

BIPOLE III TRANSMISSION PROJECT

# 2014 Biophysical Monitoring and Mitigation Report



**Report to Manitoba Conservation and Water Stewardship  
In Accordance with Manitoba *Environment Act* Licence No. 3055**

## TABLE OF CONTENTS

<b>1</b>	<b>INTRODUCTION.....</b>	<b>1</b>
<b>2</b>	<b>PROJECT OVERVIEW.....</b>	<b>1</b>
<b>3</b>	<b>PROJECT STATUS.....</b>	<b>1</b>
3.1	Keewatinohk Facilities .....	1
3.2	Transmission Line Construction .....	4
<b>4</b>	<b>BIOPHYSICAL MONITORING PLAN OVERVIEW.....</b>	<b>5</b>
<b>5</b>	<b>IMPLEMENTATION OF MONITORING AND FOLLOW-UP ACTIVITIES.....</b>	<b>6</b>
<b>6</b>	<b>ENVIRONMENTAL COMPONENT MONITORING.....</b>	<b>8</b>
<b>7</b>	<b>AQUATICS.....</b>	<b>8</b>
7.1	Fish Habitat.....	8
7.2	Stream Crossings .....	8
7.3	Water Quality .....	10
<b>8</b>	<b>MAMMALS.....</b>	<b>11</b>
8.1	Moose .....	11
8.2	Boreal Woodland Caribou .....	12
8.3	Deer & Elk.....	12
8.4	Grey Wolf.....	12
8.5	Black Bear .....	13
8.6	Wildlife Mortalities.....	13
<b>9</b>	<b>TERRESTRIAL ECOSYSTEMS AND VEGETATION.....</b>	<b>14</b>
9.1	Species of Conservation Concern .....	14
9.2	Plant Species Important to Aboriginal People .....	15
9.3	Terrestrial Vegetation .....	15
9.4	Wetlands.....	16
9.5	Invasive and Non-Native Species.....	16
9.6	Rehabilitation .....	16
<b>10</b>	<b>REPTILES.....</b>	<b>17</b>
<b>11</b>	<b>BIRDS .....</b>	<b>17</b>
11.1	Bird-Wire Collision .....	17
11.2	Species of Conservation Concern .....	18
11.3	Point Count Surveys .....	18
11.4	Colonial Nesting Sites .....	18
11.5	Sharp-tailed Grouse Lekking Sites .....	19
11.6	Active Bird Nests .....	19
11.7	Birds of Prey .....	19

<b>12 ACCESS .....</b>	<b>19</b>
<b>13 HERITAGE.....</b>	<b>19</b>
<b>14 COMPLIANCE MONITORING.....</b>	<b>21</b>
<b>15 WASTE MANAGEMENT &amp; HAZARDOUS MATERIALS.....</b>	<b>22</b>
<b>16 FUTURE MONITORING .....</b>	<b>23</b>
<b>17 SUMMARY.....</b>	<b>24</b>

## MAPS

Map 1: Bipole III Project Area and Construction Sections.....	2
Map 2: Keewatinohk Infrastructure Area .....	3

## PHOTOS

Photo 1: Aerial View of Keewatinohk Work Camp.....	1
Photo 2: Keewatinohk Construction Power Station .....	4
Photo 3: Installation of a Transmission Structure for the Construction Powerline.....	4
Photo 4: Aerial Shot of Clearing of Bipole III Transmission Line .....	4
Photo 5: Riparian Zone Measurements .....	8
Photo 6: Limestone River crossing .....	10
Photo 7: Erosion Control Measures on a Drain Leading to Goose Creek .....	11
Photo 8: Aerial View of a Collared Caribou.....	12
Photo 9: Bear Release After Transport to a Remote Location .....	13
Photo 10: Uncleared Buffer Around Vegetation Species of Conservation Concern.....	15
Photo 11: Ground Survey of the Cowan Blueberry Site .....	15
Photo 12: Patterned Fen Wetland Along Bipole III Right-of-Way .....	16
Photo 13: Borrow Pit Requiring Rehabilitation Post Construction .....	17
Photo 14: Survey of Planned Tower Sites for Garter Snake Hibernacula .....	17
Photo 15: Bird Diverters on a Transmission Line.....	18
Photo 16: Eastern Whip-Poor-Will .....	18
Photo 17: Survey of Heritage Site.....	20
Photo 18: Tin Cans and Refuse Pile Related to Hudson Bay Railway Construction.....	21
Photo 19: Temporary Hazardous Materials Storage Area at Keewatinohk Converter Station Work Area.....	22

## FIGURES

Figure 1: Transmission Line Construction Progress to End of 2013/2014 Winter Season .....	5
Figure 2: Collared Caribou Mortalities .....	13
Figure 3: Bird Species with the Highest Percent Occurrence.....	19

## TABLES

Table 1:	2014 Monitoring Activities by Environmental Component.....	9
Table 2:	Stream Crossings Survey Results.....	10
Table 3:	Terrestrial Ecosystems and Vegetation 2014 Monitoring Summary .....	14
Table 4:	Keewatinohk Area Reportable Releases.....	22

## APPENDICES

- Appendix A – Aquatics Monitoring Report
- Appendix B – Vegetation Monitoring Report
- Appendix C – Reptiles Monitoring Report
- Appendix D – Avian Monitoring Report
- Appendix E – Mammals Monitoring Report
- Appendix F – Heritage Monitoring Report

## Abbreviations

AC	Alternating Current
ATK	Aboriginal Traditional Knowledge
BMP	Biophysical Monitoring Plan
CEnvPP	Construction Environmental Protection Plan
CHRPP	Cultural and Heritage Resource Protection Plan
DC	Direct Current
EIS	Environmental Impact Statement
EPIMS	Environmental Protection Information Management System
EPP	Environmental Protection Program
ESS	Environmentally Sensitive Site
GHA	Game Hunting Area
GPS	Geographic Positioning System
HVDC	High voltage direct current
IR	Infra-red
ISO	International Standards Organization
km	kilometre
kV	kilovolt
m	metres
MH	Manitoba Hydro
MBCDC	Manitoba Conservation Data Centre
MCWS	Manitoba Conservation and Water Stewardship
NACC	Northern Association of Community Councils
PTH	Provincial Trunk Highway
ROW	Right-of-way
SOCC	Species of Conservation Concern

## 1 INTRODUCTION

Manitoba Hydro has spent years working with a variety of stakeholders to effectively plan and mitigate potential environmental and social issues associated with the Bipole III Transmission Project (the Project). Many meetings were held with First Nation and Northern Association of Community Councils (NACC) communities, and the Manitoba Metis Federation and other stakeholders to gather input on local issues and develop mitigation and monitoring approaches that addressed local concerns. A result of that process was a comprehensive Environmental Impact Statement and project Environmental Protection Plans. With the environmental approval of the Project (*Environment Act* Licence No. 3055) and the start of construction Manitoba Hydro (MH) has begun implementing the plans and monitoring their effectiveness. The accuracy of effect predictions made in the Environmental Impact Statement (EIS) are also considered in the follow-up and monitoring programs that have been developed.

The objective of this report is to present information and data on Bipole III environmental monitoring, mitigation and protection actions in compliance with clauses 57 and 58 of the Project *Environment Act* licence (No. 3055). Specifically, the results of the first year of monitoring will be presented in compliance with the Biophysical Monitoring Plan provided to Manitoba Conservation and Water Stewardship (MCWS) per clause 18 of the *Environmental Act* licence. In addition, MH is pleased to inform stakeholders and the general public of progress made on construction and implementation of mitigation measures that minimize environmental effects.

This report is the first of a series of annual reports covering the Project's first year of construction through to October 2014. Socio-economic monitoring and mitigation for the Project will be addressed in separate annual reports.

## 2 PROJECT OVERVIEW

The Bipole III Transmission Project is a new high voltage direct current transmission project required to improve overall system reliability and dependability. The Project involves the construction of a 500 kV DC line that links the northern power generating complex on the Lower Nelson River with the conversion and delivery system in southern Manitoba. The Project also involves the construction of two converter stations (Keewatinohk Converter Station in northern Manitoba and Riel Converter Station east of Winnipeg), two ground electrodes, and additional 230 kV transmission line interconnections in the north to tie the new Keewatinohk Converter Station into the existing northern AC system. The 500 kV DC transmission line is divided into eight construction sections (N1 to N4, C1, C2, and S1 and S2) as shown on Map 1. The projected in-service date for the Project is anticipated for 2018.

Due to heavy reliance on one transmission corridor for Bipole I and II and a single converter station in the south, Manitoba Hydro's system is vulnerable to extensive power outages from severe weather, fires, or other events. The Bipole III Transmission Project is essential to enhance the long-term reliability of Manitoba Hydro's power grid.

## 3 PROJECT STATUS

Construction of the Bipole III Transmission Project began in late 2013 on northern components including the Keewatinohk Converter Station site, construction power, AC collector lines, and HVDC transmission line (Map 2).

### 3.1 Keewatinohk Facilities

The Keewatinohk Converter Station site was developed by clearing trees, removing peat materials and grubbing, establishing a drainage network, installing rock lining and erosion protection on drains, and stabilizing berms.

A new 138 kV to 12 kV construction power station was built in the Keewatinohk area to provide the power needed to build the converter station and facilities. This was completed during this first construction season and placed in-service as of July 10, 2014.

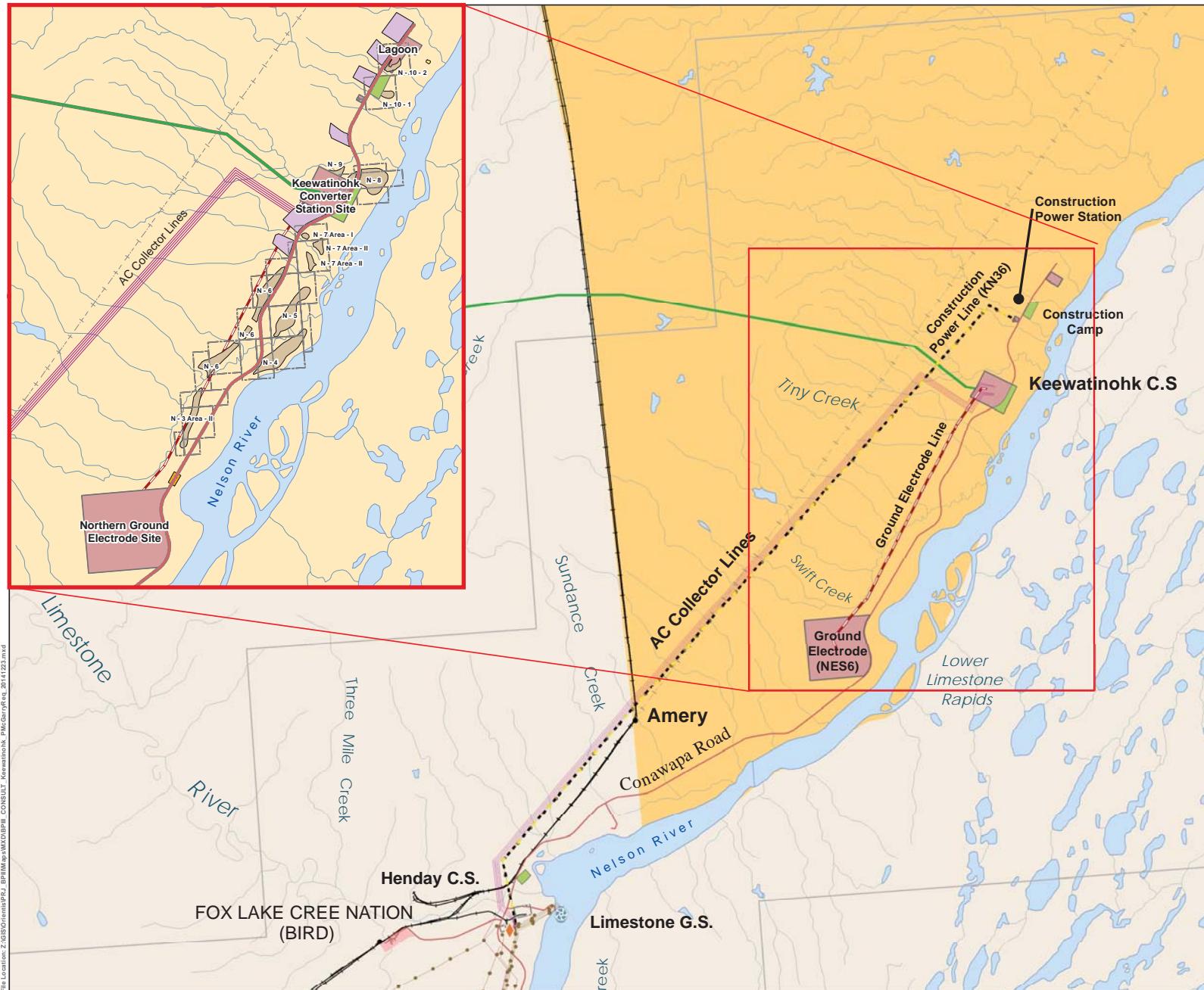
Construction on the main work camp and supporting facilities occurred in 2014 (Photo 1). One supervisory dorm and one standard dorm were completed and occupied. As of Fall 2014, a temporary kitchen, dining facilities and a 49 person dorm were also installed.



Photo 1: Aerial View of Keewatinohk Work Camp



Map 1: Bipole III Project Area and Construction Sections



Bipole III Transmission Project

## Project Infrastructure

- Final Preferred Route
  - Planning Section Division
  - AC Collector Lines
  - Construction Power (KN36)
  - Ground Electrode Line
  - Quarry Lease Boundary
  - Keewatinohk Infrastructure
  - Excavated Material Placement Area
  - Access Road Security Gatehouse
  - Conawapa GS Stockpile
  - Borrow Deposits
  - Manitoba Hydro and Contractor Work Areas

Infrastructure

- ◆ Converter Station
  - ◆ Generating Station

Landbase

- Community
  - [Grey Box] City / Town
  - [Red Box] First Nation
  - [White Box] Rural Municipality
  - [Yellow Box] Wildlife Management Area

Coordinate System: UTM Zone 14N NAD83  
Data Source: MBHydro, ProvMB  
Date Created: January 12, 2015  
Version: Final 2.0

Version: Final 2.0  
  
 0 2.5 5 Kilometres  
 0 1.5 3 Miles

Bipole III Transmission Project Infrastructure

## Northern Components

### 3.2 Transmission Line Construction

Transmission line construction activities began in mid-December at the Keewatinohk Construction Power Station with the associated construction power line (KN36) (Photo 2). Clearing was completed for the entire 310 metre (m) wide right-of-way (ROW) that will contain the 5 AC collector lines connecting Keewatinohk Converter Station to Henday Converter Station at Limestone (Map 2).



**Photo 2:** Keewatinohk Construction Power Station

The construction power line (KN36) is also on this ROW. All 30 km of line KN36 were cleared, towers installed and stringing completed in order to provide construction power to the area (Photo 3). These construction activities were carried out through a joint venture between Fox Lake Cree Nation and Valard Construction.



**Photo 3:** Installation of a Transmission Structure for the Construction Powerline

Transmission line construction activities also began with ROW clearing in sections N2B and N3 in early 2014 through a joint venture between Swampy Cree Tribal Council and Sigfusson Northern (Photo 4).



**Photo 4:** Aerial Shot of Clearing of Bipole III Transmission Line

While most work during the 2013/14 construction season consisted of clearing of northern lines, there was some anchor and foundation work carried out. At the end of the 2013/14 winter construction season, approximately 35% of section N2 was cleared with about 20% of foundations having been installed (Figure 1). Eighty-five percent of section N3 was cleared with about 35% of foundations having been installed.

No construction work occurred on transmission line sections N1, N4, C1, C2, S1 or S2 to October 31, 2014 (Map 1).

TRANSMISSION LINE CONSTRUCTION PROGRESS		Percentage Complete									
To the end of 2013/14 winter construction season		10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
<b>Construction Power Line</b>	- Route Clearing										
	- Tower Installation										
	- Conductor Stringing										
<b>AC Collector Line</b>	- Route Clearing										
	- Tower installation										
	- Conductor Stringing										
<b>Segment N2</b>	- Route Clearing										
	- Tower installation										
	- Conductor Stringing										
<b>Segment N3</b>	- Route Clearing										
	- Tower installation										
	- Conductor Stringing										

Figure 1: Transmission Line Construction Progress to End of 2013/2014 Winter Season

## 4 BIOPHYSICAL MONITORING PLAN OVERVIEW

Part of Manitoba Hydro's commitment to environmental protection includes the development of a comprehensive Environmental Protection Program (EPP) for the Bipole III Transmission Project. One aspect of this program is monitoring and follow up for biophysical environmental components identified in the Bipole III Transmission Project EIS and associated technical reports. The draft Biophysical Monitoring Plan (BMP) submitted to MCWS for review in summer 2014 outlines the various monitoring activities that will occur during the different phases of the Project.

The scope of this plan includes physical and biological components of the environment. The purpose of the Biophysical Monitoring Plan is to identify the key activities that will be conducted as part of the monitoring and follow-up component of the Environmental Protection Program that will verify potential effects and effectiveness of mitigation.

The objectives of the Biophysical Monitoring Plan are to:

- Confirm the nature and magnitude of predicted environmental effects as stated in the EIS;
- Assess the effectiveness of mitigation measures implemented;
- Identify unexpected environmental effects of the Project, if they occur;

- Identify mitigation measures to address unanticipated environmental effects, if required;
- Confirm compliance with regulatory requirements; and
- Provide baseline information to evaluate long-term changes or trends.

Environmental components requiring follow-up monitoring and discussed further in this annual biophysical monitoring and mitigation report include:

- Aquatics;
- Groundwater;
- Mammals;
- Soils and Terrain;
- Terrestrial Ecosystems and Vegetation;
- Reptiles;
- Birds;
- Access; and
- Heritage.

## 2014 Biophysical Monitoring Highlights

Key monitoring highlights during this reporting period described in further detail in this document include:

- Wolves continue to be the greatest source of mortality for collared caribou.
- Six caribou calves were recorded across Pasquia-Bog and Wabowden ranges in 2014 compared to nine in 2012.
- A multi-species aerial transect pre-construction survey was completed from construction section C1 to N2. Twenty-six elk, 29 moose, 30 deer and 1 wolf were recorded.
- There were 13 reported wildlife mortalities related to the Project in the Keewatinohk area including black bear, foxes, ptarmigan and marten. All were due to vehicle strikes.
- High success rate was achieved in protecting known vegetation species of concern on rights-of-way cleared in 2014.
- 29 stream crossings were surveyed in the summer of 2014. Four were found to be in complete compliance with prescribed mitigation measures. At the remaining 25 crossings common deviations from the prescribed mitigation were observed. However, most riparian zones were deemed adequately protected based on inspection and MCWS approval.
- Pre-construction surveys did not observe any garter snakes or hibernacula at any of the proposed tower survey locations surveyed.
- A total of 154 bird species were recorded during the 2014 baseline bird monitoring program of which 75 species are considered species of conservation concern.
- Pre-construction surveys found no evidence of colonial nesting bird colonies on the ROW.

### Adaptive Management

Manitoba Hydro has accumulated a wealth of knowledge and lessons learned from previous monitoring programs. The successes of those programs have been useful in developing the draft Biophysical Monitoring Plan for the Project. This previous experience has been used to improve upon the plan's approach, methods and key environmental monitoring activities.

Going forward, an adaptive management framework will continue to be used to deal with unexpected outcomes or events based on monitoring information gathered. Data will be reviewed as collected to determine if any of the environmental thresholds specified in the BMP have been exceeded due to shortfalls in impact prediction, ineffective mitigation measures or inadequate monitoring approaches. Actions will be developed in response to these contingencies.

## 5 IMPLEMENTATION OF MONITORING AND FOLLOW-UP ACTIVITIES

Environmental monitoring is being implemented for the Bipole III Project to verify the accuracy of environmental assessment and the effectiveness of mitigation measures in protecting the environment. Manitoba Hydro has hired full-time staff for the implementation of the Biophysical

Monitoring Plan, funded participation of community environmental monitors, and retained highly qualified specialists in appropriate disciplines. Manitoba Hydro's Environmental Protection Information Management System (EPIMS) will also play a major role in managing the BMP implementation, coordination of field work, data collection and communications amongst the monitoring team.

### Environmental Inspection Staff

Reporting to a Senior Manitoba Hydro Environmental Assessment Officer, multiple on-site Construction Environmental Inspectors were retained and trained for the 2013/14 transmission line construction season. A Site Environmental Officer was also put in place at the Keewatinohk Converter Station. In addition, Manitoba Hydro's Licensing and Environmental Assessment Department provides advice and guidance to these on-site Environmental Inspectors and Site Environmental Officers for non-compliance situations and environmental incidents.

### Community Liaisons and Environmental Monitors

In addition to providing employment and business opportunities through the Project, Manitoba Hydro is committed to engaging local community-based environmental expertise during the construction of the

Bipole III Transmission Project. Manitoba Hydro is funding qualified and interested individuals from Aboriginal communities to work as Environmental Monitors and Community Liaisons. The Environmental Monitors assist in undertaking daily inspections with Environmental Inspectors during construction of the Bipole III Transmission Project and collect monitoring information in support of Manitoba Hydro's biophysical and socio-economic effects monitoring programs.

One Environmental Monitor noted in his final report on the 2013/14 construction season, "Manitoba Hydro inspectors and supervisors are very dedicated to their work and have a zero tolerance for oil spills. If there is one, everything has to be cleaned up. Heritage sites are very important and are left alone." The monitor also contributed to improving the implementation of protection measures by suggesting that flagging ribbons could be colour coded to help communicate their purpose, which is under consideration.

To facilitate communication with in-vicinity Aboriginal communities, Manitoba Hydro has also funded Community Liaison positions. These positions allow the communities to have one of their own members on-site to observe construction and then report back to their community on work progress and environmental protection. The Community Liaisons also contribute to the monitoring of some socio-economics metrics for the Project. MH uses this transparent approach to ensure the community is well informed and can participate in monitoring with innovative approaches and remedies to protect the environment and people.

During the 2013/14 winter, clearing of the ROW in construction section C2, three rock piles were observed by the Community Liaison. With the possibility that these were potential burial sites, clearing was stopped in the area.

The Community Liaison then informed the Ebb and Flow First Nation. Community led action on protecting the site was implemented with input from elders and community members. Even if further investigation reveals these rock piles were not burial sites, the process clearly worked well in ensuring potential local heritage was protected and that the community was informed and had opportunity to participate in response to the discovery.

### **Data Management**

As the Project's Biophysical Monitoring Plan requires and generates large amounts of data, an EPIMS was developed to manage, store and facilitate the transfer of Environmental Protection Program data and information amongst the Project team. EPIMS will facilitate the transferring of knowledge and experiences encountered on a daily basis during construction activities from Environmental Inspectors and community Environmental Monitors to specialists that are responsible for monitoring project effects on a real time basis. As well, monitoring results and mitigation measure adaptations will be communicated back to construction staff and contractors.

### **Specialist Technical Data Reports**

Detailed monitoring data collected in support of this Bipole III Biophysical Annual Monitoring and Mitigation Report is available in supporting technical reports prepared by discipline specialists. Technical biophysical monitoring reports were prepared for the 2013/14 construction season for Aquatics, Avian, Mammals, Vegetation, Reptiles, and Heritage environmental components and are appended to this report. Due to the sensitive nature of some of the data collected it is not all presented on report maps.

## 6 ENVIRONMENTAL COMPONENT MONITORING

Multiple environmental components were identified for follow-up in the EIS and technical reports as well as the Clean Environmental Commission Report, *Environment Act* licence and through First Nations, NACC and Metis engagement activities. For each environmental component, one or more environmental indicators were selected to focus monitoring and follow up efforts as indicated in the BMP.

The environmental components to be monitored over the life of the monitoring program are listed in Table 1. The column on the far right of the table specifies the monitoring activities that were undertaken to October 31, 2014. These components are being monitored due to their environmental, social, regulatory and cultural importance.

In recognition of the potential impact of the Project on First Nation and Metis people, monitoring components were added to the monitoring plan including: plant communities of importance to Aboriginal people, creation of new access, and furbearer and trap line monitoring. This will enhance understanding of the impacts transmission facilities can have on blueberries, medicinal plants, access for resource use, furbearer behaviour and trapper success. Results will be shared with the communities to gather their feedback and recommendations for further monitoring or responses.

## 7 AQUATICS

### 7.1 Fish Habitat

One of the main risks to existing fish habitat from transmission line construction is damage to stream banks and riparian vegetation leading to loss of cover and in-stream sediment delivery. In recognition of this, mitigation measures were prescribed to protect streams and habitat. The monitoring program for this component is focused on evaluating the effectiveness of mitigation at stream crossings and prescribing any remedial actions.

### 7.2 Stream Crossings

During this annual reporting period, stream crossing sites were evaluated using Manitoba Hydro's Daily Inspection Reports and site visits in the summer of 2014 to assess the adherence to prescribed mitigation. Twenty-nine watercourse crossings were assessed as part of the monitoring plan located between the Keewatinohk Converter Station and the Henday Converter Station. Field studies consisted of an initial aerial reconnaissance at each site (Photo 5). Watercourses with no fish habitat or marginal fish habitat were only assessed from the air. Six crossings rated as 'important/moderate' fish habitat were chosen for ground survey to obtain an overall evaluation of the state of the site.

The surveys consisted of evaluating the stream crossing sites

against the list of prescribed mitigation to determine level of compliance as well as recording observations of the conditions of sites. Riparian buffers, vehicle crossings, tower and anchor locations, and rutting and erosion were some of the parameters evaluated.



**Photo 5: Riparian Zone Measurements**

Of the 29 stream crossings surveyed, all sites were in compliance with 13 of the 21 mitigation measures. Of the 8 mitigation measures in non-compliance, the most common deviations from the prescribed mitigation were slash present below the tree line and minor rutting and stream bank damage. As well permanent structures (tower and/or anchors) for the Construction Power line were situated within the floodplain at five sites, including Goose Creek. During tower spotting it became apparent that previous design decisions and feedback from public engagement regarding minimizing right of way width to 310 metres for the AC Collector and Construction Power lines resulted in towers placed within the floodplain making it impossible to maintain the full riparian buffer of 30 metres at four sites. Manitoba Hydro took special measures during the installation of the towers/anchors under frozen ground conditions to minimize effects to the floodplain. Care was also taken during tower spotting when within the floodplain as to not affect the active channel, so as to not directly impact fish.

Manitoba Hydro went to great efforts in the field to identify and flag appropriate boundaries for riparian zones and buffers under difficult winter conditions in a complex riparian environment. Decisions were made in the field and in conjunction with MCWS to mark buffer zones under deep snow conditions and where there was difficulty in identifying the location of some stream channels. The riparian zones adjacent to most streams were adequately protected based on inspection and MCWS review. All inspection reports indicated that there were no major issues and that the work was in compliance with the applicable approvals and permits.

**Table 1: 2014 Monitoring Activities by Environmental Component**

<b>Component</b>	<b>Environmental Indicator</b>	<b>2014 Monitoring Status</b>
Aquatics	Fish habitat	Daily Inspection Reports 29 post-construction stream crossing surveys in Keewatinohk area
	Water quality	Daily Inspection Reports
Groundwater	Water level and quality	Potable water for the work camp was monitored for coliform bacteria and chlorine residual
Mammals	Moose	Multi-species survey in winter 2013/14 Moose population surveys in Game Hunting Areas (GHAs) Monitoring survey methods under development with MCWS
	Caribou	Telemetry program Calf survival survey Mortality investigations
	Deer	Multi-species aerial transects
	Elk	Multi-species aerial transects
	Grey wolf	Multi-species aerial transects
	Black bear	Keewatinohk on-site monitoring
	Furbearers	Keewatinohk on-site monitoring Initiation of Community Trapline Monitoring Program
Soils and Terrain	Permafrost	No activity in 2014
	Soil productivity	No activity in 2014; only applicable to transmission line sections N4, C1, C2, S1 and S2
Terrestrial Ecosystems and Vegetation	Species of conservation concern	12 sites re-visited to determine species survival On-going pre-construction surveys of un-cleared ROW
	Plants/communities important to Aboriginal people	Survey of the Cowan blueberry site with community members
	Terrestrial vegetation	Survey of 15 sites along cleared ROW for differences in species composition and abundance
	Wetlands	Four ground investigations of patterned fen wetland sites
	Invasive and non-invasive species	On-going surveys of ROW
	Native grassland/prairie	Pre-construction survey in un cleared transmission line sections
Reptiles	Northern prairie skink habitat	No activity in 2014; only applicable to transmission line section S1
	Red-sided garter snake dens	52 pedestrian surveys conducted at tower locations overlapping environmentally sensitive sites and potential sites for reptiles in September 2014
Birds	Bird wire collision mortality	Environmentally Sensitive Sites (ESS) were evaluated for collision potential
	Bird species of conservation concern	Surveys of bird species of conservation concern
	Colonial bird nesting sites	Pre-construction surveys
	Sharp-tailed grouse Leks	No activity in 2014; aerial survey planned for spring 2015
	Active bird nests	Pre-construction survey for stick nests Environmental Monitor observations
	Birds of prey	Funding of PhD study on Peregrine Falcons
Access	Humans	Access cameras deployed on access points along cleared ROW
Heritage	Heritage Resources	Heritage site surveys



**Photo 6: Limestone River crossing**

Generally, monitoring activities determined the portion of the buffer closest to stream channels was hand-cleared and machinery was used for selective clearing further from the bank within the riparian buffer zone. At some sites the majority of trees as required for vegetation clearance requirements and shrubs were removed within the buffer, but ground cover remained intact.

### Stream Crossing Mitigation Measures

Many mitigation measures were prescribed to protect fish habitat and water quality and used to evaluate compliance and effectiveness. The measures address:

- Location of tower structures and anchors
- Orientation of crossing relative to stream
- Buffer zone requirements
- Preferred winter construction
- Management of woody debris in flood plain
- Use of existing access
- Restricted periods of activity
- Conditions for stream crossings

Monitoring also revealed slash was commonly left along the vehicle tracks within the floodplain of watercourses. Slash will be removed from the floodplain and re-located above the tree line this construction season.

Of the sites where mitigation measures were not realized, many of the effects can be addressed through natural re-vegetation of riparian buffers, ruts, and anchor sites and conducting follow-up site visits to monitor recovery. Winter stream crossing guidelines will be reviewed to determine if they can be improved to further reduce the potential for bank slumping and erosion.

### 7.3 Water Quality

Construction often disturbs soils and leaves them exposed to erosion and movement through site drainage and runoff. The requirement for water quality monitoring was targeted at several specific sites to ensure appropriate erosion and sedimentation mitigation measures were in place and effective at preventing sediments from entering local fish bearing streams in the Keewatinohk construction area.

Rock lining of collector drains, use of rock berms, and natural contouring of landscape were all measures used to keep soil and sediment in place at the Keewatinohk Converter Station site (Photo 7). Silt fencing, coconut fibre mats and permanent geo-textiles were installed in exposed areas to prevent sediment entering channels and streams where it could harm fish habitat in Goose Creek. During construction activities, daily monitoring of water quality was undertaken to ensure measures were effective and that any remedial action could be taken immediately. The suspended load of sediment appeared to be relatively low and sediment control measures effective.



**Photo 7: Erosion Control Measures on a Drain Leading to Goose Creek**

## **8 MAMMALS**

Potential effects of the Project on mammals were a major focus of the biophysical assessment especially for moose and boreal woodland caribou, a threatened species. Both species are currently in low numbers in vicinity of some of the Bipole III route. Additional study and monitoring is required to assess if adequate mitigation is in place to minimize effects of the Project.

The overall objectives of the mammals monitoring program are to expand baseline knowledge, ensure compliance with regulatory requirements and EIS commitments, monitor and measure mammal responses to ROW creation and operation, and assess success of mitigation measures. The Biophysical Monitoring Plan outlines the species specific monitoring commitments for moose and caribou and thresholds for response to monitoring data.

Through discussion and review with the Wildlife Branch of MCWS, a total of six sensitive ranges were identified for woodland caribou and moose. Specific mitigation plans have been developed within these sensitive ranges. These plans include measures such as modified ROW clearing, maintaining natural cover in wildlife corridors, and controlling ROW access within the sensitive ranges.

### **8.1 Moose**

The environmental review process generated a lot of interest in moose as an important species for many hunters. Recent population declines in some Game Hunting Areas (GHA) in the western region close to the Bipole III transmission route have increased the sensitivity of this species to any additional disturbance or habitat alteration. Moose will be monitored for ROW use as well as potential effects on populations from the creation of new access for predators and hunters along the transmission line ROW.

During the last year, assemblage and review of existing data was conducted as well as development of methods to improve moose survey methods. Specific work included a moose population aerial survey in GHA 14A and 19 funded by Manitoba Hydro and conducted jointly by MCWS and Manitoba Hydro. This monitoring contributed to data supporting the closure of GHA 19 to moose hunting. To address the complexity associated with accurately assessing low density moose populations, appropriate telemetry and aerial survey methods for moose are currently under development in consultation with MCWS.

A multi-species survey was completed prior to winter construction from section N2 to C1 in February 2014. Six transects, spaced approximately 250 m from ROW, 1,250 m from ROW and 2,250 m from ROW were flown. Higher concentrations of moose were recorded in association with sensitive moose areas including Moose Meadows and Tom Lamb Wildlife Management Area as well as an area southwest

of Hargrave Lake. In total, 29 moose were observed along the ROW which is quite low for the length of the survey. This information contributes to the baseline of Functional Habitat Availability monitoring and understanding of moose response to disturbance, the presence of the line, and predator utilization effects on mortality.

Mineral licks are groundwater seeps that provide essential minerals to wildlife populations, including moose. As they are highly valued sites, monitoring has been on-going through all winter aerial surveys to detect presence on the future ROW. The surveys to date have not identified any sites along the ROW requiring protection.

Part of the monitoring work was also to determine the effect of construction on moose mortality. During the past year, no moose-vehicle collisions were recorded as a result of clearing and construction activity.

## 8.2 Boreal Woodland Caribou

Similar to moose, recent work had focused on developing survey and monitoring plans for this threatened species in 2014. Intensive assessment and monitoring programs have been carried out for a number of ranges of the woodland caribou in proximity to the Bipole III ROW over the past five years. Baseline data collection including a comprehensive telemetry program for boreal woodland caribou was initiated in 2010 and will continue through to 2018. This program was used to investigate movement dynamics and range use as well as population vital rates such as calf survival and mortality. Within the Bipole III study area for caribou, 174 radio collars were deployed across four boreal caribou ranges. Twenty-five percent of these collars were still active in 2014. Fewer numbers of collars are now needed to monitor only the specific caribou ranges intersected by the final Bipole III route.

Caribou calf survival surveys were conducted in July and August 2014. Abundance of calf records have varied widely across years since 2010. Low calf numbers were observed in both 2012 and 2014. Six calves were recorded across Pasquia-Bog and Wabowden ranges in 2014 compared to nine in 2012. The sample size of caribou was smaller in these surveys due to fewer caribou ranges being monitored once the final route for Bipole III was selected. Monitoring will continue to establish trends and refine population estimates ( $\lambda$ ) which based on early data suggest the populations are relatively stable.

Mortality investigations of collared boreal caribou continue to be undertaken when a mortality signal from an active satellite collar is received. Predation by wolves is the most frequent cause of death of collared caribou. Seven caribou mortalities were recorded in 2014 collar monitoring work all of which were by wolves (Figure 2).

MH plans to deploy 44 more GPS collars in 2015 to effectively monitor caribou movements, habitat preferences, and mortality in response to the clearing of the ROW (Photo 8).

Calf survival and recruitment surveys as well as integrated camera trap and ground surveys will be deployed in 2015 to meet BMP monitoring requirements. The information from these surveys will provide on-going confidence in mitigation effectiveness and assessment predictions and guide any additional actions to reduce effects on caribou populations.

## 8.3 Deer & Elk

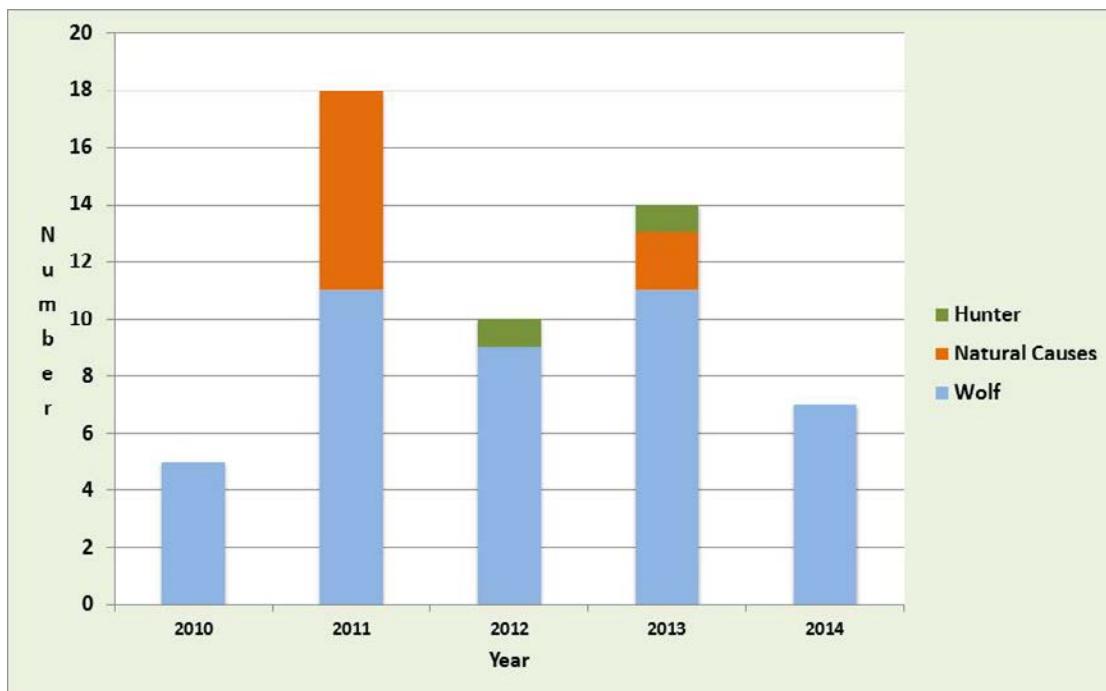
The multi-species aerial transect mentioned for moose also provided data on the presence and location of deer and elk. Both elk and deer were largely observed south of Porcupine Hills in comparable frequencies. A total of 26 elk and 30 deer were recorded. For white-tailed deer, the data contributes to the baseline and assessing the expansion of range for this species which will be determined after multiple years of monitoring. Elk response to the transmission line ROW in terms of distribution and mortality will be determined through the on-going monitoring program.

## 8.4 Grey Wolf

The presence of a new ROW can provide opportunity for wolves to increase their access to and success of taking prey, including moose and caribou. The monitoring plan includes tracking wolf on or along the ROW, and investigating mortalities of GPS collared caribou and moose. During the multi-species aerial survey completed in February 2014, one wolf was observed in proximity to Moose Meadows in GHA 14. Wolf tracks were also frequently recorded in this area.



**Photo 8: Aerial View of a Collared Caribou**

**Figure 2: Collared Caribou Mortalities**

## 8.5 Black Bear

Similar to wolves, there is concern that the presence of a ROW could alter black bear distribution in relation to moose and caribou. Mortality investigations of GPS collared caribou to date have not shown black bears as a cause.

Black bear were attracted to the Keewatinohk Converter Station work areas during the spring and summer where human interactions can be dangerous.

**Photo 9: Bear Release after Transport to a Remote Location**

One black bear was killed as a result of a vehicle collision during a heavy traffic period during start-up. To reduce the occurrence of bears in work areas, additional measures were implemented with respect to food and waste handling which will help reduce wildlife attraction. Site specific bear awareness training was also provided to all project personnel. Live bear traps were deployed when other measures were not effective. One bear was trapped and relocated away from the Keewatinohk Converter Station work area (Photo 9).

## 8.6 Wildlife Mortalities

There were a total of thirteen reported wildlife mortalities related to the Project including 3 arctic fox, 4 ptarmigan, 1 red fox, 1 marten, 1 gray jay, 1 adult black bear, and two small black bear cubs. Wildlife mortalities were almost all due to vehicle strikes and the majority occurred in the early stages of construction when the camp was not in operation and traffic to and from the Keewatinohk Converter Station site and Gillam was heavier. Considering the volume of traffic associated with construction, the number of incidents is relatively low and not likely to affect local wildlife populations. With completion of more camp facilities, there is less traffic on the Conawapa Access Road and fewer reported wildlife mortalities. Manitoba Hydro is working alongside MCWS to develop approaches to reduce wildlife interactions and mortalities.

## 9 TERRESTRIAL ECOSYSTEMS AND VEGETATION

The protection of terrestrial ecosystems and vegetation was identified and confirmed as an important priority for mitigation during construction and also in later maintenance activities. The monitoring activity during 2014 included surveys for forested areas, wetlands, invasive and non-native species and rare plants or species of conservation concern (SOCC). Over one hundred line surveys were conducted in the Project area. Surveys and results are summarized in Table 3.

### 9.1 Species of Conservation Concern

To meet the commitments outlined in the draft BMP, two approaches were used for monitoring of species of conservation concern. The first approach was to revisit many sites with SOCC plants that were either identified in pre-construction field surveys in 2010 and 2012 or were known sites from Manitoba Conservation Data Centre (MBCDC) records. Surveys were targeted at locations that had been cleared during the winter construction season of 2014.

Twelve sites were re-surveyed along the northern AC collector lines, construction power line, and ground electrode line, to determine if the plant species had survived construction and how successful the 5 m vegetation buffers were in protecting them. All rare species identified in pre-construction surveys were found again with the exception of one on the construction power line. The results indicated a high success rate of protection and the effectiveness of mitigation.

The second approach was to continue surveying uncleared portions of the route for species of conservation concern. In 2014, additional species of conservation concern were identified and designated as ESS which form part of the Construction Environmental Protection Plan (CEnvPP). Buffers and other mitigation measures are prescribed in the CEnvPP for the construction section where they were identified. Results thus far are encouraging in the ability to protect these species from the impacts of construction and eventually maintenance.

**Table 3: Terrestrial Ecosystems and Vegetation 2014 Monitoring Summary**

Component	Monitoring Requirement	2014 Activity	Results
Species of Conservation Concern	Rare Plant Surveys	<ul style="list-style-type: none"> <li>• 12 sites re-surveyed</li> <li>• Pre-clearing surveys of undeveloped ROW</li> </ul>	All but one species site was found again. Indicates high success rate of plant survival.
Wetlands	Ground Surveys	<ul style="list-style-type: none"> <li>• 4 sites with Patterned Fens investigated</li> </ul>	Surveys indicated that only percent cover was different between ROW and adjacent undisturbed sites. Some buffer zone infringements were identified.
Invasive and Non native	Ground Surveys	<ul style="list-style-type: none"> <li>• 17 sites were investigated with paired comparisons on and off the ROW</li> </ul>	ROW sites generally had a greater number of invasives and more frequent occurrence which was expected. The occurrence is still considered low.
Plant Communities Important to Aboriginal People	Ground Surveys	<ul style="list-style-type: none"> <li>• 10 sites were investigated with paired comparisons on and off the ROW</li> </ul>	Blueberry plants were located both on and off the ROW in similar quantities based on percent ground cover.
Terrestrial Vegetation	Ground Surveys	<ul style="list-style-type: none"> <li>• 15 paired sites surveyed</li> </ul>	Species cover, richness and diversity were significantly different between paired sites as expected immediately following clearing due to the removal of tree and shrub vegetation. Species evenness was similar.
Site Rehabilitation	Ground Surveys	<ul style="list-style-type: none"> <li>• Preliminary site surveys</li> </ul>	Surveys were done to determine and confirm approach for eventual rehabilitation.

## Vegetation Mitigation

The Bipole III Transmission Project occurs over eight eco-regions. Mitigation measures related to terrestrial ecosystems and vegetation identified in the Construction Environmental Protection Plan include:

- Carry out construction activities on frozen or dry ground to minimize surface damage, rutting and erosion;
- Use existing access roads and trails to extent possible;
- Provide a 30 m vegetated buffer around wetlands;
- Remove trees by low disturbance methods where prescribed;
- Wash and inspect all construction equipment prior to working in new sites to reduce the spread of invasive and non-native species; and
- Identify and flag species of conservation concern prior to start of work.

Through fieldwork, it was determined that recommended mitigation was implemented during clearing activities for most sites and effective where implemented (Photo 10). From surveys a further mitigation measure is recommended around the Assiniboine River crossing. Eliminating tree removal by spanning the steep slope or, where possible, reducing clearing at this location is desired to protect populations of several species of conservation concern observed.



**Photo 10: Uncleared Buffer Around Vegetation Species of Conservation Concern**

## 9.2

### Plant Species Important to Aboriginal People

During the environmental assessment and approval process for Bipole III, a number of plant species were identified for protection based on their importance to Aboriginal people who gather them for food, medicinal and traditional purposes. The Cowan blueberry site was the focus of monitoring in 2014 as it was identified by many people as a highly valued local resource (Photo 11). Three community members from Pine Creek First Nation and two community members from Camperville joined the survey team in July 2014 to see and participate in the investigation of the Cowan site. Ten sites were investigated with side-by-side paired surveys conducted on the future location of the Bipole III ROW. Two species of blueberry plants were observed during the surveys: velvetleaf blueberry and low sweet blueberry. Blueberry plants were more commonly observed in areas with deciduous tall shrub cover. Species richness, cover and diversity were not significantly different between the paired sites. Blueberry occurrence was similar on ROW and off ROW sites.



**Photo 11: Ground Survey of the Cowan Blueberry Site**

## 9.3

### Terrestrial Vegetation

Monitoring was conducted under this category in relation to natural forest vegetation that will be lost as a result of the clearing for Bipole III. Fifteen sites were visited to sample terrestrial vegetation with paired samples conducted at each site (on and off the ROW), for a total of 30 surveys in Sections N2, N3 and along the northern AC collector lines and construction power line. Total species cover, richness and diversity were significantly different between surveys on and off the ROW. These differences were expected due to the removal of tree and shrub vegetation structure and associated species as part of the clearing process. The evenness of species distribution, however, shows no significant change with clearing at this time.

For the Project areas cleared during 2013/14, the effect predictions for terrestrial vegetation were accurate for loss of native forest vegetation, temporary reduction of vegetation diversity on the Project site, and occurrence of fragmentation of vegetation communities. Prescribed mitigation measures were effective in minimizing disturbance from clearing activities although different levels of disturbance were observed at some sites where tree and shrub roots were exposed and the understory removed. This is in part due to insufficient freezing of the substrate before blading, leading to uplifting the root mass rather than shearing. Opportunities for improvement such as checking ground condition prior to clearing will be reviewed with the environmental protection team.

#### **9.4 Wetlands**

Wetlands are valued for their biological diversity and ecological function. The monitoring program for wetlands was aimed at assessing the effect of ROW development on vegetation community health in environmentally sensitive sites (ESS). In the sections cleared in 2014, four patterned fen wetlands sites previously identified in the Project assessment in 2010 were selected for vegetation assessment (Photo 12). Two sites were analyzed for wetland vegetation in paired on ROW and off ROW comparisons. Diversity index, species evenness and species richness had similar ranges in value to the paired survey sites, suggesting that vegetation clearing in these wet sites may not be affecting these vegetation parameters. The only difference was for total percent species cover which was slightly lower on the ROW compared to adjacent to the ROW which was expected immediately following clearing activity and will recover in subsequent growing seasons. For the Project areas cleared during 2013/14, the effect predictions for environmentally sensitive wetland vegetation were accurate with the exception of diversity measures in year one.



**Photo 12: Patterned Fen Wetland Along Bipole III Right-of-Way**

Through field work, map review and discussion, it was determined that while some recommended mitigation measures were implemented during clearing activities, others were implemented partially or not at all. Where implemented, mitigation was determined to be effective. In the absence of mitigation, some site disturbance were apparent. All sites appeared to utilize existing access roads and trails, had vehicle traffic confined to established trails, and construction activities were carried out on frozen ground to minimize surface damage. Approximately 42 hectares were disturbed by clearing activities in the environmentally sensitive wetlands and all sites did not retain a 30 m vegetated buffer surrounding the ends of the wetlands. However, no rehabilitation was prescribed as natural revegetation is expected to repair the disturbance caused by construction.

As a result of this information, protection of wetland zones are being reviewed with the Environmental Inspectors for potential improvements in ESS flagging and communication with clearing contractors. Riparian zones were previously noted in the aquatic section and remedial actions described.

#### **9.5 Invasive and Non-Native Species**

Monitoring has demonstrated there is limited spread of the invasive and non-native species in cleared areas. Most sites surveyed did not show a spread of invasive and non-native species in year one of environmental monitoring. Seventeen sites were visited and paired comparisons made to the recently cleared ROW and adjacent undisturbed area. Five invasive and two non-native species were identified in the surveys with a greater number of species occurrence on the cleared ROW as was predicted in the environmental assessment. Surveys were conducted near roads, a rail line, and water crossings where invasives are more prevalent. Seeds and propagules can get tracked into the newly cleared areas from construction activities and new access. All construction equipment must arrive on site in a clean condition free from invasive seeds. While the occurrence of invasives on the ROW is still quite low, on-going monitoring will determine need for any control action.

#### **9.6 Rehabilitation**

Rehabilitation of areas disturbed by construction can provide mitigation of adverse project effects by providing erosion control and reducing invasive plant spread while restoring wildlife habitat and aesthetics. Monitoring is required to verify the implementation and effectiveness of rehabilitation measures. Preliminary surveys at Keewatinohk were conducted in 2014 to assess site requirements and design effective rehabilitation measures that will eventually be implemented and monitored.

The degree of disturbance was assessed at all sites visited to determine whether natural re-vegetation was feasible (Photo 13). It is recommended the Keewatinohk Construction Camp lagoon, Conawapa Road ditch immediately adjacent to the lagoon and the ditches surrounding the Keewatinohk Converter Station be re-vegetated using native seed.



**Photo 13: Borrow Pit Requiring Rehabilitation Post Construction**

## 10 REPTILES

Surveys were conducted for potential red-sided garter snake over-wintering locations or hibernacula. Pedestrian surveys were conducted at 52 Bipole III undeveloped tower sites in September 2014 during the garter snake's fall return migration period. Sites were chosen based on ESS's previously identified in the EIS, additional areas with potential to support garter snake hibernacula, or through Aboriginal Traditional Knowledge (ATK) surveys (Photo 14). Garter snakes or hibernacula were not observed at any of the tower survey locations. Therefore, it is concluded that garter snake hibernacula are not present at or in the immediate vicinity of surveyed tower locations. No further mitigation is recommended at these locations.



**Photo 14: Survey of Planned Tower Sites for Garter Snake Hibernacula**

## 11 BIRDS

### 11.1 Bird-Wire Collision

One of the larger biophysical concerns with the presence of transmission lines on the landscape is the potential for birds to collide with conductors that can be hard to see or avoid for some species. The Bipole III environmental assessment identified 144 sites where there was potential for bird-wire collisions based on desktop assessment from multiple data sources. Bird habitat qualifying as ESS included presence of bird colonies, raptor nesting habitat, and waterbird nesting or migration stopover habitat in vicinity of the ROW.

The 2014 surveys consisted of verification surveys to determine the relative significance of each ESS identified in the EIS based on the density and richness of bird species that have a greater potential for bird-wire collision (e.g., waterfowl, waterbirds, colonial nesting birds). The relative significance of ESS's will allow for a priority assessment for the placement of bird diverters and for bird diverter effectiveness monitoring (Photo 15).

As a result of additional aerial surveys carried out in 2014, a number of the original 144 sites and some new sites have been deemed to be candidate high risk ESS that are recommended for installation of bird diverters when the Bipole III conductors are installed. These sites will be monitored after construction for occurrences of bird-wire collisions in accordance with the BMP. Comparison will be made between high risk sites with bird diverters versus lower risk sites with no diverters.



**Photo 15:** Bird Diverters on a Transmission Line

## 11.2 Species of Conservation Concern

Pre-construction surveys to document species of conservation concern were conducted in June and July 2014 in areas scheduled to be cleared in winter 2014/15. Avian species of conservation concern were recorded throughout the targeted survey areas. Eastern Whip-poor-wills were detected in relatively high numbers in areas previously identified in the baseline surveys provided in the Bipole III EIS report (Photo 16).



**Photo 16:** Eastern Whip-Poor-Will

Permanent monitoring point count stations were established along transects throughout the transmission line route and were stationed in areas identified in the Bipole III EIS as supporting species of conservation concern. Three point count surveys were conducted: morning songbird surveys; morning and evening marsh bird surveys; and night time crepuscular bird surveys. All these pre-construction surveys provide baseline conditions for evaluating the predictions presented in the EIS and effectiveness of mitigation prescribed in the Environmental Protection Plans for the Project.

## 11.3 Point Count Surveys

Pre-construction songbird surveys were conducted in June and July 2014 at 222 morning songbird point count stations in a range of habitats and vegetation communities in N4, C1 and C2. Species occurrence was similar between future impact sites compared to control sites, as expected, indicating that impact and control sites currently represent a similar distribution of species.

Marsh bird surveys were also conducted in June and July 2014 at 83 point count stations in cattail and sedge marshes. Crepuscular bird surveys were also conducted before construction in June and July 2014 at 48 point count stations in N4, C1 and C2. The species that occurred the most in all point count surveys are shown in Figure 3.

## 11.4 Colonial Nesting Sites

The installation of the Bipole III Transmission Line has the potential to adversely affect the behavior of nearby colonial nesting birds and the use of colonial nesting sites. The colonial nesting bird monitoring will test the hypothesis that the installation of the Bipole III Transmission line affects the behavior of colonial nesting birds or the abundance of birds using the colony in areas where summer clearing and construction overlaps colony occupancy.

Pre-construction surveys of colonial nesting birds were conducted in July 2014 after breeding colonies had established and birds were incubating eggs. Of four colonies identified in the original environmental assessment in 2010, no evidence of their existence was observed. To ensure accuracy, the area approximately 200 m surrounding the colony coordinates for the two Great Blue Heron colonies identified in the EIS was extensively surveyed on foot by two qualified biologists. In addition, the area approximately 1 kilometre surrounding the colony coordinates for the Black Tern and the Franklin's Gull colonies identified in the EIS were extensively surveyed by helicopter. No evidence of past or present colonies was observed. All colonies were determined not to exist. As such, no further monitoring of colonial nesting sites will be conducted as part of the overall avian monitoring program.

## 11.5 Sharp-tailed Grouse Lekking Sites

Sharp-tailed Grouse have a reproductive system known as lekking, where males form large groups and vocalize and display at the same time in attempts to attract females. Leks are generally elevated sites associates with sparse or disturbed vegetation and are typically used for many years. Sharp-tailed Grouse nesting usually occurs in shrub habitat located close to the lek.

No surveys were conducted in 2014 for this species since it only occurs in uncleared sections of C2, and in S1 and S2 where construction had not yet begun. Pre-construction surveys will be conducted to look for lekking locations in April followed by nest surveys in May and June 2015.

## 11.6 Active Bird Nests

When clearing and construction may occur in the growing season and when active bird nests may be present, a nesting survey is conducted. Active nests need to be located and avoided during clearing, in construction sections in southern Manitoba that are scheduled for summer work in 2015. No nest surveys were conducted in 2014 for this category.

## 11.7 Birds of Prey

With respect to Birds of Prey monitoring requirement in the BMP, Manitoba Hydro continues to fund Isabel Martinez-Welgan's PTT-Marked Peregrine Falcon Ph.D. study. Initial results of the work are not yet available as it is on-going research on habitat use and mortality which will be reported on at the end of the 3 year program.

Results will be reviewed for any potential action that may reduce effects on peregrines and other raptors based on study outcomes.

## 12 ACCESS

Part of the BMP is to monitor the use of new ROWs for use by humans and predators. Trail cams were deployed in several areas along the Bipole III corridor in N2 to monitor use. Between camera deployment in June 2014 and the first data download in August 2014, only one occurrence was documented of an all-terrain vehicle at the first access point off Cormorant Road. The 2014 results continue to be analysed and will contribute to multi-year data that is necessary to determine the potential effect of new access.

## 13 HERITAGE

As part of the environmental protection program for the Project, monitoring requirements were identified for cultural and heritage resources. Known archeological sites were inventoried and identified as environmentally sensitive sites in the CEnvPPs for avoidance and protection. Follow-up monitoring was conducted on potentially affected sites in 2014 that included:

- A July 2014 site visit to two known archaeological sites in close proximity to the Keewatinohk Converter Station;
- Assessment and protective mitigation of two archaeological sites within transmission line section N3 in February 2014; and
- In-field assessment of a number of heritage environmentally sensitive sites in sections N2 and N3.

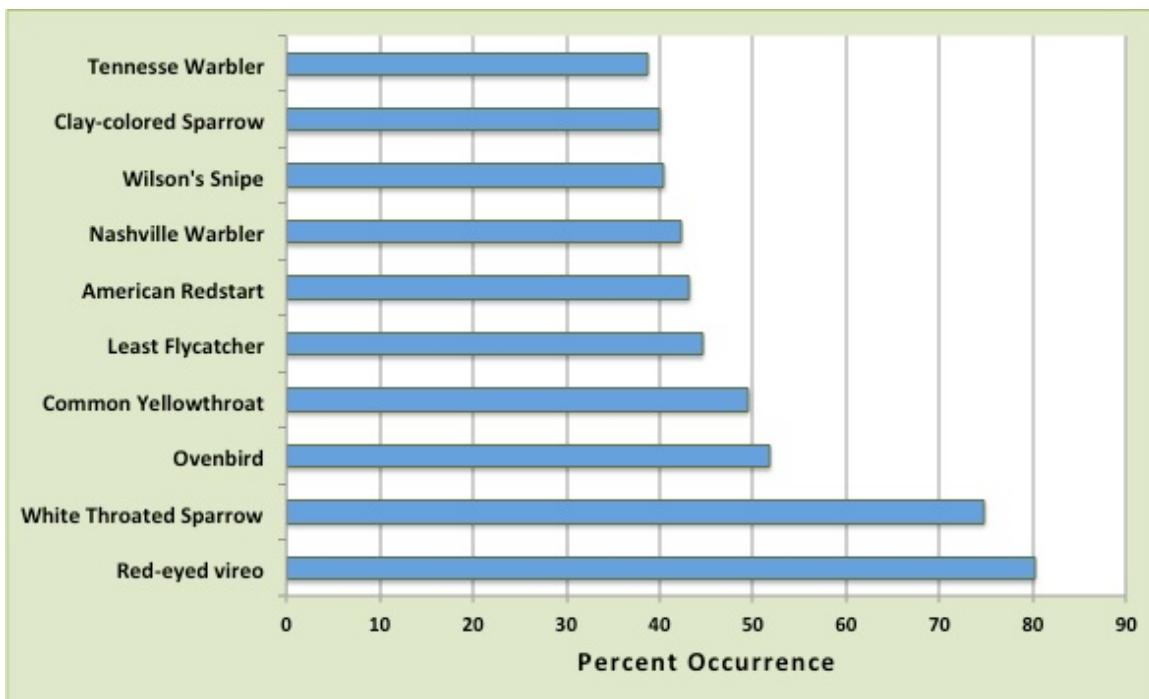


Figure 3: Bird Species with the Highest Percent Occurrence

Heritage work permits were obtained from the Historic Resources Branch and heritage permit reports will be drafted and submitted as part of permitting requirements.

In November 2013, one of two known heritage sites was accidentally accessed by snow clearing equipment. The incident was immediately investigated by the Site Environmental Officer and the impact assessed as minimal. The Project Archeologist was notified and visited the site that winter and again in the summer for a full impact assessment. The heritage assessment conducted in July 2014 included a pedestrian survey and GPS documentation of exposed artifacts or any stone features identified (Photo 17). The site assessment included the Project Archaeologist, Fox Lake Cree Nation community members and others. Evidence of ground scraping was noted, however, it appeared that only the very top of the organic humus layer was affected and not the substrate below. Both heritage sites are now protected with permanent chain link fencing. In light of the incident steps have been taken to train site contractors to recognize potential heritage resources in the field and how to respond when artifacts are accidentally discovered. This training is now a component of all site orientation.



**Photo 17: Survey of Heritage Site**

Field assessment of environmentally sensitive sites along transmission line sections N2 and N3 occurred in August 2014. The CEnvPP for the section N2 identified four heritage environmentally sensitive sites in the vicinity of the transmission line. Only two of the four sites (Patridge Crop Lake and Grass River) were cleared during the winter of 2013/2014 and accessible for site investigation. Heavy rains and inundated soils impeded the surveys but no cultural or heritage resources were identified. The two remaining sites for N2, an ATK-identified portage and the Halfway River, will be surveyed in 2015.

Nine environmentally sensitive sites were identified in the CEnvPP for transmission line section N3. Planned mitigation of the two registered archaeological sites in N3, Les Phillips (Sky Sailor) and Cormorant Petroform, were to have had protective fencing put in place around each site prior to clearing of the ROW. Upon visiting the Les Phillips (Sky Sailor) site in February 2014 to erect protective snow fencing, it was noted by the Project Archaeologist that the site is actually located 125 metres off the centre line and therefore would not be impacted by ROW clearing activities. Regardless, a proactive measure of flagging the site was undertaken in case other activities in proximity to the site occur.

The Cormorant Petroform site was mitigated through avoidance and the establishment of a series of snow fence buffers in February 2014. Prescribed mitigation measures included tree removal by hand-clearing or feller buncher into the buffered area. Also those trees to which the fencing had been attached were to be cut off at a four foot height and left in place so as to clearly delineate the site throughout the construction phase. The site was revisited during the August 2014 summer field survey to ensure mitigative actions were implemented and were successful. It was noted that the entire 66 metre ROW was cleared, but did not appear to impact the site. Snow fencing was still in place protecting the petroform. The current snow fence has deteriorated and a permanent fence is recommended to provide ongoing protection.

Three sites were identified through ATK workshops and were reviewed by the Project Archeologist. The first is a historically used freighting/corduroy road. The Bipole III transmission line crosses over the road at three separate locations. The current PTH 596 overlays the original road and therefore this ESS has been previously impacted and does not require additional mitigation. The second ATK ESS location is the former Wekusko School Site. The exact location of the site is currently undetermined but warrants caution when working in the general vicinity of Mile 81 along the Hudson Bay Railroad where the school and townsite existed in the early to mid-20<sup>th</sup> century. A plant harvest area is the third ATK identified site but was not surveyed due to not knowing the exact location. The Cultural and Heritage Resource Protection Plan (CHRPP) provides guidance to contractors and environment officers upon discovering potential heritage or cultural resources in the area.

Three out of four water crossings identified as ESS for heritage were surveyed. At the Saskatchewan River crossing, a historic steam boiler was discovered along the edge of the ROW but was not considered a heritage concern. Two crossings of the Mitishto River were investigated. At one site, tin cans, animal bones and glass bottles were discovered along an access trail (Photo 18).

The material was likely from construction of the Hudson's Bay Railroad in the 1930's and was not of heritage value to warrant designation as an archeological site. In the future, it is recommended Environmental Monitors be on-site to observe all tower footing excavations within 100 metres of heritage environmentally sensitive site locations in case unknown heritage resources are revealed.



**Photo 18: Tin Cans and Refuse Pile Related to Hudson Bay Railway Construction**

## 14 COMPLIANCE MONITORING

Compliance monitoring is observation or testing conducted to verify whether a practice or procedure meets the applicable requirements prescribed by legislation, licence conditions, permits, and/or environmental protection plans. Manitoba Hydro's Bipole III Transmission Project mitigation measures are aligned with both provincial and federal regulatory requirements.

The Compliance Program involves the use of dedicated Environmental Inspectors and Site Environmental Officers to observe and verify the implementation of the environmental protection plans. Information generated from these programs will be used within an adaptive management approach to improve both mitigation measure effectiveness and monitoring program design.

### Compliance Monitoring Summary 2014

- The Keewatinohk Converter Station hired a Site Environmental Officer who conducted compliance monitoring to ensure mitigation measures outlined in the Environmental Protection Plan, licences, permits and approval were followed during construction.
- The Keewatinohk Construction Department and Site were audited in September 2014 by the International Standards Organization (ISO) as part of Manitoba Hydro's re-certification of ISO 14001.
- One environmental stop work order in transmission line section N3 was issued by Manitoba Hydro due to a centerline clearing misalignment. MCWS was notified and corrective action taken by the contractor.
- Throughout the winter construction season, the local Natural Resource Officers conducted periodic inspections of transmission line sections. All inspection reports indicated there were no major issues and work was in compliance with applicable approvals and permits.

## 15 WASTE MANAGEMENT & HAZARDOUS MATERIALS

Manitoba Hydro requires all contractors to have a spill response plan. All contractor spills, regardless of quantity are reported to Manitoba Hydro. All hazardous materials on Keewatinohk Converter Station site are segregated and stored in lined temporary storage cells (Photo 19).



**Photo 19: Temporary Hazardous Materials Storage Area at Keewatinohk Converter Station Work Area**

Daily monitoring of all active work areas, petroleum storage facilities, hazardous material storage areas and camp facilities, as well as an inspection of all heavy equipment used at the Keewatinohk Converter Station was undertaken.

There were five reported releases of hazardous materials from November 2013 to November 2014 at the Keewatinohk Converter Station site (Table 4). The bulk of these releases were the result of equipment failure. With warmer weather, the large excavators are more prone to overheating causing stress to fittings and hoses of the hydraulic system.

With respect to transmission line construction, there were two spills of reportable quantities. The first involved 300 litres of diesel fuel in transmission line section N2 as a result of the fuel valve drain being left open and fuel draining overnight. Emergency spill response plan was put into action including measures for notification, site security, spill containment, and collection and removal of contaminated materials. The site was fenced until results from soil samples indicated safe levels of hydrocarbons that would ensure the site had been adequately cleaned up. The second was a release of approximately 72 litres of antifreeze from a punctured anti-freeze line. In both cases, all contaminated material was collected and disposed of at a licensed facility.

**Table 4: Keewatinohk Area Reportable Releases**

Date	Work Area	Cause	Receptor	Summary
2014/04/04	KCS converter station	Equipment Failure	Soil	A hydraulic hose on a contractor excavator ruptured releasing approximately 20 L of hydraulic oil. Contaminated materials and soil were removed from the site and temporarily placed in hazardous materials storage area prior to being shipped to an approved disposal facility.
2014/04/26	Excavated Material Placement 1A	Equipment Failure	Soil	A hydraulic hose on a contractor excavator ruptured releasing approximately 245 L of hydraulic oil. A sucker truck was dispatched to the site to remove the large volume of hydraulic oil. Contaminated materials and soil were removed and temporarily placed in the hazardous materials storage area prior to being shipped to an approved disposal facility.
2014/04/28	KCS converter station	Equipment Failure	Soil	A fitting on the hydraulic hose on a contractor excavator broke releasing approximately 35 L of hydraulic oil. Contaminated materials and soil were removed and temporarily placed in the hazardous materials storage area prior to being shipped to an approved disposal facility.
2014/05/06	2 km south of the Sundance Camp	Maintenance Related	Gravel road	A 6" water pump being used by Manitoba Hydro to mitigate a flood situation leaked approximately 1 L of engine oil onto the ground above a culvert. Because this was deemed a sensitive area involving a waterway, the spill was reported. Soil and contaminated materials were removed and temporarily placed the hazardous materials storage area prior to being shipped to an approved disposal facility.
2014/06/18	N8 Borrow Pit Laydown Area	Maintenance Related	Exposed ground	A hydraulic hose on a contractor excavator ruptured while being worked on releasing approximately 30 L of hydraulic oil. Contaminated materials and soil were removed and temporarily placed in the hazardous materials storage area prior to being shipped to an approved disposal facility.

## 16 FUTURE MONITORING

Clearing activities are anticipated to begin in transmission line construction sections N1, N4, C1 and C2 during the 2014/15 winter construction season. The following monitoring activities are anticipated to occur during this upcoming season and in 2015.

### Mammals

Caribou calf recruitment, caribou genetic capture-mark-recapture surveys, deer pellet surveys, multi-species ground surveys, and remote infra-red (IR) camera deployment are planned for winter 2015. Deployment of 44 more telemetry collars in the boreal caribou study areas is planned during winter 2014/15. A portion of the caribou currently collared will also be re-collared to obtain longer term data on a subset of animals.

At the time of preparing this 2014 annual monitoring and mitigation report, appropriate telemetry and aerial survey methods for moose are currently under development in consultation with MCWS. Additional moose monitoring is expected in future annual reports. Deployment of collars are planned for at least two moose monitoring ranges. They are not likely to be deployed until the winter of 2015/16 to allow opportunity for multi-stakeholder input and ensure agreements are in place.

Multi-species aerial transect surveys will be completed annually post-construction to record mammal locations via tracks and animal sightings. Integrated remote IR camera trap and winter ground transect surveys will be used to assess local distribution and abundance of mammals as well as frequency of human access within 5 kilometres of the ROW.

### Terrestrial & Vegetation

Activities will continue in 2015 in accordance with the BMP both for pre and post construction surveys.

Plots established during native vegetation and rare plant surveys in 2014 will serve as sites for on-going monitoring of construction effect and effectiveness of mitigation. The Cowan blueberry resource use area will be a focus of monitoring subsequent to construction in 2015 in construction section C1.

### Birds

Future monitoring of songbird, marsh and crepuscular bird locations will allow for a statistically robust assessment of disturbance/avoidance effects of the Project on species of conservation concern and overall bird species populations. Effectiveness of bird diverters and reduction in line collisions will be monitored for sections where conductors are strung in 2015.

### Aquatics

Follow-up monitoring will be conducted on 15 of the stream crossing sites surveyed along the AC collector and construction power lines between Keewatinohk and the Limestone River that were done in 2014. Additional stream crossing surveys will be conducted post construction on the main Bipole III transmission line route as clearing and construction continue in 2015. Based on 2014 surveys Manitoba Hydro will develop adaptive management measures for riparian zone clearing and will monitor these in future surveys.

### Heritage

The ATK-identified portage trail between Thicket-Portage and Paint Lake, the Halfway River and the Ralls Creek crossing were not cleared at the time of the 2014 summer survey and therefore, access to these locations could not occur. These three environmentally sensitive site locations will require heritage assessment in 2015.

## 17 SUMMARY

Monitoring activities conducted in 2014 have provided a solid base to meet the objectives of the BMP from determining potential effects of construction and effectiveness of mitigation to preconstruction surveys and establishing sites for future monitoring.

Extensive effort was put into monitoring activity with hundreds of surveys done for vegetation, birds, mammals, reptiles and riparian habitat. Surveys conducted on stream crossings and riparian zones showed the difficulty in precisely locating streams and riparian areas in winter. The results showed that there was limited environmental damage and that riparian zones are expected to re-vegetate naturally to the intended widths. These results will help guide future winter activity at stream crossings.

The monitoring work on mammals in 2014 focused largely on reviewing baseline data and conducting a multi-species survey and a moose population survey. Low numbers of moose were recorded in the surveys of several Game Hunting Areas providing data that supported closure of GHA 19 to moose hunting.

Woodland caribou monitoring work continued with calf survival surveys and mortality investigations of collared animals. Calf numbers were low in the surveys, which was in part related to smaller sample size as the number of deployed collars has been reduced since the earliest surveys. More data is needed to establish population trends and to monitor potential effects of the Project and effectiveness of mitigation. Other mammals including deer, elk, black bear and wolf will continue to be monitored for verifying predicted effects. In other wildlife work, garter snake surveys did not turn up any hibernacula in the areas examined in 2014.

Over a hundred line surveys were conducted for the vegetation monitoring program which identified successful protection of species of conservation concern, and the limited effects of the cleared ROW on wetlands and species richness and diversity.

Invasive plant species were more abundant and frequent on the ROW than off the ROW as was expected. Surveys in the Cowan area highlighted the presence of blueberries on and off the ROW. The data will contribute to monitoring any effects on growth and abundance of blueberries on the ROW once cleared in that area.

Surveys conducted for birds collected solid baseline data for monitoring potential disturbance and avoidance effects as a result of the Project. Surveys for locations of potential bird - wire strikes reduced the number of sites where likelihood of collisions was highest and requiring the installation of bird diverters on transmission line conductors. The work also verified that Bipole III is not in close proximity to any bird nesting colonies where bird strikes would be a concern.

Heritage resource surveys were successfully conducted in the Keewatinohk area and on construction sections N2 and N3 leading to verification and protection of a number of ESS. Investigations indicated a known heritage site at the Keewatinohk site was not damaged by snow clearing equipment. Fencing protected the Cormorant petroform site from clearing activities and the Sky Sailor site was found not to be on the ROW. Three sites of Aboriginal interest were also reviewed and resulted in a need for caution when working in the vicinity of Mile 81 on the rail line to protect any remnants of an old school site. Other mitigation included requirements for permanent fencing of several heritage sites.

Initial results of the first year of the monitoring plan have highlighted some areas to improve upon as well as many areas where mitigation has been effective and environmental effects limited. Monitoring results have been reviewed and used to develop appropriate responses consistent with an adaptive management approach to ensure environmental protection throughout the implementation of the Bipole III Project.