08	2	7		0
T08-CB03-7	536630	5509711	08/16/10	NE-09-009-08W1	08	3	7		0
T08-CB04-7	536627	5509712	08/16/10	NE-09-009-08W1	08	4	7		0
T08-CB05-7	536657	5509738	08/16/10	NE-09-009-08W1	08	5	7		0
T08-CB06-7	536670	5509756	08/16/10	NE-09-009-08W1	08	6	7		0
T08-CB07-7	536614	5509729	08/16/10	NE-09-009-08W1	08	7	7		N/A
T08-CB08-7	536610	5509724	08/16/10	NE-09-009-08W1	08	8	7		0
T08-CB09-7	536617	5509722	08/16/10	NE-09-009-08W1	08	9	7		0
T08-CB10-7	536601	5509721	08/16/10	NE-09-009-08W1	08	10	7		0
T08-CB11-7	536592	5509733	08/16/10	NE-09-009-08W1	08	11	7		0
T08-CB12-7	536589	5509726	08/16/10	NE-09-009-08W1	08	12	7		0
T08-CB13-7	536589	5509720	08/16/10	NE-09-009-08W1	08	13	7		0
T08-CB14-7	536591	5509669	08/16/10	NE-09-009-08W1	08	14	7	Burrow	1
T08-CB15-7	536598	5509666	08/16/10	NE-09-009-08W1	08	15	7		0
T08-CB16-7	536540	5509656	08/16/10	NE-09-009-08W1	08	16	7		0
T08-CB17-7	536591	5509625	08/16/10	NE-09-009-08W1	08	17	7		0
T08-CB18-7	536609	5509631	08/16/10	NE-09-009-08W1	08	18	7	Nest- mouse	1
T08-CB19-7	536627	5509636	08/16/10	NE-09-009-08W1	08	19	7		0
T08-CB20-7	536638	5509602	08/16/10	NE-09-009-08W1	08	20	7		0
T08-CB21-6	536598	5509674	08/16/10	NE-09-009-08W1	08	21	6		0
T08-CB22-6	536628	5509604	08/16/10	NE-09-009-08W1	08	22	6		0
T08-CB23-6	536631	5509609	08/16/10	NE-09-009-08W1	08	23	6		0
T08-CB24-6	536632	5509618	08/16/10	NE-09-009-08W1	08	24	6		0
T08-CB25-6	536569	5509647	08/16/10	NE-09-009-08W1	08	25	6		0
T08-CB26-5	536606	5509716	08/16/10	NE-09-009-08W1	08	26	5		0
T08-CB27-5	536598	5509666	08/16/10	NE-09-009-08W1	08	27	5		0
T08-CB28-5	536582	5509658	08/16/10	NE-09-009-08W1	08	28	5		0
T08-CB29-5	536581	5509633	08/16/10	NE-09-009-08W1	08	29	5		0
T08-CB30-5	536597	5509623	08/16/10	NE-09-009-08W1	08	30	5		0
T08-CB31-5	536619	5509616	08/16/10	NE-09-009-08W1	08	31	5		0
T08-CB32-5	536630	5509612	08/16/10	NE-09-009-08W1	08	32	5		0
T08-CB33-5	536641	5509599	08/16/10	NE-09-009-08W1	08	33	5		0
T08-CB34-5	536652	5509585	08/16/10	NE-09-009-08W1	08	34	5		0
T08-CB35-5	536661	5509604	08/16/10	NE-09-009-08W1	08	35	5		0
T04-CB01-7	539800	5498354	08/16/10	SE-11-008-08W1	04	1	7		0
T04-CB02-7	539814	5498379	08/16/10	SE-11-008-08W1	04	2	7		0
T04-CB03-7	539811	5498394	08/16/10	SE-11-008-08W1	04	3	7		0
T04-CB04-7	539800	5498364	08/16/10	SE-11-008-08W1	04	4	7		0
T04-CB05-7	539812	5498376	08/16/10	SE-11-008-08W1	04	5	7	Nest- deer mouse	1
T03-CB06-7	539775	5498447	08/16/10	SE-11-008-08W1	03	6	7		0
T03-CB07-7	539811	5498493	08/16/10	SE-11-008-08W1	03	7	7		0
T03-CB08-7	539782	5498469	08/16/10	SE-11-008-08W1	03	8	7		0
T03-CB09-7	539791	5498491	08/16/10	SE-11-008-08W1	03	9	7		0
T03-CB10-7	539794	5498516	08/16/10	SE-11-008-08W1	03	10	7		0
T02-CB17-7	539760	5498953	08/16/10	SE-11-008-08W1	02	17	7		0

Table A4-4. Continued.

SAMPLE ID	(UTM ZONE 14U) EASTING	NORTHING	DATE	SITE ID	TRACK	CB #	VISIT	SPECIES	# OF INDS
T02-CB18-7	539789	5498917	08/16/10	SE-11-008-08W1	02	18	7		0
T02-CB19-7	539765	5498861	08/16/10	SE-11-008-08W1	02	19	7		0
T02-CB20-7	539764	5498831	08/16/10	SE-11-008-08W1	02	20	7		0
T02-CB21-7	539776	5498803	08/16/10	SE-11-008-08W1	02	21	7		0
T02-CB22-7	539782	5498754	08/16/10	SE-11-008-08W1	02	22	7		0
T02-CB23-7	539814	5498800	08/16/10	SE-11-008-08W1	02	23	7		0
T02-CB24-7	539812	5498772	08/16/10	SE-11-008-08W1	02	24	7		0
T02-CB25-7	539795	5498750	08/16/10	SE-11-008-08W1	02	25	7		0
T02-CB26-7	539798	5498714	08/16/10	SE-11-008-08W1	02	26	7		0
T02-CB27-7	539806	5498739	08/16/10	SE-11-008-08W1	02	27	7		0
T02-CB28-7	539790	5498834	08/16/10	SE-11-008-08W1	02	28	7		0
T02-CB29-7	539790	5498867	08/16/10	SE-11-008-08W1	02	29	7		0
T02-CB30-7	539790	5498867	08/16/10	SE-11-008-08W1	02	30	7		0
T01-CB11-07-7	539773	5499067	08/16/10	SE-11-008-08W1	01	11	7		0
T01-CB12-7	539784	5499042	08/16/10	SE-11-008-08W1	01	12	7		0
T01-CB13-7	539776	5499028	08/16/10	SE-11-008-08W1	01	13	7		0
T01-CB14-7	539787	5498987	08/16/10	SE-11-008-08W1	01	14	7		0
T01-CB15-7	539788	5498997	08/16/10	SE-11-008-08W1	01	15	7		0
T01-CB16-7	539792	5499013	08/16/10	SE-11-008-08W1	01	16	7		0
T09-CB36-3	538966	5504523	08/16/10	NW-26-008-08W1	09	36	3		0
T09-CB37-3	538982	5504517	08/16/10	NW-26-008-08W1	09	37	3		0
T09-CB38-3	539029	5504523	08/16/10	NW-26-008-08W1	09	38	3		0
T09-CB39-3	539068	5504520	08/16/10	NW-26-008-08W1	09	39	3		0
T09-CB40-3	539177	5504368	08/16/10	NW-26-008-08W1	09	40	3		0
IO-T09-CB-03	539307	5504396	08/16/10	NW-26-008-08W1	09	IO	3	Reptilia- GASN	1
T09-CB41-3	539307	5504396	08/16/10	NW-26-008-08W1	09	41	3		0
T09-CB42-3	539323	5504383	08/16/10	NW-26-008-08W1	09	42	3		0
T09-CB43-3	539322	5504374	08/16/10	NW-26-008-08W1	09	43	3		0
T09-CB44-3	539389	5504536	08/16/10	NW-26-008-08W1	09	44	3		0
T09-CB45-3	539417	5504543	08/16/10	NW-26-008-08W1	09	45	3	Burrow	1
T09-CB46-3	539323	5504410	08/16/10	NW-26-008-08W1	09	46	3		0
T09-CB47-3	539329	5504449	08/16/10	NW-26-008-08W1	09	47	3		0
T09-CB48-3	539131	5504378	08/16/10	NW-26-008-08W1	09	48	3		0
T09-CB49-3	539127	5504175	08/16/10	NW-26-008-08W1	10	49	3		0
T09-CB50-3	539147	5504165	08/16/10	NW-26-008-08W1	10	50	3		0
T09-CB51-3	539232	5504116	08/16/10	NW-26-008-08W1	10	51	3		0
T09-CB52-3	539238	5504104	08/16/10	NW-26-008-08W1	10	52	3		0
T09-CB53-3	539049	5504084	08/16/10	NW-26-008-08W1	10	53	3		0
T09-CB54-3	539238	5504098	08/16/10	NW-26-008-08W1	10	54	3		0
T09-CB55-3	539232	5504087	08/16/10	NW-26-008-08W1	10	55	3		0
T08-CB01-8	536600	5509709	08/26/10	NE-09-009-08W1	08	1	8		0
T08-CB02-8	536617	5509710	08/26/10	NE-09-009-08W1	08	2	8		0
T08-CB03-8	536630	5509711	08/26/10	NE-09-009-08W1	08	3	8		0
T08-CB04-8	536627	5509712	08/26/10	NE-09-009-08W1	08	4	8		0
T08-CB05-8	536657	5509738	08/26/10	NE-09-009-08W1	08	5	8		0
T08-CB06-8	536670	5509756	08/26/10	NE-09-009-08W1	08	6	8		0
T08-CB07-8	536614	5509729	08/26/10	NE-09-009-08W1	08	7	8		0
T08-CB08-8	536610	5509724	08/26/10	NE-09-009-08W1	08	8	8		0
T08-CB09-8	536617	5509722	08/26/10	NE-09-009-08W1	08	9	8		0
T08-CB10-8	536601	5509721	08/26/10	NE-09-009-08W1	08	10	8		0
T08-CB11-8	536592	5509733	08/26/10	NE-09-009-08W1	08	11	8		0
T08-CB12-8	536589	5509726	08/26/10	NE-09-009-08W1	08	12	8		0
T08-CB13-8	536589	5509720	08/26/10	NE-09-009-08W1	08	13	8		0

Table A4-4. Continued.

SAMPLE ID	(UTM ZONE 14U) EASTING	NORTHING	DATE	SITE ID	TRACK	CB #	VISIT	SPECIES	# OF INDS
T08-CB14-8	536591	5509669	08/26/10	NE-09-009-08W1	08	14	8		0
T08-CB15-8	536598	5509666	08/26/10	NE-09-009-08W1	08	15	8		0
T08-CB16-8	536540	5509656	08/26/10	NE-09-009-08W1	08	16	8		0
T08-CB17-8	536591	5509625	08/26/10	NE-09-009-08W1	08	17	8		0
T08-CB18-8	536609	5509631	08/26/10	NE-09-009-08W1	08	18	8		0
T08-CB19-8	536627	5509636	08/26/10	NE-09-009-08W1	08	19	8		0
T08-CB20-8	536638	5509602	08/26/10	NE-09-009-08W1	08	20	8		0
T08-CB21-7	536598	5509674	08/26/10	NE-09-009-08W1	08	21	7		0
T08-CB22-7	536628	5509604	08/26/10	NE-09-009-08W1	08	22	7		0
T08-CB23-7	536631	5509609	08/26/10	NE-09-009-08W1	08	23	7		0
T08-CB24-7	536632	5509618	08/26/10	NE-09-009-08W1	08	24	7		0
T08-CB25-7	536569	5509647	08/26/10	NE-09-009-08W1	08	25	7		0
T08-CB26-6	536606	5509716	08/26/10	NE-09-009-08W1	08	26	6		0
T08-CB27-6	536598	5509666	08/26/10	NE-09-009-08W1	08	27	6		0
T08-CB28-6	536582	5509658	08/26/10	NE-09-009-08W1	08	28	6		0
T08-CB29-6	536581	5509633	08/26/10	NE-09-009-08W1	08	29	6		0
T08-CB30-6	536597	5509623	08/26/10	NE-09-009-08W1	08	30	6		0
T08-CB31-6	536619	5509616	08/26/10	NE-09-009-08W1	08	31	6		0
T08-CB32-6	536630	5509612	08/26/10	NE-09-009-08W1	08	32	6		0
T08-CB33-6	536641	5509599	08/26/10	NE-09-009-08W1	08	33	6		0
T08-CB34-6	536652	5509585	08/26/10	NE-09-009-08W1	08	34	6		0
T08-CB35-6	536661	5509604	08/26/10	NE-09-009-08W1	08	35	6		0
T09-CB36-4	538966	5504523	08/26/10	NW-26-008-08W1	09	36	4		0
T09-CB37-4	538982	5504517	08/26/10	NW-26-008-08W1	09	37	4		0
T09-CB38-4	539029	5504523	08/26/10	NW-26-008-08W1	09	38	4		0
T09-CB39-4	539068	5504520	08/26/10	NW-26-008-08W1	09	39	4		0
T09-CB40-4	539177	5504368	08/26/10	NW-26-008-08W1	09	40	4		0
T09-CB41-4	539307	5504396	08/26/10	NW-26-008-08W1	09	41	4		0
T09-CB42-4	539323	5504383	08/26/10	NW-26-008-08W1	09	42	4		0
T09-CB43-4	539322	5504374	08/26/10	NW-26-008-08W1	09	43	4		0
T09-CB44-4	539389	5504536	08/26/10	NW-26-008-08W1	09	44	4		0
T09-CB45-4	539417	5504543	08/26/10	NW-26-008-08W1	09	45	4		0
T09-CB46-4	539323	5504410	08/26/10	NW-26-008-08W1	09	46	4		0
T09-CB47-4	539329	5504449	08/26/10	NW-26-008-08W1	09	47	4		0
T09-CB48-4	539131	5504378	08/26/10	NW-26-008-08W1	09	48	4		0
T09-CB49-4	539127	5504175	08/26/10	NW-26-008-08W1	10	49	4		0
T09-CB50-4	539147	5504165	08/26/10	NW-26-008-08W1	10	50	4		0
T09-CB51-4	539232	5504116	08/26/10	NW-26-008-08W1	10	51	4		0
T09-CB52-4	539238	5504104	08/26/10	NW-26-008-08W1	10	52	4		0
T09-CB53-4	539049	5504084	08/26/10	NW-26-008-08W1	10	53	4		0
T09-CB54-4	539238	5504098	08/26/10	NW-26-008-08W1	10	54	4		0
T09-CB55-4	539232	5504087	08/26/10	NW-26-008-08W1	10	55	4		0
T04-CB01-8	539800	5498354	08/26/10	SE-11-008-08W1	04	1	8		0
T04-CB02-8	539814	5498379	08/26/10	SE-11-008-08W1	04	2	8		0
T04-CB03-8	539811	5498394	08/26/10	SE-11-008-08W1	04	3	8		0
T04-CB04-8	539800	5498364	08/26/10	SE-11-008-08W1	04	4	8		0
T04-CB05-8	539812	5498376	08/26/10	SE-11-008-08W1	04	5	8	Mammal-mouse nest	1
T03-CB06-8	539775	5498447	08/26/10	SE-11-008-08W1	03	6	8	Mammal-mouse nest?	1
T03-CB07-8	539811	5498493	08/26/10	SE-11-008-08W1	03	7	8		0
T03-CB08-8	539782	5498469	08/26/10	SE-11-008-08W1	03	8	8		0
T03-CB09-8	539791	5498491	08/26/10	SE-11-008-08W1	03	9	8		0
T03-CB10-8	539794	5498516	08/26/10	SE-11-008-08W1	03	10	8		0
T02-CB17-8	539760	5498953	08/26/10	SE-11-008-08W1	02	17	8		0

Table A4-4. Continued.

	(UTM ZONE 14U)								
SAMPLE ID	**EASTING**	**NORTHING**	**DATE**	**SITE ID**	**TRACK**	**CB #**	**VISIT**	**SPECIES**	**# OF INDS**
T02-CB18-8	539789	5498917	08/26/10	SE-11-008-08W1	02	18	8		0
T02-CB19-8	539765	5498861	08/26/10	SE-11-008-08W1	02	19	8		0
T02-CB20-8	539764	5498831	08/26/10	SE-11-008-08W1	02	20	8		0
T02-CB21-8	539776	5498803	08/26/10	SE-11-008-08W1	02	21	8		0
T02-CB22-8	539782	5498754	08/26/10	SE-11-008-08W1	02	22	8		0
T02-CB23-8	539814	5498800	08/26/10	SE-11-008-08W1	02	23	8		0
T02-CB24-8	539812	5498772	08/26/10	SE-11-008-08W1	02	24	8		0
T02-CB25-8	539795	5498750	08/26/10	SE-11-008-08W1	02	25	8		0
T02-CB26-8	539798	5498714	08/26/10	SE-11-008-08W1	02	26	8		0
T02-CB27-8	539806	5498739	08/26/10	SE-11-008-08W1	02	27	8		0
T02-CB28-8	539790	5498834	08/26/10	SE-11-008-08W1	02	28	8		0
T02-CB29-8	539790	5498867	08/26/10	SE-11-008-08W1	02	29	8		0
T02-CB30-8	539790	5498867	08/26/10	SE-11-008-08W1	02	30	8		0
T01-CB11-08-8	539773	5499067	08/26/10	SE-11-008-08W1	01	11	8		0
T01-CB12-8	539784	5499042	08/26/10	SE-11-008-08W1	01	12	8		0
T01-CB13-8	539776	5499028	08/26/10	SE-11-008-08W1	01	13	8		0
T01-CB14-8	539787	5498987	08/26/10	SE-11-008-08W1	01	14	8		0
T01-CB15-8	539788	5498997	08/26/10	SE-11-008-08W1	01	15	8		0
T01-CB16-8	539792	5499013	08/26/10	SE-11-008-08W1	01	16	8		0
T08-CB01-9	536600	5509709	09/03/10	NE-09-009-08W1	08	1	9		0
T08-CB02-9	536617	5509710	09/03/10	NE-09-009-08W1	08	2	9		0
T08-CB03-9	536630	5509711	09/03/10	NE-09-009-08W1	08	3	9		0
T08-CB04-9	536627	5509712	09/03/10	NE-09-009-08W1	08	4	9		0
T08-CB05-9	536657	5509738	09/03/10	NE-09-009-08W1	08	5	9		0
T08-CB06-9	536670	5509756	09/03/10	NE-09-009-08W1	08	6	9		0
T08-CB07-9	536614	5509729	09/03/10	NE-09-009-08W1	08	7	9		0
T08-CB08-9	536610	5509724	09/03/10	NE-09-009-08W1	08	8	9		0
T08-CB09-9	536617	5509722	09/03/10	NE-09-009-08W1	08	9	9		0
T08-CB10-9	536601	5509721	09/03/10	NE-09-009-08W1	08	10	9	Burrow	1
T08-CB11-9	536592	5509733	09/03/10	NE-09-009-08W1	08	11	9		0
T08-CB12-9	536589	5509726	09/03/10	NE-09-009-08W1	08	12	9	Burrow	1
T08-CB13-9	536589	5509720	09/03/10	NE-09-009-08W1	08	13	9		0
T08-CB14-9	536591	5509669	09/03/10	NE-09-009-08W1	08	14	9		1
T08-CB15-9	536598	5509666	09/03/10	NE-09-009-08W1	08	15	9		0
T08-CB16-9	536540	5509656	09/03/10	NE-09-009-08W1	08	16	9		0
T08-CB17-9	536591	5509625	09/03/10	NE-09-009-08W1	08	17	9		0
T08-CB18-9	536609	5509631	09/03/10	NE-09-009-08W1	08	18	9		0
T08-CB19-9	536627	5509636	09/03/10	NE-09-009-08W1	08	19	9		0
T08-CB20-9	536638	5509602	09/03/10	NE-09-009-08W1	08	20	9		0
T08-CB21-8	536598	5509674	09/03/10	NE-09-009-08W1	08	21	8		0
T08-CB22-8	536628	5509604	09/03/10	NE-09-009-08W1	08	22	8		0
T08-CB23-8	536631	5509609	09/03/10	NE-09-009-08W1	08	23	8		0
T08-CB24-8	536632	5509618	09/03/10	NE-09-009-08W1	08	24	8		0
T08-CB25-8	536569	5509647	09/03/10	NE-09-009-08W1	08	25	8		0
T08-CB26-7	536606	5509716	09/03/10	NE-09-009-08W1	08	26	7		0
T08-CB27-7	536598	5509666	09/03/10	NE-09-009-08W1	08	27	7		0
T08-CB28-7	536582	5509658	09/03/10	NE-09-009-08W1	08	28	7		0
T08-CB29-7	536581	5509633	09/03/10	NE-09-009-08W1	08	29	7		0
T08-CB30-7	536597	5509623	09/03/10	NE-09-009-08W1	08	30	7		0
T08-CB31-7	536619	5509616	09/03/10	NE-09-009-08W1	08	31	7		0
T08-CB32-7	536630	5509612	09/03/10	NE-09-009-08W1	08	32	7		0
T08-CB33-7	536641	5509599	09/03/10	NE-09-009-08W1	08	33	7		0
T08-CB34-7	536652	5509585	09/03/10	NE-09-009-08W1	08	34	7		0

Table A4-4. Continued.

SAMPLE ID	(UTM ZONE 14U) EASTING	NORTHING	DATE	SITE ID	TRACK	CB #	VISIT	SPECIES	# OF INDS
T08-CB35-7	536661	5509604	09/03/10	NE-09-009-08W1	08	35	7		0
T09-CB36-5	538966	5504523	09/03/10	NW-26-008-08W1	09	36	5		0
T09-CB37-5	538982	5504517	09/03/10	NW-26-008-08W1	09	37	5		0
T09-CB38-5	539029	5504523	09/03/10	NW-26-008-08W1	09	38	5		0
T09-CB39-5	539068	5504520	09/03/10	NW-26-008-08W1	09	39	5		0
T09-CB40-5	539177	5504368	09/03/10	NW-26-008-08W1	09	40	5		0
T09-CB41-5	539307	5504396	09/03/10	NW-26-008-08W1	09	41	5		0
T09-CB42-5	539323	5504383	09/03/10	NW-26-008-08W1	09	42	5		0
T09-CB43-5	539322	5504374	09/03/10	NW-26-008-08W1	09	43	5		0
T09-CB44-5	539389	5504536	09/03/10	NW-26-008-08W1	09	44	5	Tunnels- mouse	1
T09-CB45-5	539417	5504543	09/03/10	NW-26-008-08W1	09	45	5	Tunnels- mouse	1
T09-CB46-5	539323	5504410	09/03/10	NW-26-008-08W1	09	46	5		0
T09-CB47-5	539329	5504449	09/03/10	NW-26-008-08W1	09	47	5		0
T09-CB48-5	539131	5504378	09/03/10	NW-26-008-08W1	09	48	5		0
T09-CB49-5	539127	5504175	09/03/10	NW-26-008-08W1	10	49	5		0
T09-CB50-5	539147	5504165	09/03/10	NW-26-008-08W1	10	50	5		0
T09-CB51-5	539232	5504116	09/03/10	NW-26-008-08W1	10	51	5		0
T09-CB52-5	539238	5504104	09/03/10	NW-26-008-08W1	10	52	5		0
T09-CB53-5	539049	5504084	09/03/10	NW-26-008-08W1	10	53	5		0
T09-CB54-5	539238	5504098	09/03/10	NW-26-008-08W1	10	54	5		0
T09-CB55-5	539232	5504087	09/03/10	NW-26-008-08W1	10	55	5		0
T04-CB01-9	539800	5498354	09/03/10	SE-11-008-08W1	04	1	9		0
T04-CB02-9	539814	5498379	09/03/10	SE-11-008-08W1	04	2	9		0
T04-CB03-9	539811	5498394	09/03/10	SE-11-008-08W1	04	3	9		0
T04-CB04-9	539800	5498364	09/03/10	SE-11-008-08W1	04	4	9		0
T04-CB05-9	539812	5498376	09/03/10	SE-11-008-08W1	04	5	9	Nest- Mammal	1
T03-CB06-9	539775	5498447	09/03/10	SE-11-008-08W1	03	6	9		0
T03-CB07-9	539811	5498493	09/03/10	SE-11-008-08W1	03	7	9		0
T03-CB08-9	539782	5498469	09/03/10	SE-11-008-08W1	03	8	9		0
T03-CB09-9	539791	5498491	09/03/10	SE-11-008-08W1	03	9	9		0
T03-CB10-9	539794	5498516	09/03/10	SE-11-008-08W1	03	10	9		0
T02-CB17-9	539760	5498953	09/03/10	SE-11-008-08W1	02	17	9		0
T02-CB18-9	539789	5498917	09/03/10	SE-11-008-08W1	02	18	9		0
T02-CB19-9	539765	5498861	09/03/10	SE-11-008-08W1	02	19	9		0
T02-CB20-9	539764	5498831	09/03/10	SE-11-008-08W1	02	20	9		0
T02-CB21-9	539776	5498803	09/03/10	SE-11-008-08W1	02	21	9		0
T02-CB22-9	539782	5498754	09/03/10	SE-11-008-08W1	02	22	9		0
T02-CB23-9	539814	5498800	09/03/10	SE-11-008-08W1	02	23	9		0
T02-CB24-9	539812	5498772	09/03/10	SE-11-008-08W1	02	24	9		0
T02-CB25-9	539795	5498750	09/03/10	SE-11-008-08W1	02	25	9		0
T02-CB26-9	539798	5498714	09/03/10	SE-11-008-08W1	02	26	9		0
T02-CB27-9	539806	5498739	09/03/10	SE-11-008-08W1	02	27	9		0
T02-CB28-9	539790	5498834	09/03/10	SE-11-008-08W1	02	28	9		0
T02-CB29-9	539790	5498867	09/03/10	SE-11-008-08W1	02	29	9		0
T02-CB30-9	539790	5498867	09/03/10	SE-11-008-08W1	02	30	9		0
IO-T02-CB-04	539776	5498803	09/03/10	SE-11-008-08W1	02	IO	9	Aves- sandhill cranes	57
T01-CB11-09-9	539773	5499067	09/03/10	SE-11-008-08W1	01	11	9		0
T01-CB12-9	539784	5499042	09/03/10	SE-11-008-08W1	01	12	9		0
T01-CB13-9	539776	5499028	09/03/10	SE-11-008-08W1	01	13	9		0
T01-CB14-9	539787	5498987	09/03/10	SE-11-008-08W1	01	14	9		0
T01-CB15-9	539788	5498997	09/03/10	SE-11-008-08W1	01	15	9		0
T01-CB16-9	539792	5499013	09/03/10	SE-11-008-08W1	01	16	9		0
T08-CB01-10	536600	5509709	09/14/10	NE-09-009-08W1	08	1	10		0

Table A4-4. Continued.

	(UTM ZONE 14U)								
SAMPLE ID	EASTING	NORTHING	DATE	SITE ID	TRACK	CB #	VISIT	SPECIES	# OF INDS
T08-CB02-10	536617	5509710	09/14/10	NE-09-009-08W1	08	2	10		0
T08-CB03-10	536630	5509711	09/14/10	NE-09-009-08W1	08	3	10		0
T08-CB04-10	536627	5509712	09/14/10	NE-09-009-08W1	08	4	10		0
T08-CB05-10	536657	5509738	09/14/10	NE-09-009-08W1	08	5	10		0
T08-CB06-10	536670	5509756	09/14/10	NE-09-009-08W1	08	6	10		0
T08-CB07-10	536614	5509729	09/14/10	NE-09-009-08W1	08	7	10		0
T08-CB08-10	536610	5509724	09/14/10	NE-09-009-08W1	08	8	10		0
T08-CB09-10	536617	5509722	09/14/10	NE-09-009-08W1	08	9	10		0
T08-CB10-10	536601	5509721	09/14/10	NE-09-009-08W1	08	10	10		0
T08-CB11-10	536592	5509733	09/14/10	NE-09-009-08W1	08	11	10		0
T08-CB12-10	536589	5509726	09/14/10	NE-09-009-08W1	08	12	10		0
T08-CB13-10	536589	5509720	09/14/10	NE-09-009-08W1	08	13	10		0
T08-CB14-10	536591	5509669	09/14/10	NE-09-009-08W1	08	14	10		0
T08-CB15-10	536598	5509666	09/14/10	NE-09-009-08W1	08	15	10		0
T08-CB16-10	536540	5509656	09/14/10	NE-09-009-08W1	08	16	10		0
T08-CB17-10	536591	5509625	09/14/10	NE-09-009-08W1	08	17	10		0
T08-CB18-10	536609	5509631	09/14/10	NE-09-009-08W1	08	18	10		0
T08-CB19-10	536627	5509636	09/14/10	NE-09-009-08W1	08	19	10		0
T08-CB20-10	536638	5509602	09/14/10	NE-09-009-08W1	08	20	10		0
T08-CB21-9	536598	5509674	09/14/10	NE-09-009-08W1	08	21	9		0
T08-CB22-9	536628	5509604	09/14/10	NE-09-009-08W1	08	22	9		0
T08-CB23-9	536631	5509609	09/14/10	NE-09-009-08W1	08	23	9		0
T08-CB24-9	536632	5509618	09/14/10	NE-09-009-08W1	08	24	9		0
T08-CB25-9	536569	5509647	09/14/10	NE-09-009-08W1	08	25	9		0
T08-CB26-8	536606	5509716	09/14/10	NE-09-009-08W1	08	26	8		0
T08-CB27-8	536598	5509666	09/14/10	NE-09-009-08W1	08	27	8		0
T08-CB28-8	536582	5509658	09/14/10	NE-09-009-08W1	08	28	8		0
T08-CB29-8	536581	5509633	09/14/10	NE-09-009-08W1	08	29	8		0
T08-CB30-8	536597	5509623	09/14/10	NE-09-009-08W1	08	30	8		0
T08-CB31-8	536619	5509616	09/14/10	NE-09-009-08W1	08	31	8		0
T08-CB32-8	536630	5509612	09/14/10	NE-09-009-08W1	08	32	8		0
T08-CB33-8	536641	5509599	09/14/10	NE-09-009-08W1	08	33	8		0
T08-CB34-8	536652	5509585	09/14/10	NE-09-009-08W1	08	34	8		0
T08-CB35-8	536661	5509604	09/14/10	NE-09-009-08W1	08	35	8		0
T04-CB01-10	539800	5498354	09/14/10	SE-11-008-08W1	04	1	10		0
T04-CB02-10	539814	5498379	09/14/10	SE-11-008-08W1	04	2	10		0
T04-CB03-10	539811	5498394	09/14/10	SE-11-008-08W1	04	3	10		0
T04-CB04-10	539800	5498364	09/14/10	SE-11-008-08W1	04	4	10		0
T04-CB05-10	539812	5498376	09/14/10	SE-11-008-08W1	04	5	10	Mammal	1
T03-CB06-10	539775	5498447	09/14/10	SE-11-008-08W1	03	6	10	Mammal	1
T03-CB07-10	539811	5498493	09/14/10	SE-11-008-08W1	03	7	10		0
T03-CB08-10	539782	5498469	09/14/10	SE-11-008-08W1	03	8	10		0
T03-CB09-10	539791	5498491	09/14/10	SE-11-008-08W1	03	9	10		0
T03-CB10-10	539794	5498516	09/14/10	SE-11-008-08W1	03	10	10		0
T02-CB17-10	539760	5498953	09/14/10	SE-11-008-08W1	02	17	10		0
T02-CB18-10	539789	5498917	09/14/10	SE-11-008-08W1	02	18	10		0
T02-CB19-10	539765	5498861	09/14/10	SE-11-008-08W1	02	19	10		0
T02-CB20-10	539764	5498831	09/14/10	SE-11-008-08W1	02	20	10		0
T02-CB21-10	539776	5498803	09/14/10	SE-11-008-08W1	02	21	10		0
T02-CB22-10	539782	5498754	09/14/10	SE-11-008-08W1	02	22	10		0
T02-CB23-10	539814	5498800	09/14/10	SE-11-008-08W1	02	23	10		0
T02-CB24-10	539812	5498772	09/14/10	SE-11-008-08W1	02	24	10		0
T02-CB25-10	539795	5498750	09/14/10	SE-11-008-08W1	02	25	10		0
T02-CB26-10	539798	5498714	09/14/10	SE-11-008-08W1	02	26	10		0

Table A4-4. Continued.

SAMPLE ID	(UTM ZONE 14U) EASTING	NORTHING	DATE	SITE ID	TRACK	CB #	VISIT	SPECIES	# OF INDS
T02-CB27-10	539806	5498739	09/14/10	SE-11-008-08W1	02	27	10		0
T02-CB28-10	539790	5498834	09/14/10	SE-11-008-08W1	02	28	10		0
T02-CB29-10	539790	5498867	09/14/10	SE-11-008-08W1	02	29	10		0
T02-CB30-10	539790	5498867	09/14/10	SE-11-008-08W1	02	30	10		0
T01-CB11-10-10	539773	5499067	09/14/10	SE-11-008-08W1	01	11	10		0
T01-CB12-10	539784	5499042	09/14/10	SE-11-008-08W1	01	12	10		0
T01-CB13-10	539776	5499028	09/14/10	SE-11-008-08W1	01	13	10		0
T01-CB14-10	539787	5498987	09/14/10	SE-11-008-08W1	01	14	10		0
T01-CB15-10	539788	5498997	09/14/10	SE-11-008-08W1	01	15	10		0
T01-CB16-10	539792	5499013	09/14/10	SE-11-008-08W1	01	16	10		0
IO-T01-CB-01	539776	5499028	09/14/10	SE-11-008-08W1	01	IO	10	Aves- wild turkeys	4
T09-CB36-6	538966	5504523	09/14/10	NW-26-008-08W1	09	36	6		0
T09-CB37-6	538982	5504517	09/14/10	NW-26-008-08W1	09	37	6		0
T09-CB38-6	539029	5504523	09/14/10	NW-26-008-08W1	09	38	6		0
T09-CB39-6	539068	5504520	09/14/10	NW-26-008-08W1	09	39	6		0
T09-CB40-6	539177	5504368	09/14/10	NW-26-008-08W1	09	40	6		0
T09-CB41-6	539307	5504396	09/14/10	NW-26-008-08W1	09	41	6		0
T09-CB42-6	539323	5504383	09/14/10	NW-26-008-08W1	09	42	6		0
T09-CB43-6	539322	5504374	09/14/10	NW-26-008-08W1	09	43	6		0
T09-CB44-6	539389	5504536	09/14/10	NW-26-008-08W1	09	44	6		0
T09-CB45-6	539417	5504543	09/14/10	NW-26-008-08W1	09	45	6		0
T09-CB46-6	539323	5504410	09/14/10	NW-26-008-08W1	09	46	6	Mammal	1
T09-CB47-6	539329	5504449	09/14/10	NW-26-008-08W1	09	47	6		0
T09-CB48-6	539131	5504378	09/14/10	NW-26-008-08W1	09	48	6		0
T09-CB49-6	539127	5504175	09/14/10	NW-26-008-08W1	10	49	6		0
T09-CB50-6	539147	5504165	09/14/10	NW-26-008-08W1	10	50	6		0
T09-CB51-6	539232	5504116	09/14/10	NW-26-008-08W1	10	51	6		0
T09-CB52-6	539238	5504104	09/14/10	NW-26-008-08W1	10	52	6		0
T09-CB53-6	539049	5504084	09/14/10	NW-26-008-08W1	10	53	6		0
T09-CB54-6	539238	5504098	09/14/10	NW-26-008-08W1	10	54	6	Insecta- ants	1
T09-CB55-6	539232	5504087	09/14/10	NW-26-008-08W1	10	55	6		0
IO-T10-CB-05	539232	5504116	09/14/10	NW-26-008-08W1	10	IO	6	Lepidoptera-Danaidae/Nymphalidae-monarch/viceroy	1
IO-T10-CB-06	539232	5504116	09/14/10	NW-26-008-08W1	10	IO	6	Lepidoptera-Nymphalidae-Polygonia spps	1
T08-CB01-11	536600	5509709	09/24/10	NE-09-009-08W1	08	1	11		0
T08-CB02-11	536617	5509710	09/24/10	NE-09-009-08W1	08	2	11		0
T08-CB03-11	536630	5509711	09/24/10	NE-09-009-08W1	08	3	11		0
T08-CB04-11	536627	5509712	09/24/10	NE-09-009-08W1	08	4	11		0
T08-CB05-11	536657	5509738	09/24/10	NE-09-009-08W1	08	5	11		0
T08-CB06-11	536670	5509756	09/24/10	NE-09-009-08W1	08	6	11		0
T08-CB07-11	536614	5509729	09/24/10	NE-09-009-08W1	08	7	11		0
T08-CB08-11	536610	5509724	09/24/10	NE-09-009-08W1	08	8	11		0
T08-CB09-11	536617	5509722	09/24/10	NE-09-009-08W1	08	9	11		0
T08-CB10-11	536601	5509721	09/24/10	NE-09-009-08W1	08	10	11		0
T08-CB11-11	536592	5509733	09/24/10	NE-09-009-08W1	08	11	11		0
T08-CB12-11	536589	5509726	09/24/10	NE-09-009-08W1	08	12	11		0
T08-CB13-11	536589	5509720	09/24/10	NE-09-009-08W1	08	13	11		0
T08-CB14-11	536591	5509669	09/24/10	NE-09-009-08W1	08	14	11		0
T08-CB15-11	536598	5509666	09/24/10	NE-09-009-08W1	08	15	11		0
T08-CB16-11	536540	5509656	09/24/10	NE-09-009-08W1	08	16	11		0

Table A4-4. Continued.

SAMPLE ID	(UTM ZONE 14U) EASTING	NORTHING	DATE	SITE ID	TRACK	CB #	VISIT	SPECIES	# OF INDS
T08-CB17-11	536591	5509625	09/24/10	NE-09-009-08W1	08	17	11		0
T08-CB18-11	536609	5509631	09/24/10	NE-09-009-08W1	08	18	11		0
T08-CB19-11	536627	5509636	09/24/10	NE-09-009-08W1	08	19	11	Nest- mouse	1
T08-CB20-11	536638	5509602	09/24/10	NE-09-009-08W1	08	20	11		0
T08-CB21-10	536598	5509674	09/24/10	NE-09-009-08W1	08	21	10		0
T08-CB22-10	536628	5509604	09/24/10	NE-09-009-08W1	08	22	10		0
T08-CB23-10	536631	5509609	09/24/10	NE-09-009-08W1	08	23	10		0
T08-CB24-10	536632	5509618	09/24/10	NE-09-009-08W1	08	24	10		0
T08-CB25-10	536569	5509647	09/24/10	NE-09-009-08W1	08	25	10		0
T08-CB26-9	536606	5509716	09/24/10	NE-09-009-08W1	08	26	9		0
T08-CB27-9	536598	5509666	09/24/10	NE-09-009-08W1	08	27	9		0
T08-CB28-9	536582	5509658	09/24/10	NE-09-009-08W1	08	28	9		0
T08-CB29-9	536581	5509633	09/24/10	NE-09-009-08W1	08	29	9		0
T08-CB30-9	536597	5509623	09/24/10	NE-09-009-08W1	08	30	9		0
T08-CB31-9	536619	5509616	09/24/10	NE-09-009-08W1	08	31	9		0
T08-CB32-9	536630	5509612	09/24/10	NE-09-009-08W1	08	32	9		0
T08-CB33-9	536641	5509599	09/24/10	NE-09-009-08W1	08	33	9		0
T08-CB34-9	536652	5509585	09/24/10	NE-09-009-08W1	08	34	9	anthill	1
T08-CB35-9	536661	5509604	09/24/10	NE-09-009-08W1	08	35	9		0
T04-CB01-11	539800	5498354	09/24/10	SE-11-008-08W1	04	1	11		0
T04-CB02-11	539814	5498379	09/24/10	SE-11-008-08W1	04	2	11		0
T04-CB03-11	539811	5498394	09/24/10	SE-11-008-08W1	04	3	11		0
T04-CB04-11	539800	5498364	09/24/10	SE-11-008-08W1	04	4	11		0
T04-CB05-11	539812	5498376	09/24/10	SE-11-008-08W1	04	5	11	Burrow	1
T03-CB06-11	539775	5498447	09/24/10	SE-11-008-08W1	03	6	11		0
T03-CB07-11	539811	5498493	09/24/10	SE-11-008-08W1	03	7	11		0
T03-CB08-11	539782	5498469	09/24/10	SE-11-008-08W1	03	8	11		0
T03-CB09-11	539791	5498491	09/24/10	SE-11-008-08W1	03	9	11		0
T03-CB10-11	539794	5498516	09/24/10	SE-11-008-08W1	03	10	11		0
T02-CB17-11	539760	5498953	09/24/10	SE-11-008-08W1	02	17	11		0
T02-CB18-11	539789	5498917	09/24/10	SE-11-008-08W1	02	18	11		0
T02-CB19-11	539765	5498861	09/24/10	SE-11-008-08W1	02	19	11		0
T02-CB20-11	539764	5498831	09/24/10	SE-11-008-08W1	02	20	11		0
T02-CB21-11	539776	5498803	09/24/10	SE-11-008-08W1	02	21	11		0
T02-CB22-11	539782	5498754	09/24/10	SE-11-008-08W1	02	22	11		0
T02-CB23-11	539814	5498800	09/24/10	SE-11-008-08W1	02	23	11		0
T02-CB24-11	539812	5498772	09/24/10	SE-11-008-08W1	02	24	11		0
T02-CB25-11	539795	5498750	09/24/10	SE-11-008-08W1	02	25	11		0
T02-CB26-11	539798	5498714	09/24/10	SE-11-008-08W1	02	26	11		0
T02-CB27-11	539806	5498739	09/24/10	SE-11-008-08W1	02	27	11		0
T02-CB28-11	539790	5498834	09/24/10	SE-11-008-08W1	02	28	11		0
T02-CB29-11	539790	5498867	09/24/10	SE-11-008-08W1	02	29	11		0
T02-CB30-11	539790	5498867	09/24/10	SE-11-008-08W1	02	30	11		0
T01-CB11-11-11	539773	5499067	09/24/10	SE-11-008-08W1	01	11	11		0
T01-CB12-11	539784	5499042	09/24/10	SE-11-008-08W1	01	12	11		0
T01-CB13-11	539776	5499028	09/24/10	SE-11-008-08W1	01	13	11		0
T01-CB14-11	539787	5498987	09/24/10	SE-11-008-08W1	01	14	11		0
T01-CB15-11	539788	5498997	09/24/10	SE-11-008-08W1	01	15	11		0
T01-CB16-11	539792	5499013	09/24/10	SE-11-008-08W1	01	16	11		0
T09-CB36-7	538966	5504523	09/24/10	NW-26-008-08W1	09	36	7		0
T09-CB37-7	538982	5504517	09/24/10	NW-26-008-08W1	09	37	7		0
T09-CB38-7	539029	5504523	09/24/10	NW-26-008-08W1	09	38	7		0
T09-CB39-7	539068	5504520	09/24/10	NW-26-008-08W1	09	39	7		0
T09-CB40-7	539177	5504368	09/24/10	NW-26-008-08W1	09	40	7		0

Table A4-4. Continued.

SAMPLE ID	(UTM ZONE 14U) EASTING	NORTHING	DATE	SITE ID	TRACK	CB #	VISIT	SPECIES	# OF INDS
T09-CB41-7	539307	5504396	09/24/10	NW-26-008-08W1	09	41	7		0
T09-CB42-7	539323	5504383	09/24/10	NW-26-008-08W1	09	42	7		0
T09-CB43-7	539322	5504374	09/24/10	NW-26-008-08W1	09	43	7	Burrow	1
T09-CB44-7	539389	5504536	09/24/10	NW-26-008-08W1	09	44	7		0
T09-CB45-7	539417	5504543	09/24/10	NW-26-008-08W1	09	45	7	Burrow	1
T09-CB46-7	539323	5504410	09/24/10	NW-26-008-08W1	09	46	7		0
T09-CB47-7	539329	5504449	09/24/10	NW-26-008-08W1	09	47	7		0
T09-CB48-7	539131	5504378	09/24/10	NW-26-008-08W1	09	48	7		0
T09-CB49-7	539127	5504175	09/24/10	NW-26-008-08W1	10	49	7	toad	1
T09-CB50-7	539147	5504165	09/24/10	NW-26-008-08W1	10	50	7		0
T09-CB51-7	539232	5504116	09/24/10	NW-26-008-08W1	10	51	7	Burrow	1
T09-CB52-7	539238	5504104	09/24/10	NW-26-008-08W1	10	52	7		0
T09-CB53-7	539049	5504084	09/24/10	NW-26-008-08W1	10	53	7		0
T09-CB54-7	539238	5504098	09/24/10	NW-26-008-08W1	10	54	7	ants	1
T09-CB55-7	539232	5504087	09/24/10	NW-26-008-08W1	10	55	7		0

Table A4-5. Raw data for garter snake surveys conducted in suitable habitat polygons, within the Bipole III Transmission Project Study Area, 2010.

SAMPLE ID	(UTM ZONE 14U) EASTING	NORTHING	DATE	SITE ID	TRACK	START TIME	END TIME	HIBERNACULA	COMMENTS
T04-GASN-01	433623	5718258	10/06/10	T04	T04_OCT0610	13:45	16:00	No	~50m E of the start of T04; dried cow footprints in area; potential old gravel pit?; gravel/rocky area with depressed cattail wetland & ATV trail
T04-GASN-02	433586	5718296	10/06/10	T04	T04_OCT0610	13:45	16:00	No	start of T04
T04-GASN-03	433394	5718371	10/06/10	T04	T04_OCT0610	13:45	16:00	No	middle of T04; not many rock outcrops- more grassland/shrub & fallen trees
T04-GASN-04	433216	5718473	10/06/10	T04	T04_OCT0610	13:45	16:00	No	end of T04; edge of pasture at fence with giant sedge/rush wetland/bog beyond (pics 0966-0967); pics taken from berm near depression cattail wetland. Rocks & cobbles present but no evidence of hibernacula; UTMs estimated based on Google Earth
T04-GASN-05	433514	5718536	10/06/10	T04	T04_OCT0610	13:45	16:00	Potential	pic 0929 looking S at pile of rocks; potential GASN hibernacula? Looks like manmade rock pile; WPT taken at top of rock pile
T04-GASN-06	433530	5718524	10/06/10	T04	T04_OCT0610	13:45	16:00	No	small eggregation of boulders; pics facing direction & boulder pile; doesn't seem to be little entrances/holes like last site (WPT 209)
T04-GASN-07	433667	5718336	10/06/10	T04	T04_OCT0610	13:45	16:00	Potential	rock/boulder combo pile; looks dug & dropped from pit; pics 0948-0951 taken of pile facing direction; pics 0952-0953 of holes/burrows; pics 0954-0955 looking N at wetland/dugout, potential spot we went to investigate, open wetland, N & NW- cattail etc., NW- raised area with cobbles & rocks but no outcrops, N- wetland
T04-GASN-08	433471	5718621	10/06/10	T04	T04_OCT0610	13:45	16:00	No	depressed wetland & surrounding berm with rock piles; pics looking cobble pile; manmade? Wetland depression with berm all around & rock pile is on outside of berm
T04-GASN-09	433515	5718703	10/06/10	T04	T04_OCT0610	13:45	16:00	No	old borrow pit similar to WPT212; pics looking AT cobble pile; with fenceline- wetland/bog appears to be large field of rushes/sedges
T04-GASN-10	433599	5718289	10/06/10	T04	T04_OCT0610	13:45	16:00	No	mammal burrow; pics 0968-0970: pic of burrow for mammals crew (WRCS); also burrow 20m E of WPT214- pic 0971
T04-GASN-11	433649	5718274	10/06/10	T04	T04_OCT0610	13:45	16:00	No	mammal burrow; large fox hole?; ~15X9" hole gets quite deep; on berm near truck
T02-GASN-01	445217	5710602	10/07/10	T02	T0102_OCT0710	10:00	13:30	No	start of T02; pics taken looking NESW from WPT 216; private property

Table A4-5. Continued.

SAMPLE ID	(UTM ZONE 14U) EASTING	NORTHING	DATE	SITE ID	TRACK	START TIME	END TIME	HIBERNACULA	COMMENTS
T02-GASN-02	445380	5710422	10/07/10	T02	T0102_OCT0710	10:00	13:30	No	middle of T02; some boulders but no evidence of hibernacula; leaving dense forest heading towards opening; some boulders
T02-GASN-03	445545	5710240	10/07/10	T02	T0102_OCT0710	10:00	13:30	No	edge of forest, in clearing/cattle pasture with gravel/cobble substrate; near edge of poplar/bush
T02-GASN-04	445721	5710043	10/07/10	T02	T0102_OCT0710	10:00	13:30	No	end of T02; edge of pasture/wetland
T01-GASN-01	445973	5709692	10/07/10	T01	T0102_OCT0710	10:00	13:30	No	start of T01; edge of aspen stand; inundated wetland with rushes & shrub
T01-GASN-02	446167	5709523	10/07/10	T01	T0102_OCT0710	10:00	13:30	No	middle of T01; clearing with poplar/birch? Stand, some extruding boulders & shrubs & grass
T01-GASN-03	446329	5709355	10/07/10	T01	T0102_OCT0710	10:00	13:30	No	end of T01; in aspen meadow/grassland, mowed down by cows; boulders/cobbles (embedded) scattered throughout; some gravel patches
T01-GASN-04	446296	5709777	10/07/10	T01	T0102_OCT0710	10:00	13:30	No	rock piles, potentially from dug-out, scattered throughout field; not much in terms of crevices under the rocks- very imbedded with grass
T01-GASN-05	446292	5709692	10/07/10	T01	T0102_OCT0710	10:00	13:30	No	looking S at dugout/watering hole
T01-GASN-06	445615	5710311	10/07/10	T01	T0102_OCT0710	10:00	13:30	No	pics of dugout in cow pasture; lots of rock/loam/cobble/gravel
T01-GASN-07	445218	5710478	10/07/10	T01	T0102_OCT0710	10:00	13:30	Potential	large aggregation of rocks; grasses & shrubs
T02-GASN-01	444735	5710611	10/07/10	T02		10:00	13:30	Potential	pile of rocks right at gate near house; pics looking N at rock pile; pics 1029-1030: openings
T02-GASN-02	444471	5710818	10/07/10	T02	LK01_OCT0710	13:30	15:30	Potential	rock pile with large cobble; NE section with downfall; property owner spoke of GASN concentrations along rock ridges at these 2 locations; the hunt continues in high concentration areas
T02-GASN-03	444477	5710777	10/07/10	T02	LK01_OCT0710	13:30	15:30	Potential	wood pile; limestone ground visible along path; property owner spoke of GASN concentrations along rock ridges at these 2 locations; the hunt continues in high concentration areas
T02-GASN-04	444510	5710706	10/07/10	T02	LK01_OCT0710	13:30	15:30	Potential	limestone outcrops along path; property owner spoke of GASN concentrations along rock ridges at these 2 locations; the hunt continues in high concentration areas
T02-GASN-05	444533	5710689	10/07/10	T02	LK01_OCT0710	13:30	15:30	No	trees with holes, soil dug out; potential mammal holes; berries visible in pics, inside burrow; property owner spoke of GASN concentrations along rock ridges at these 2 locations; the hunt continues in high concentration areas

Table A4-5. Continued.

SAMPLE ID	(UTM ZONE 14U) EASTING	NORTHING	DATE	SITE ID	TRACK	START TIME	END TIME	HIBERNACULA	COMMENTS
T01-GASN-01	445471	5710068	10/07/10	T01	LK02_OCT0710	13:30	15:30	Potential	rock pile; pics of pile facing NESW; pics 1060-1061: ground cover with potential holes; property owner spoke of GASN concentrations along rock ridges at these 2 locations; the hunt continues in high concentration areas; LK02: "The Ridge"
T01-GASN-02	445422	5710019	10/07/10	T01	LK02_OCT0710	13:30	15:30	No	triangle ridge area; property owner spoke of GASN concentrations along rock ridges at these 2 locations; the hunt continues in high concentration areas; LK02: "The Ridge"
T01-GASN-03	445440	5709768	10/07/10	T01	LK02_OCT0710	13:30	15:30	No	property owner spoke of GASN concentrations along rock ridges at these 2 locations; the hunt continues in high concentration areas; LK02: "The Ridge"
T01-GASN-04	445861	5709524	10/07/10	T01	LK02_OCT0710	13:30	15:30	Potential	rock pile/den; pics facing rock pile/den; property owner spoke of GASN concentrations along rock ridges at these 2 locations; the hunt continues in high concentration areas; LK02: "The Ridge"
T01-GASN-05	446094	5709521	10/07/10	T01	LK02_OCT0710	13:30	15:30	No	open area (based on map) near T01; property owner spoke of GASN concentrations along rock ridges at these 2 locations; the hunt continues in high concentration areas; LK02: "The Ridge"
T03-GASN-01	440714	5714393	10/07/10	T03	T03_OCT0710	16:00	17:00	No	start of T03; embedded boulders with shrub, grass etc.; poplar stand to west; transect running N-S; similar to previous site (LK02)
T03-GASN-02	440609	5714475	10/07/10	T03	T03_OCT0710	16:00	17:00	No	middle of T03; entering clearing after leaving shrub/grass with boulder/rock outcrops
T03-GASN-03	440569	5714486	10/07/10	T03	T03_OCT0710	16:00	17:00	Potential	well/quarry 5x5ft wide, 8ft deep; large hole in rock- looks like potential snake den/quarry (although can't see entrances in rock)
T03-GASN-04	440457	5714597	10/07/10	T03	T03_OCT0710	16:00	17:00	No	end of T03
T03-GASN-05	440387	5714647	10/07/10	T03	T03_OCT0710	16:00	17:00	No	rock outcrop in clearing; looks like limestone bedrock under grass; 1 wood frog heard calling (CR=1)
T03-GASN-06	440490	5714512	10/07/10	T03	T03_OCT0710	16:00	17:00	No	opening with sparse imbedded boulders, grasses & oaks
T03-GASN-07	440594	5714692	10/07/10	T03	T03_OCT0710	16:00	17:00	No	small ridge of boulders near mile by mile line; no obvious snakes or access pts
T03-GASN-08	440699	5714610	10/07/10	T03	T03_OCT0710	16:00	17:00	No	pile of boulders & deadfall; overgrown with shrubs, grasses etc.; pics facing feature; no obvious entrances
T03-GASN-09	440701	5714515	10/07/10	T03	T03_OCT0710	16:00	17:00	Potential	deadfall & boulders in clearing; similar to WPT245; at ROW/rd; looks to be debris cleared for road; some entrances in these piles- into dirt, some rocks