

Pointe du Bois

Spillway Replacement Project

TERRESTRIAL EFFECTS MONITORING PLAN

DRAFT



 Manitoba
Hydro

October 2012

POINTE DU BOIS SPILLWAY REPLACEMENT PROJECT

Terrestrial Effects Monitoring Plan

DRAFT

Report Prepared for



October 2012



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1.0

INTRODUCTION

This document describes the Terrestrial Effects Monitoring Plan (TEMP) for the Pointe du Bois Spillway Replacement Project (the Project) at the Pointe du Bois Generating Station (GS) on the Winnipeg River in southeastern Manitoba. See Figure 1 for Project location.

Project Description

The Project, which will be constructed and operated by Manitoba Hydro, involves replacing the existing spillway and sluiceway with a new 7-bay spillway located in an excavated channel located east of the existing spillway. A new earth fill dam will be constructed mid-way across the existing spillway rock shelf connecting the new spillway structure to the center island (west main dam). A new permanent earth fill dam (south dam) will be constructed downstream of the existing east gravity dam and tied into the existing powerhouse with a new concrete gravity wall. Construction and decommissioning of existing facilities and restoration of the Project site will occur over a period of approximately three years. The predicted environmental effects of the Project were described in the Pointe du Bois Spillway Replacement Project Environmental Impact Statement (Manitoba Hydro 2011) (the EIS) and the Manitoba Hydro Pointe du Bois Spillway Replacement Alteration notice (August 2012).

Environmental Protection Program and the TEMP

The TEMP is one part of an integrated Environmental Protection Program (EPP) developed for the Project. Implementation of the EPP is an application of Manitoba Hydro's Corporate Environmental Management Policy under the company's ISO14001-certified Environmental Management System. The EPP for the Project will assist Manitoba Hydro and its contractors to be compliant with regulatory requirements. Additionally, it will provide an opportunity for adaptive management to mitigate unexpected adverse effects should they be detected during monitoring.

The Environmental Protection Program for the Project includes the following:

- Environmental Protection Plans (EnvPP), which provide detailed, site-specific directions to contractors to minimize environmental impact. For the Project, EnvPPs are organized by construction component, highlighting measures to reduce the impacts of specific work activities, such as tree clearing and erosion and sediment control;
- Environmental Management Plans, which are focused documents that address a specific environmental issue. For the Project these include a Sediment Management Plan and a Fish Habitat Compensation Plan; and

- Environmental Monitoring Plans, which provide instructions for monitoring the effects of construction and operational activities on the biophysical, physical and socio-economic environments. For the Pointe du Bois Spillway Replacement Project they include individual plans for the monitoring of Aquatic Effects, Terrestrial Effects, Physical Effects and Socio-economic Effects.

The TEMP is comprised of the following components: (1) Terrestrial Vegetation (Section 3.0); (2) Amphibians and Reptiles (Section 4.0); (3) Birds (Section 5.0); and (4) Mammals (Section 6.0). Within each of these components, monitoring plans are presented for the construction (including decommissioning of existing facilities) and operation phases of the Project. This document also describes the overall objectives and approach to monitoring and reporting of monitoring results (Section 7.0).

Sampling programs have been developed on the basis of currently available information. As construction plans evolve, in particular after the award of contracts for various components of the construction phase, programs may need to be modified so that collected information will meet the TEMP objectives.

The monitoring approach is adaptive in that results of the programs will be evaluated on an on-going basis to facilitate plan objectives being met in an effective and efficient manner.

2.0 OVERALL OBJECTIVES, APPROACH AND MONITORING PHASES

2.1 OBJECTIVES AND APPROACH

The TEMP for the Project is intended to document conditions over time for identified Valued Environment Components (VECs) and other environmental parameters to:

- verify effects assessment predictions in the EIS;
- identify unexpected effects related to the Project;
- monitor effectiveness of mitigation measures;
- identify the need for additional mitigation or remedial actions and then, subsequently, monitor the new mitigation measures that are implemented; and
- confirm compliance with regulatory requirements including Project approvals and environmental regulations.

The TEMP focuses on the primary effects to key components of the environment rather than addressing all potential changes to the aquatic environment as described in the EIS. The EIS (Chapter 8) provides an overview of the major linkages examined in the EIS, proposed mitigation measures and predicted residual effects of the Project. In brief, construction effects to the terrestrial environment are primarily related to the clearing for, and construction of, the ancillary facilities including those associated with concrete batch plant(s), equipment staging, access roads and borrow sites. Conditions during the operation phase are expected to be similar to those that existed prior to the Project.

2.2 MONITORING SCHEDULE

As some terrestrial ecosystem components experience wide ranges of seasonal and year-to-year variation, and as some effects of the Project may only be detectable after a period of several years, portions of the monitoring program have been designed to extend throughout the length of the construction period and into operation. Conversely, certain activities are short-term and require only short-term monitoring. Some monitoring activities have been scheduled within an ongoing plan, while others will be conducted on an “as required” basis (e.g., focused monitoring for specific construction activities).

The current monitoring schedule is as follows:

- Pre-clearing Phase (2011-2012) - conditions that will be directly affected by clearing activities at the commencement of construction will be monitored pre-clearing.
- Construction Phase (including decommissioning of existing facilities) (2012-2014) – generally conditions that are closely linked to specific construction activities will be targeted in the construction phase monitoring. In addition, some broader-based monitoring is planned to provide continuity with pre-Project monitoring for components that will subsequently be targeted in operation phase monitoring. Also, some monitoring will be conducted during this period to supplement baseline data.
- Construction Phase review and Operation Phase (2015-2018) - integrated evaluation of results after most components have field data for several replicate years will occur during the construction phase review. In addition, monitoring of some components will continue during the initial years of operation. Following the completion of operation monitoring activities, a final monitoring report for each component will be submitted that synthesizes the data and analysis collected over all years of study. An operation phase review will be conducted in 2018 to determine if any ongoing monitoring is required.

3.0 TERRESTRIAL VEGETATION

3.1 INTRODUCTION

Potential environmental impacts and anticipated residual effects on terrestrial vegetation after mitigation are summarized in the EIS (Chapter 8, Section 8.6.1, pp. 8.48 – 8.50). Potential residual effects include the loss of rare plants, loss of native forest vegetation and spread of invasive plants in areas that have been cleared for Project activities. Modification of terrestrial vegetation will occur where substrate material and/or vegetation will be removed and along newly created forest edges adjacent to Project activities. Overall, residual Project effects on terrestrial vegetation (including species of conservation concern) are expected to be negative but small in both magnitude and geographic extent and therefore insignificant.

3.2 EFFECTS ON VERY RARE (S1) AND RARE (S2) PLANT SPECIES

3.2.1 Objectives

Consistent with the overall objectives stated in Section 2.1, the objectives of the S1 and S2 plant component of the TEMP are to:

- document the nature and extent of disturbance to S1 and S2 plants identified as being potentially affected by the Project; and
- transplant rare plants that will be affected by construction activities, if feasible and practicable.

3.2.2 Monitoring Area

The monitoring area for S1 and S2 plants will include the areas where S1 and S2 plants have been identified and other areas where Project clearing and construction areas may occur (Figure 2). The monitoring area will be evaluated after each survey year and may be revised based on borrow use for the project.

3.2.3 Rationale and Design

The distribution and even the presence of rare plant species are often difficult to map because local populations are usually very small and/or widely dispersed and many species do not have high fidelity to particular site or habitat types. S1 and S2 plant species identified as being potentially affected by Project activities in the monitoring area are:

- Merritt Fernald's sedge (*Carex merritt-fernaldii*);
- White wood aster (*Eurybia macrophylla*);
- Dwarf bilberry (*Vaccinium caespitosum*);
- Hooker's orchid (*Platanthera hookeri*);
- Hop-hornbeam (*Ostrya virginiana*);
- Sessile-fruited arrowhead (*Sagittaria rigida*); and
- Three-way sedge (*Dulichium arundinaceum*).

Residual effects of the Project include the potential loss of individuals of the above S1 and S2 rare plant species. Mitigation measures include clearly marking of S1 and S2 rare plants prior to clearing and construction activities and the avoidance, to the degree practicable, of these plants during the clearing of vegetation associated with Project site preparation and construction and transplanting the plants where feasible and practicable.

3.2.4 Parameters of Concern

Parameters being measured for S1 and S2 plant species are:

- number and location of occurrences of plants affected; and
- nature of effects on the plants of concern.

3.2.5 Sample Site Locations

Monitoring will occur in the area where plants ranked S1 and S2 were found during pre-construction assessments and additional project areas to be cleared. Plants ranked as S1 and S2 that have been identified in the monitoring area are shown in Figure 2. S1 and S2 plant surveys will also occur in any areas identified for potential clearing that were not surveyed during EIS studies.

3.2.6 Sampling Frequency and Schedule

Growing season surveys will be conducted once annually for S1 and S2 species. It is anticipated that monitoring for rare plants will require one to two annually. Surveys will occur during the growing season (June to August) for each construction year and the first year post-construction.

3.2.7 Methods

Growing season inspections for previously identified S1 and S2 plant species will consist

of searching those areas where clearing and construction activities have occurred and in any areas identified for potential clearing that were not surveyed during EIS studies so as to verify species presence/absence. Incidental observations will be recorded while conducting milkweed and invasive plant surveys. At each rare plant location, the number of individuals (rare species) and phenology of the plants will be documented. The surrounding plant community will also be described and species composition recorded. Site and landscape conditions will be recorded, including descriptions of aspect, slope, litter thickness, soil moisture, and high exposure.

3.3 EFFECTS ON MILKWEED

3.3.1 Objectives

Consistent with the overall objectives stated in Section 2.1, the objective of the milkweed component of the Terrestrial Effects Monitoring Plan is to:

- document the nature and extent of disturbance to milkweed plants (habitat requirement for Monarch butterfly).

3.3.2 Monitoring Area

The monitoring area for milkweed plants will include areas to be disturbed within the Project footprint, which include the construction and staging areas at Pointe du Bois and potential borrow material sources near Moose Creek, and along Highway #313 (Figure 3). The monitoring area will be evaluated after each survey year and may be revised based on planned borrow use for the project.

3.3.3 Rationale and Design

Milkweed provides a critical life requisite for the Monarch butterfly, a species that is listed under the federal *Species at Risk Act* as a species of “special concern”. The species breeds only where milkweed occurs and the plant provides the sole food source for Monarch caterpillars. No areas of milkweed were identified in the Project area during the assessment; however, if areas in the Project footprint containing milkweed are identified they will be marked and avoided, to the extent practicable. Any observed use of milkweed in the area by the Monarch butterfly will be recorded and reported to Manitoba Hydro.

3.3.4 Parameters of Concern

Parameters being measured for milkweed are:

- number and location of occurrences of plants affected; and
- nature of effects on the plants of concern.

3.3.5 Sample Site Locations

Sampling will occur in the monitoring area as described in Section 3.3.2. Any effects are expected to be confined within this area.

3.3.6 Sampling Frequency and Schedule

Growing season surveys will be conducted annually for milkweed. It is anticipated that monitoring for milkweed will require a total of one to two days annually. Surveys will occur during the growing season (June to August) for two construction years. The need to continue monitoring after two construction years will be evaluated depending on the outcome of these surveys.

3.3.7 Methods

Surveys for milkweed will be conducted by using a random meander search in preferred habitat (i.e., open and disturbed sites) for the species within the monitoring area (Figure 3). Incidental observations will be recorded while conducting rare plant and invasive plant surveys. Any observations will be recorded, marked with a GPS and a map of the locations will be generated to assist in monitoring for milkweed loss from Project activities. Maps will be compared annually to assess changes to milkweed.

3.4 EFFECTS OF INTRODUCTION AND SPREAD OF INVASIVE PLANT SPECIES¹

3.4.1 Objectives

Consistent with the overall objectives stated in Section 2.1, the objectives of the invasive plant

¹ invasive species are defined as those plants that out-compete native species when introduced outside of their normal setting.

component of the TEMP are to:

- document the composition and extent of and invasive plant species in cleared areas;
- evaluate implications of a potential increase of invasive plant species as a result of clearing and construction activities; and
- recommend control methods, if necessary.

3.4.2 Monitoring Area

The monitoring area for invasive plant species encompasses the entire Project footprint where clearing activities occur, including construction and staging areas adjacent to the Project site and potential borrow material sources near Moose Creek and along Highway #313(Figure 3). The monitoring area will be evaluated after each survey year and may be revised based on borrow use for the project.

3.4.3 Rationale and Design

The abundance of invasive plant species may increase as a result of clearing and construction activities. Construction-related ground disturbance has the potential to introduce invasive plant species, and construction materials used for Project development such as gravel and fill also could provide a source for these plants.

Invasive plant species are often capable of growing under a wide range of climatic and soil conditions and they often produce abundant seeds that are easily disseminated and long-lived. They often grow vigorously and may continue to persist even after the removal of vegetative portions of the plant.

Cleared areas in the monitoring area will be inspected for invasive plants. Annual growing season inspections by the terrestrial ecologist will determine the presence and abundance of species and whether there are places where plants need to be controlled.

3.4.4 Parameters of Concern

Parameters being measured are:

- invasive plant species composition and abundance; and
- spread of invasive plant species (area).

3.4.5 Sample Site Locations

Monitoring for invasive plant species will occur in all locations of the monitoring area to be cleared (see Figure 3).

3.4.6 Sampling Frequency and Schedule

Monitoring for invasive plant species will occur once annually during the growing season (between July and August) for each construction year as well as one year post-construction. It is anticipated that monitoring for invasive plants will take 3 days annually.

3.4.7 Methods

Monitoring for invasive plants will occur in the monitoring area as described in Section 3.4.2.. All cleared areas will be traversed and invasive plant species observed will be recorded, and relative population densities noted. Incidental observations will be recorded while conducting rare plant and milkweed surveys. Where invasive plant species are found to be spreading in the monitoring area, the site will be photographed, GPS coordinates will be recorded and Manitoba Hydro will be contacted. Control measures will then be implemented as appropriate.

4.0 AMPHIBIANS AND REPTILES

4.1 INTRODUCTION

Potential environmental impacts and anticipated residual effects on amphibians and reptiles after mitigation are summarized in the EIS (Chapter 8, Section 8.6.3, pp 8.51 – 8.54). Overall, residual effects on the northern leopard frog and the common snapping turtle are predicted to be small and localized. With respect to the northern leopard frog, these are related to the loss of pond habitat in the Project footprint on the east side of the existing spillway. With respect to snapping turtle, any effects are expected to be related to possible sensory disturbance or injury/mortality due to construction activities and alteration or loss of habitat, particularly any basking habitats in the Project footprint along the east side of the Winnipeg River.

4.2 EFFECTS ON AMPHIBIAN VEC SPECIES

4.2.1 Objectives

Consistent with the overall objectives stated in Section 2.1, the objective of the amphibian component of the TEMP is to:

- monitor rehabilitated/created inland wetlands for northern leopard frog breeding suitability and activity.

4.2.2 Monitoring Area

The monitoring area for northern leopard frogs will include all wetland habitats rehabilitated or created during site restoration.

4.2.3 Rationale and Design

Localized wetland habitats located at inland sites on the east side of the Winnipeg River near Pointe du Bois have the potential to be adversely affected by construction activities associated with the Project. Construction will result in the infilling of approximately 2 ha of inland wetlands east of the existing spillway, which have potential to provide seasonal northern leopard frog habitat.

Rehabilitated or created wetlands will be monitored to determine their suitability as northern leopard frog breeding and summering habitat. Incidental information collected on northern

leopard frogs seen or heard during monitoring will further help to determine whether similar or better conditions than those that existed prior to construction are achieved and whether northern leopard frogs inhabit these areas post-construction. Northern leopard frogs were seen in the general area of wetland habitats on the east side of the Winnipeg River at Pointe du Bois prior to construction, but no evidence of breeding was observed (i.e., no leopard frog were heard during call surveys in the area).

4.2.4 Parameters of Concern

Parameters being measured are:

- post-construction suitability of the created/rehabilitated wetlands for northern leopard frog breeding; and
- post-construction northern leopard frog breeding and summering activity in and near newly created and rehabilitated wetlands.

4.2.5 Sample Site Locations

Sample sites will include all wetlands rehabilitated or created during site restoration and terrestrial habitats immediately adjacent to these wetlands.

4.2.6 Sampling Frequency and Schedule

Post-construction monitoring of rehabilitated and/or created wetlands will be conducted twice annually (spring and fall) beginning after the wetlands have been created until wetland restoration efforts result in similar or better northern leopard frog habitats than those that existed prior to the Project. The frequency of the monitoring will be re-evaluated after each survey year. Attributes of pre-existing wetlands identified as favourable for northern leopard frogs include:

- ponds are isolated and have some degree of permanence;
- presence of shallow water, with mean depths between 31 cm and 73 cm;
- pH 5.5-6.6 at sampled sites;
- substrates predominantly consisting of organic matter, silt and clay;
- gradually sloping shorelines with abundant emergent and adjacent vegetation, including cattail, reeds, sedges and duckweed; and
- the presence of open water (25-85% of wetland area).

4.2.7 Methods

Post-construction monitoring will consist of ground surveys documenting the nature and extent of changes in wetland characteristics, including changes in total wetland area, percentage of open water, presence of emergent vegetation, and composition of substrates. Incidental observations of Northern leopard frog (either seen or heard) during these surveys will be recorded.

Post-construction wetland monitoring will include an assessment of the success of restoration efforts in achieving the following northern leopard frog habitat attributes (which will result in similar or better conditions to those existing prior to the existing development):

- presence of shallow (10-65 cm depth) open water areas that receive direct sunlight in early morning and afternoons;
- presence of gradually sloping shorelines capable of supporting emergent and adjacent vegetation (emergent vegetation at breeding sites – includes cattail, bulrush, sedges or duckweed);
- presence of aquatic and emergent vegetation; and
- pHs generally ranging from 6.5-8.5.

4.3 EFFECTS ON REPTILE VEC SPECIES

4.3.1 Objectives

Consistent with the overall objectives stated in Section 2.1, the objectives of the reptile component of the Terrestrial Effects Monitoring Plan are to:

- document the nature and extent of clearing and disturbance of potential snapping turtle habitat in the monitoring area; and
- document any mortality or injury of snapping turtles in the area.

4.3.2 Monitoring Area

The monitoring area for snapping turtle habitat monitoring encompasses the eastern shoreline on the Winnipeg River immediately upstream and downstream of the spillway (Figure 4). The total linear length of shoreline to be monitored is approximately 2.3 km.

4.3.3 Rationale and Design

Shoreline habitats along the Winnipeg River will be altered by construction of the new spillway

facilities and barge landings and decommissioning of existing facilities. Since common snapping turtles bask and nest on banks along waterways, construction activities affecting bank quality have the potential to affect this species.

4.3.4 Parameters of Concern

Parameters being measured are:

- suitability (including plant cover, shoreline composition) of shoreline habitats in the monitoring area to serve as common snapping turtle nesting and basking sites;
- the nature and total area of suitable shoreline habitat altered; and
- the presence/absence of snapping turtles in the monitoring area as determined by incidental observation.

4.3.5 Sample Site Locations

Sample sites will include east shoreline areas shown on Figure 4. Additionally, any incidental observations of common snapping turtles during northern leopard frog monitoring (see Section 4.2) will be recorded.

4.3.6 Sampling Frequency and Schedule

Monitoring will occur one year post construction to document the area of disturbance to the shoreline areas. Surveys will require one to two days during the open water season.

4.3.7 Methods

Pre-construction surveys of Winnipeg River shoreline areas have been conducted in and immediately adjacent to the Project footprint area and no important common snapping turtle habitat was identified. While the shoreline north of the spillway is too steep for basking and contains too little sand and gravel for nesting, the low gradient bedrock shoreline south of the spillway may be adequate for basking individuals. The monitoring area will be re-evaluated for changes in suitable common snapping turtle habitat during the post-construction phase of the Project.

Monitoring of the shoreline will consist of boat-based surveys, documenting the nature and extent of any disturbance to the shoreline, including changes in total area, and substrate composition. The extent of any altered bedrock shoreline will be documented at this time.

Any evidence of injury or mortality due to construction activities will be documented by

Manitoba Hydro on the Wildlife Mortality Incident Report (Appendix A) and provided for inclusion in reporting.

5.0 BIRDS

5.1 INTRODUCTION

Potential environmental impacts and anticipated residual effects on birds after mitigation are summarized in the EIS (Chapter 8, Section 8.6.4, pp 8.54 – 8.55). Potential residual effects include short term sensory disturbance to individual bald eagles and osprey and minor loss of song bird habitat including that for Canada warbler. Sensory disturbance to songbirds will be temporary and residual effects to individual Canada warbler if they occur in the area are expected to be short-term and minor.

Overall, residual Project effects on birds are expected to be negative but small in both magnitude and geographic extent and therefore insignificant.

5.2 BREEDING BIRD SURVEYS

5.2.1 Objectives

Consistent with the overall objectives stated in Section 2.1, the objectives of the breeding bird component of the TEMP are to:

- detect the presence/absence of breeding birds in the monitoring area with a focus on Canada warbler (*Wilsonia canadensis*);
- monitor bird abundance and number of species in the buffer area adjacent to the Winnipeg River on the east side of the spillway as well and habitats within 100 m adjacent to the borrow areas; and
- compare bird abundance and number of species to control sites of similar habitat approximately 2 km away from the project disturbance.

5.2.2 Monitoring Area

Monitoring for breeding birds will be conducted in the 30 m un-cleared buffer on the east side adjacent to the Winnipeg River, within 100 m adjacent to the borrow areas and at control sites (Figure 5). The monitoring area will be evaluated after each survey year and may be revised based on borrow use for the project.

5.2.3 Rationale and Design

Breeding bird surveys will be conducted to determine the extent of Project-related effects (if any) on breeding birds in general and Canada warbler specifically. Bird diversity and abundance immediately adjacent to construction areas may be lower than at less disturbed sites further away from construction activities. Bird species abundance and diversity will be monitored at sites adjacent to Project construction sites and borrow areas as well as in control sites characterized by similar pre-construction habitat in the disturbed areas. Control sites will be located at approximately 2 km from the disturbance. Sampling will assess and compare bird abundance and diversity both proximal and distal to the disturbance.

5.2.4 Parameters of Concern

Parameters being measured are:

- the number of breeding birds and species richness in the monitoring area including the control sites; and
- presence/absence of Canada Warbler.

5.2.5 Sample Site Locations

The comparison of bird abundance and diversity during construction will be conducted within the shoreline buffer area and compared to survey results at control sites. Preliminary control sites have been identified and are located at approximately 2 km from the disturbance areas. For borrow areas, the sampling will be conducted in the 100 m buffer adjacent to identified borrow area boundaries as well as at control sites located approximately 2 km away (Figure 5).

5.2.6 Sampling Frequency and Schedule

Breeding bird surveys are anticipated to occur during an approximate five week period during spring (late May to early July) when most birds are breeding, singing and nesting. Breeding bird surveys will commence in 2012 and continue throughout the construction period as well as during the first three years of operation.

5.2.7 Methods

Breeding bird surveys will occur on the east side in the spillway buffer area, within 100m of the borrow areas and at control areas approximately 2 km from the disturbance area.

Methods for breeding bird surveys will be consistent with breeding bird inventory procedures

using a Point Count Method (Ralph et al.1993; Hobson et al. 2002 and Rempel et al. 2005.). Ten-minute point counts will be conducted at each sample station using a Tascam DR100 audio recorder. Sample plots will be conducted between one-half hour before sunrise to 10:30 a.m. GPS waypoints and recording of UTM coordinates of each survey plot will be recorded. Audio recordings will be processed in the lab by a qualified biologist using Adobe Audition TM Version 2.0 to identify bird species present from unique vocalizations at each sample plot.

5.3 PRECLEARING NESTING SURVEYS

5.3.1 Objectives

Consistent with the overall objectives stated in Section 2.1, the objective of the pre-clearing nesting component of the TEMP is to:

- determine the presence/absence of raptor nests (i.e., osprey(*Pandion haliaetus*), bald eagle(*Haliaeetus leucocephalus*), hawks and owls) in the monitoring area.

5.3.2 Monitoring Area

Pre-clearing monitoring for raptor nests will be conducted in all portions of the Project footprint that will be cleared both east and west of the spillway construction site as well as near borrow areas along Highway 313 and the Slave Falls access road at Moose Creek (Figure 6).

5.3.3 Rationale and Design

EIS studies identified nesting bald eagles in the area and other raptors such as ospreys and owls are known to occur near the Project area. To minimize the loss of nests due to construction related activities, intensive pedestrian searches for stick nests and candidate snag trees with well excavated cavities will be conducted.

5.3.4 Parameters of Concern

Parameters to be measured include:

- locations of raptor nests in the monitoring area; and
- type and number of raptor nests in the monitoring area.

5.3.5 Sample Site Locations

Raptor nest surveys will be conducted throughout the monitoring area at sites identified for tree clearing and grubbing as shown on Figure 6.

5.3.6 Sampling Frequency and Schedule

Pre-clearing surveys will be based on the construction schedule and will be conducted prior to site clearing.

5.3.7 Methods

Pre-clearing intensive pedestrian ground surveys have been, and will continue to be, conducted in the monitoring area to determine the potential for osprey, bald eagle and owl nesting. Surveys will be conducted by walking ground transects, searching for raptor stick nests and or candidate tree cavities. Other notable bird and mammal observations will be documented. All observational data will be summarized, tabled and mapped. If nests are found, they will be way-pointed using a hand held GPS and flagged. Manitoba Hydro will then be notified to determine appropriate mitigation. This could include avoidance of raptor nests, re-scheduling clearing activities and possible re-location of newly established raptor nests.

5.4 POWER LINE MORTALITY SURVEYS

5.4.1 Objectives

Consistent with the overall objectives stated in Section 2.1, the objective of the Power Line mortality component of the Terrestrial Effects Monitoring Plan is to:

- monitor any injuries/mortalities associated with bird strikes of the construction power line.

5.4.2 Monitoring Area

Monitoring of the construction power line right-of-way (ROW) and up to 10 m on either side of the ROW on the east side will be conducted in order to determine the extent and severity of any injuries and/or mortalities associated with bird strikes.

5.4.3 Rationale and Design

Monitoring of bird injuries and mortalities due to strikes with the construction power line will be conducted during spring and fall migration periods and during the breeding season. Surveys will be conducted during evening for day flyers and in the early morning to detect mortality of nocturnally active birds, including owls.

5.4.4 Parameters of Concern

The parameter of concern is:

- bird injury/mortality associated with strikes of the construction power line post-construction.

5.4.5 Sample Site Locations

Monitoring of bird injuries/mortalities will be conducted along, and 10 m on either side of, the construction power line ROW located south-east of the existing spillway facilities as shown in Figure 7.

5.4.6 Sampling Frequency and Schedule

Construction power line bird injury/mortality surveys will take place in the first spring and fall following power line construction. The surveys are expected to take place over 3 days in each of the spring and fall periods. Pedestrian surveys of the ROW will be undertaken, walking in a meandering pattern to visually inspect the ROW for the entire length of the construction power line.

5.4.7 Methods

Construction power line pedestrian search surveys will be conducted by the Manitoba Hydro Site Environmental Officer during the spring and fall migration periods. The length and width of the power line ROW including a 10 m buffer to either side will be walked to determine the presence of any bird carcasses. Each bird carcass found will be photographed, georeferenced and recorded, including species, sex, age, physical condition and possible cause of death. The need for further construction power line surveys in years subsequent to the first spring and fall the power line is in place will be determined on the basis of results from the first year.

5.5 YELLOW RAIL SURVEYS

5.5.1 Objectives

The overall objective of the yellow rail component of the Terrestrial Effects Monitoring Plan is to:

- detect the presence/absence of yellow rail in wetlands associated with the Project.

5.5.2 Monitoring Area

Monitoring areas for yellow rail include the wetlands on the east side of the spillway and near the borrow area at Moose Creek (Figure 8).

5.5.3 Rationale and Design

Monitoring of yellow rail during the peak breeding and vocal period during late May and June by conducting broadcast (call back) surveys will detect presence/absence of this species.

5.5.4 Parameters of Concern

The parameter of concern is:

- presence/absence of yellow rail near construction areas.

5.5.5 Sample Site Locations

Monitoring for yellow rail will include wetlands found east of the spillway and adjacent to the Moose Creek borrow area as illustrated in Figure 8.

5.5.6 Sampling Frequency and Schedule

Three broadcast call surveys will be conducted in late-May and early June (three sampling periods each separated by a 10 day period) to ensure detection of any yellow rail present. Monitoring will take place in the first and second year of construction. Any monitoring in subsequent years will be based on the results from the first two years.

5.5.7 Methods

Sampling protocol will follow the Canadian Wildlife Service Standardized Protocol for the Survey of Yellow Rail (*Coturnicops noveboracensis*) In Prairie and Northern Region (Bazin and Baldwin 2007).

Three separate surveys will be conducted at each study site annually. Surveys will be separated by a minimum of 10 days to increase the probability that the survey will coincide with the peak breeding period of rails while facilitating evaluation of temporal variation in density and detectability if yellow rail are present. Surveys will correspond with the peak yellow rail breeding period (late May and June). Surveys will be conducted when wind speeds are <20 km hr. Surveys will be postponed and rescheduled if surveyors believe the detectability of vocalizations is likely to be compromised by weather conditions (e.g., heavy rainfall).

Surveys will be conducted at night on foot. The protocol described by Bazin and Baldwin (2007) provides specific documentation and recording parameters that include; five minutes of passive listening, beginning call broadcast using a series of 'clicks' from an electronic acoustic device for 30 seconds, followed by 30 seconds of continuous silence. Each interval of the call broadcast will be one minute in length (i.e. 30 seconds of intermittent calling followed by 30 seconds of silence). Surveyors will broadcast three call sequences (totaling three minutes) and will record each 1-minute interval in which individuals respond. Due to the small size of the wetlands, one strategic sampling plot will be established as a permanent listening post to facilitate a detection history that consists of three occasions (i.e. one for each 1-minute interval). The distance and bearing of each "call back" will be documented when birds are detected. All other waterbird calls as well as any bird or mammal observations will be documented.

6.0 MAMMALS

6.1 INTRODUCTION

Potential environmental impacts and anticipated residual effects on mammals after mitigation are summarized in the EIS (Chapter 8, Section 8.6.4, pp 8.55 – 8.56). Potential residual effects include destruction and disturbance to denning black bears, general habitat loss and human encounters with wildlife. Overall, residual Project effects on mammals are expected to be negative but small in both magnitude and geographic extent and therefore insignificant.

6.2 BLACK BEAR DENNING

6.2.1 Monitoring Area

The monitoring area for the bear denning monitoring is the area, including the construction power access ROW, to be cleared during the winter east of the spillway (Figure 9).

6.2.2 Objectives

Consistent with the overall objectives stated in Section 2.1, the objective of the black bear denning component of the TEMP is to:

- systematically search for black bear den locations in advance of clearing activities, determine level of activity near the den(s), geo-reference, flag and report location(s) to Manitoba Hydro.

6.2.3 Rationale and Design

Black bears provide an important part of the socio-economic environment at Pointe du Bois via commercial outfitting, trapping and hunting. Studies conducted for the EIS suggest that the area east of the spillway scheduled for clearing in the winter of 2011/2012 as well as the construction power access ROW may be suitable for black bear denning. This monitoring program is designed to minimize Project disturbance on active dens during the fall and winter months when black bear are dependant on dens for hibernation. In general, den sites are considered important and possibly critical life requisites (birthing and rearing of young, hibernation) for black bear.

6.2.4 Parameters of Concern

The parameter being assessed is:

- location of any black bear den sites in proximity to construction activities.

6.2.5 Sample Site Locations

Monitoring for black bear dens will occur within the area east of the spillway, including the construction power line ROW (Figure 9).

6.2.6 Sampling Frequency and Schedule

A one-time bear den survey will be conducted prior to clearing on the east side of the spillway in November, a time when bears are actively searching for/excavating den locations.

6.2.7 Methods

A systematic ground-search method will be used to sample the monitoring area for bear dens. Individuals walked parallel to each other searching for den cues at distances of between 10 and 25 m. Distances between searchers may varied depending on ground conditions, vegetation density, visibility and the number of personnel available for searches. Searchers are trained to focus on structural attributes that provide suitable sites for black bear denning including hill sides, woody debris areas, root masses and other sites that could be easily dug out or are close to food and water sources.

Once located, any dens will be flagged, photographed, geo-referenced and the location reported to Manitoba Hydro. Mitigation options would then have been discussed with Manitoba Conservation.

6.3 WILDLIFE INTERACTIONS

6.3.1 Monitoring Area

The monitoring area for the wildlife interaction portion of mammals monitoring will include the entire Project footprint including all borrow areas (see Figure 3).

6.3.2 Objectives

Consistent with the overall objectives stated in Section 2.1, the objective of the wildlife interaction component of the TEMP is to:

- quantify and assess effects of the Project on wildlife interaction and mortality.

6.3.3 Rationale and Design

This monitoring program is intended to document the frequency and severity of human/wildlife interactions.

6.3.4 Parameters of Concern

Parameters being assessed are:

- mammal mortality from accidents or other sources; and
- frequency and type of human-wildlife interactions

6.3.5 Sample Site Locations

The sample site location for this monitoring is as described in Section 6.3.1.

6.3.6 Sampling Frequency and Schedule

Forms detailing any wildlife encounters will be distributed and reviewed monthly throughout the Project construction period.

6.3.7 Methods

Wildlife encounters and mortality due to wildlife vehicle collisions, other accidents, or predator-related mortalities will be collected in the monitoring area through the use of a “Wildlife Mortality Report Form”, a “Wildlife Encounters Report Form” and a “Mammal Observation Form” (Appendix A). These forms will be prepared by Manitoba Hydro and will include such information as date, time, location (by map), causal circumstances and/or actions leading to an event or action, vehicle speed, attempted evasive action, injuries, damage, animal behaviour prior to the accident, disposition of the remains, and other relevant data.

The Manitoba Hydro Site Environmental Officer will collect and record information on all of the wildlife forms and provide them on a monthly basis to the Wildlife Biologist and the

Environmental Licensing and Protection Department. Any exceptional encounters will be reported immediately and potential follow-up actions will be discussed.

7.0 REPORTING AND FOLLOW-UP FOR REGULATORY AUTHORITIES

Reports detailing results of monitoring activities will be submitted to the regulatory authorities on an annual basis.

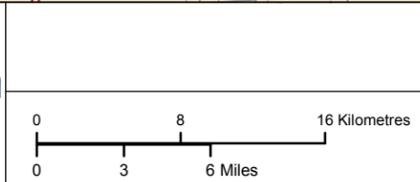
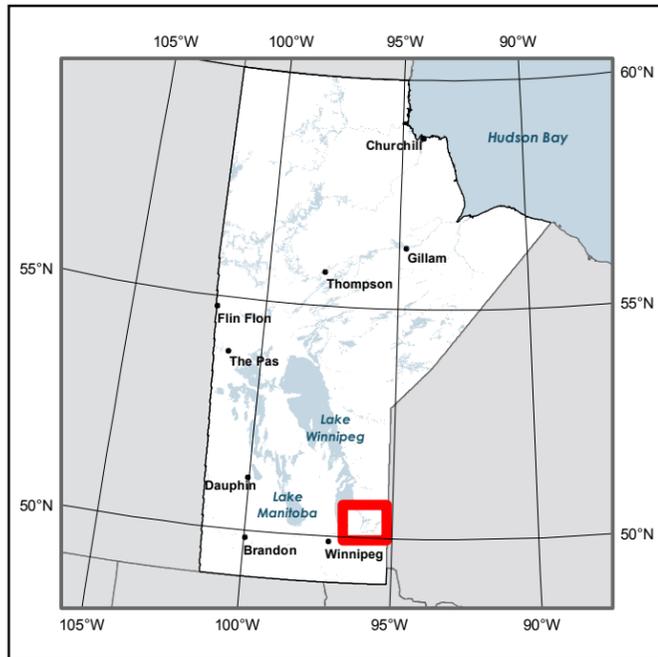
The Project Engineer or his/her designate will be responsible to ensure that monitoring and reporting are conducted as described in this TEMP. Manitoba Hydro will oversee the implementation and conduct of the studies by qualified individuals, and will oversee the review of reports prior to submission to the regulators. Manitoba Hydro will also be responsible for implementing required modifications to monitoring plans, as well as any follow-up activities related to modifications of prescribed mitigation measures.

During the pre-clearing and construction periods, annual reports integrating the results of all components of the monitoring program will be prepared by December of the year of data collection.

The information collected through the TEMP will be incorporated into:

- Annual Field Reports – which summarize the findings and relationship to the EIS predictions being tested. These will be provided to regulators by Manitoba Hydro.
- Final Reports – which synthesize data collected, document the extent of terrestrial disturbance to study parameters, identify deviations from EIS assumptions, evaluate implications of deviations from assumptions, and provide any required recommendations for continuation of monitoring, mitigation measures and EnvPP guidelines.

FIGURES



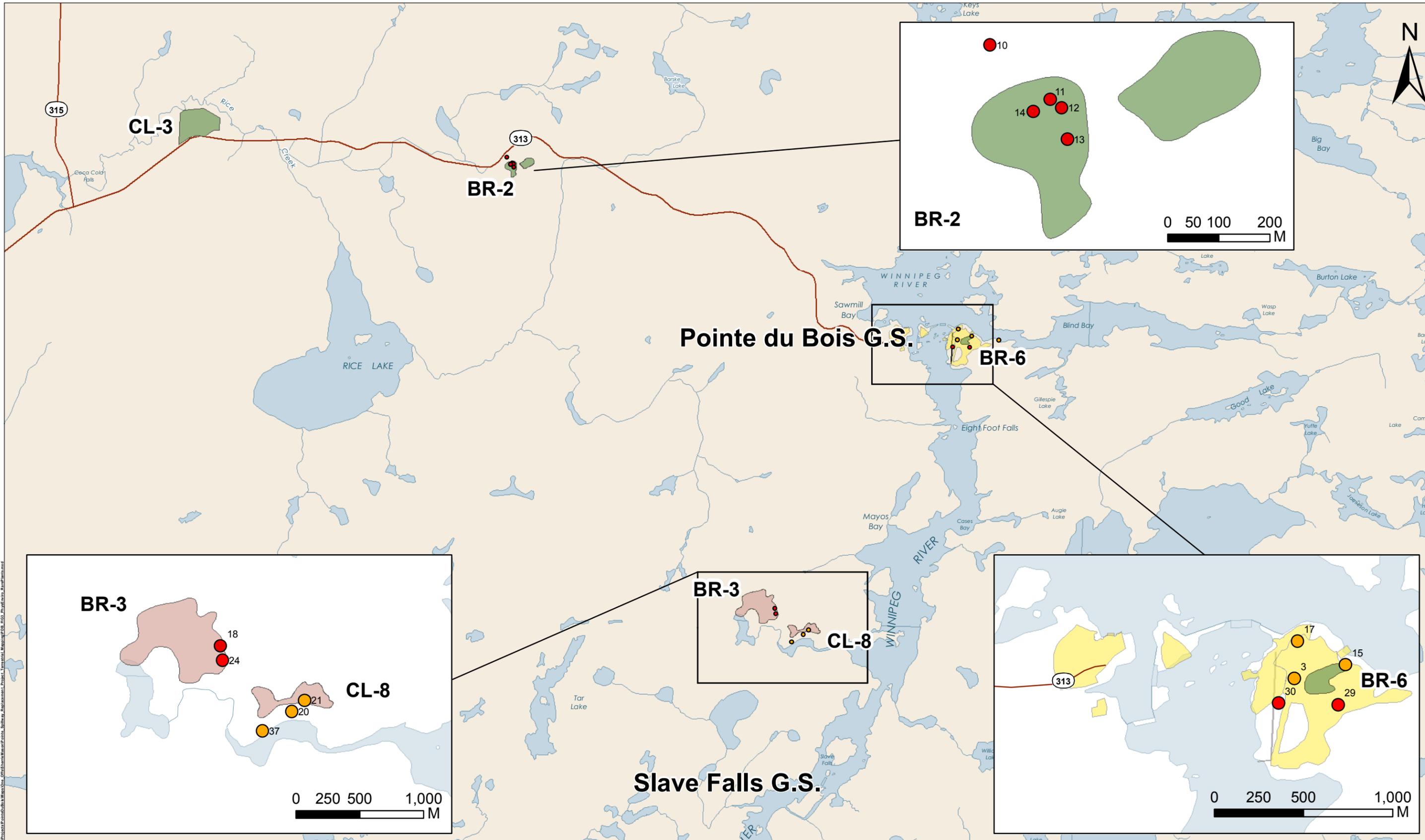
DATA SOURCE: Manitoba Hydro, Government of Canada, Province of Manitoba		
DATE CREATED: 05 DEC 2011	CREATED BY: HPP - GIS & Special Studies	
REVISION NO: VERSION: 1.0	REVISION DATE: 05 DEC 2011	QA/QC: xx

Legend	
ROAD - GENERAL	Pointe du Bois G.S.
RAIL LINE	Provincial Parks
Generating Stations (G.S.)	Reserve Land
	Project Location

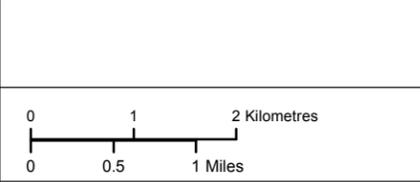
**Pointe du Bois
Spillway Replacement Project**

Project Location Map

Figure:
1.0



The location of the spillway is shown in red. The map is based on the following data sources: Manitoba Hydro, MMM Group, ECOSTEM. The map is based on the following data sources: Manitoba Hydro, MMM Group, ECOSTEM.



DATA SOURCE: Manitoba Hydro, MMM Group, ECOSTEM		
DATE CREATED: 10 OCT 2012	CREATED BY: HPP - GIS	
REVISION NO: Map 3.0	REVISION DATE:	QA/QC: MB HYDRO

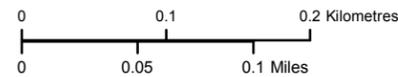
Legend	
● Very Rare Plants (S1)	 Primary Borrow Sources
● Rare Plants (S2)	 Secondary Borrow Sources
— Rivers	 Potential Disturbance Area

Pointe du Bois Spillway Replacement Project
S1 and S2 Rare Plant Study Area

Figure: 2.0



File Location: W:\wehuase_group\shewar_supply\projects\Pointe du Bois\MapDocs\02_Infrastructure\MapDocs_Spills\Replacements\Project_Terrain_Map\Map02_P02_MortonsWetlands.mxd



DATA SOURCE: Manitoba Hydro, KGS Acres		
DATE CREATED: 22 DEC 2011	CREATED BY: HPP - Pointe du Bois Planning	
REVISION NO: VERSION 1.0	REVISION DATE:	QA/QC:

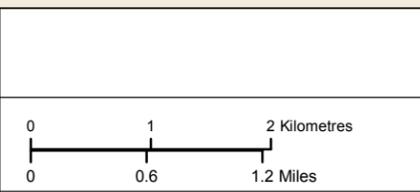
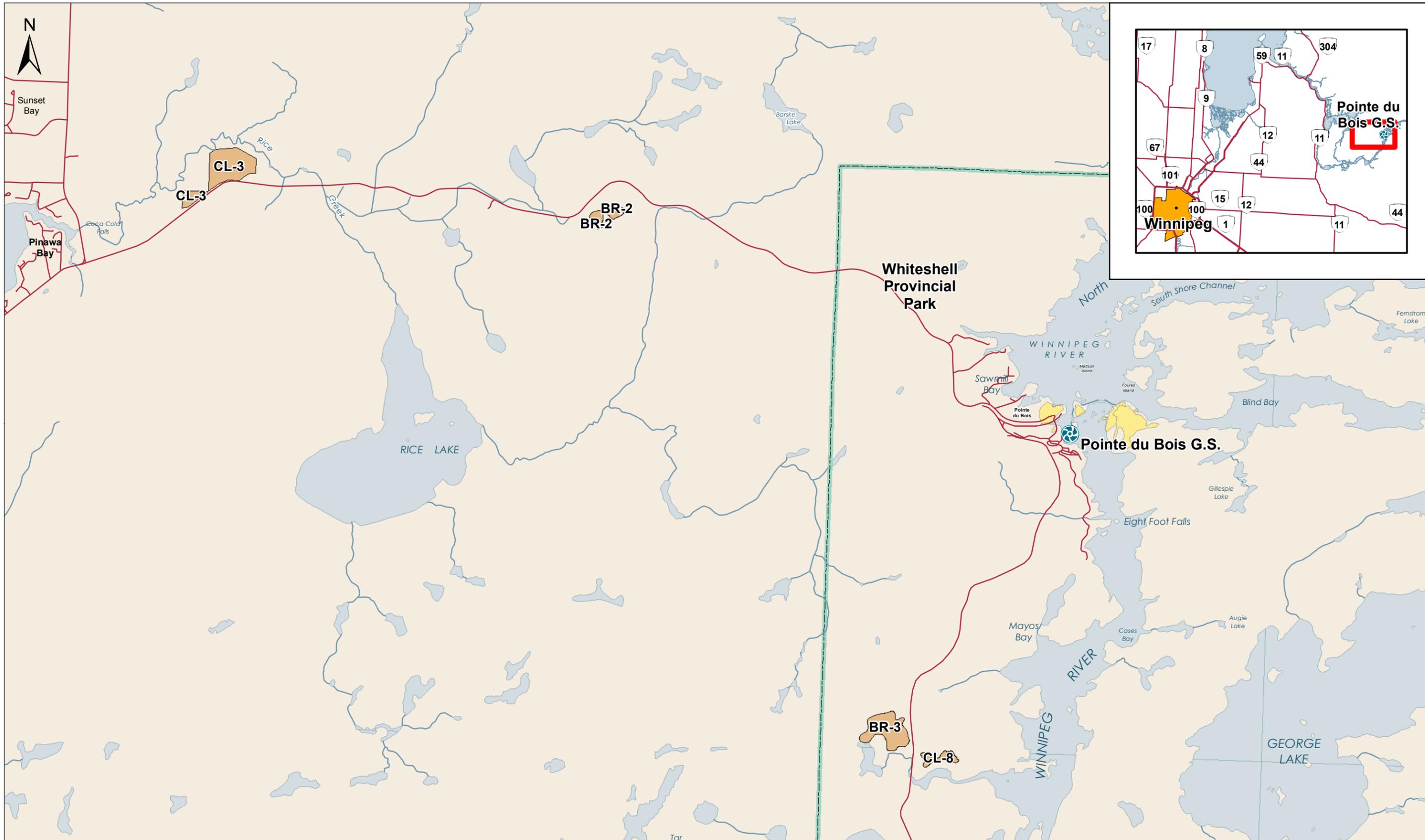
Legend

Reptile Study Area

Pointe du Bois Spillway Replacement Project

Reptile Study Area

Figure:
4.0



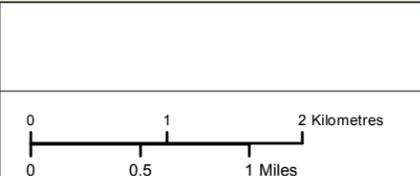
DATA SOURCE: Manitoba Hydro, KGS Acres		
DATE CREATED: 08 DEC 2011	CREATED BY: HPP - GIS & Special Studies	
REVISION NO: VERSION: 1.0	REVISION DATE:	QA/QC:

Legend	
	Borrow Areas for CL-3, BR-2, CL-8, & BR-3
	Potential Disturbance Area
	Roads
	Whiteshell Provincial Park
	Generating Stations (G.S.)

Pointe du Bois Spillway Replacement Project	
Pre Clearing Nesting Study Area	
Figure: 6.0	



File Location: W:\manitoba_hydro\Projects\Pointe du Bois\GIS\Map_Series_Replacement_Project_Territorial_Mapping\GIS_F102_ManitobaHydro.mxd



DATA SOURCE: Manitoba Hydro, KGS Acres		
DATE CREATED: 06 DEC 2011	CREATED BY: HPP - Pointe du Bois Planning	
REVISION NO: VERSION 1.0	REVISION DATE:	QA/QC:

Legend
 Yellow Rail Survey

Pointe du Bois Spillway Replacement Project	
Yellow Rail Study Area	
Figure:	8.0

Appendix A

Wildlife Observation Report

Date _____

Form ___ of ___ for Today

Name of person reporting : _____

Date of wildlife observation: _____ Time : _____ (AM/PM)

Species observed (e.g., deer, bear, turtle, hawk): _____

Sex and Age of species if known (e.g., male, female, adult, young)?: _____

Was the animal wounded?: _____

Location or GPS coordinates if available: _____

Weather (at time of occurrence): _____

Animal behaviour (e.g., was the animal running, standing, swimming, nesting etc.)?:

Were photos taken?: _____

Any other comments?: _____

Prepared By:

Wildlife Mortality Incident Report

Date _____

Form ___ of ___ for Today

Name of person reporting mortality: _____

Date of wildlife mortality: _____ Time (if vehicle collision): _____ (AM/PM)

Type of mortality (e.g., vehicle collision, control, predator): _____

Species involved (e.g., deer, bear, turtle, hawk): _____

Sex and Age of species (e.g., male, female, adult, young)?: _____

GPS coordinates of mortality site: _____

Weather (at time of occurrence): _____

If a collision how did it occur (e.g., speed, blind corner, reduced visibility, animal behaviour such as was the animal running, standing)?: _____

Were photos taken?: _____

Was this reported to the local Natural Resource Officer?: _____

How was the animal disposed of (e.g., NRO removed, removed from road into forest, buried, burned)?: _____

Suggestions to avoid future mortality?: _____

Prepared By:

Wildlife Encounter Report

Date _____

Form ___ of ___ for Today

Name of person reporting : _____

Date of wildlife encounter: _____ Time : _____ (AM/PM)

Type of encounter (e.g., vehicle collision, injury, property damage): _____

Species involved (e.g., deer, bear, turtle, hawk): _____

Sex and Age of speices if known (e.g., male, female, adult, young)?: _____

Was the animal wounded?: _____

GPS coordinates of encounter: _____

Weather (at time of occurrence): _____

If a collision how did it occur (e.g., speed, blind corner, reduced visibility, animal behaviour such as was the animal running, standing)?: _____

Were photos taken?: _____

Was this reported to the local Natural Resource Officer?: _____

Suggestions to avoid future encounters?: _____

Prepared By:

Bird Powerline Mortality Collision Report

Date _____

Form ___ of ___ for Today

Name of person reporting : _____

Date: _____

Time : _____ (AM/PM)

Bird found (e.g., hawk, goose, duck, owl): _____

Multiple found at birds the site? Yes/No

If yes number of birds? _____

Sex and age of bird if known (e.g., male, female, adult, young)?: _____

Possible cause of death (e.g. strike, electrocution, predation)?: _____

Location or GPS coordinates: _____

Weather (at time of finding the bird): _____

Photographs attached: _____

Condition of the carcass (e.g.does the mortality look recent, has the carcass been predated?):

Are there any bands on the legs? Yes/No

If yes what color and which leg? _____

Prepared By: