3.0 ENVIRONMENTAL ASSESSMENT APPROACH

This chapter describes the environmental assessment approach for the Keeyask Transmission Project.

3.1 BACKGROUND AND PURPOSE

The environmental assessment process is consistent with provincial and federal environmental assessment legislation, guidelines and procedures, as well as best practices. Manitoba Hydro uses a Site Selection and Environmental Assessment (SSEA) process (Figure 3-1) to conduct assessments of its transmission facilities. The primary overarching objective in the conventional SSEA approach for transmission facilities is to provide impact avoidance and management opportunities at every stage in the process, from pre-licensing through post-construction. The following sections provide the methods used in the Keeyask Transmission Project to assure this objective is addressed through the process.

3.2 PUBLIC INVOLVEMENT PROGRAM

Public involvement is an important part of the SSEA process for sharing information, particularly during the alternative and preferred route stages of a proposed transmission line project. Input is sought from elected officials, communities in the Project Study Area, Leadership of First Nations and Aboriginal communities, the Manitoba Metis Federation, landowners, environmental groups, the private sector and other interested parties. The Public Involvement Program (PIP) provides the public with a variety of opportunities to stay informed throughout the study process, to offer pertinent information, and to provide input into the project. Information gathered during this process is used for:

- Site selection.
- Identification of potential effects.
- Identification of potential mitigation measures.

The Public Involvement Program was an important source of information during the SSEA study for the proposed Project. Local input and traditional knowledge provided by First Nation elders, residents, resource harvesters and other uses, was utilized during various stages of the process. Specific methods and outcomes of the public involvement process are provided in Chapter 5.

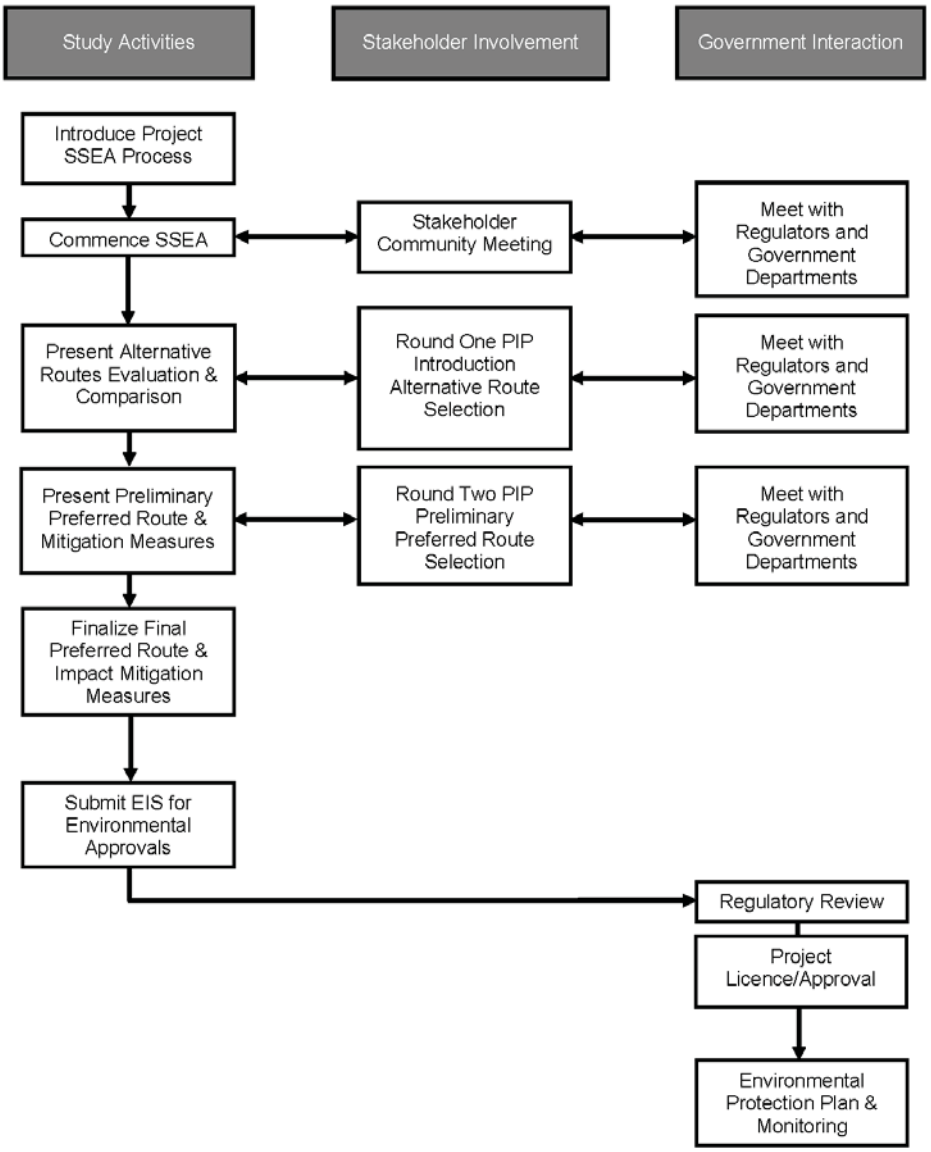

Figure 3-1: Site Selection and Environmental Assessment Process

3.2.1 ABORIGINAL ENGAGEMENT

From the outset of the planning process, Manitoba Hydro is committed to meaningful engagement with Aboriginal communities and incorporating Aboriginal perspectives, including Aboriginal Traditional Knowledge (ATK), as important components of the planning and SSEA process.

Manitoba Hydro worked with Tataskweyak Cree Nation, Fox Lake Cree Nation, War Lake First Nation, Manitoba Metis Federation and York Factory First Nation to assure appropriate Aboriginal public involvement opportunities and traditional knowledge information were included in the SSEA process.

3.3 SITE SELECTION

3.3.1 Study Area Delineation and Characterization

The Site Selection and Environmental Assessment study for the Project involves the definition of the Project Study Area (Map 1-1) that reflects the basic functional requirements of the Generation Outlet and Construction Power transmission lines, Keeyask Switching Station and Construction Power Station. The Study Area is sufficiently broad and representative to allow identification of several alternative routes and infrastructure sites (Chapter 2, Map 2-2).The Project Study Area is large enough to allow balancing line length and environmental considerations (biophysical and socio-economic) when choosing preferred transmission line routes and stations.

Following delineation of the Study Area, pertinent environmental information was compiled and evaluated from existing published sources in order to develop an understanding of the area. This included information on biophysical characteristics such as soils and terrain, vegetation, wildlife and aquatic resources, and socio-economic characteristics such as the locations of communities and heritage resources (Chapter 4). Study Area characterization, although broadly focused on all aspects of the environment, was guided by prior SSEA experience through which Manitoba Hydro has established an understanding of the environmental issues and concerns associated with development of transmission facilities; local input and traditional knowledge respecting possible environmental issues was also integral to the characterization of the Study Area and assessment of potential effects.

3.3.2 Information Sources

The following primary sources of information have been used to conduct the environmental assessment of the proposed Project:

- Local knowledge and ATK provided by residents, resource harvesters and other users, and Elders of First Nations and other potentially affected communities (Chapter 5).

- Information provided in a project-specific report by Tataskweyak Cree Nation (2011) is summarized in Chapter 5 and is provided in a separate technical report (Tataskweyak Cree Nation Report on Keeyask Transmission Project).

- Discussions and information provided by Fox Lake Cree Nation (FLCN; Chapter 5).

    - In addition to the aforementioned sources of information, Manitoba Hydro is currently undertaking ATK studies with the Manitoba Metis Federation (MMF) and FLCN related to the Project. Existing published and unpublished information, e.g., biophysical and socio-economic information from the Keeyask Generation Project (Chapter 4).

- Information collected through field studies and other Project-specific research activity conducted to address known or expected gaps in the data. The results of these studies are particularly pertinent towards characterizing the Study Area and conducting an assessment of potential environmental effects and appropriate mitigation measures. In some cases, additional research and monitoring activity may follow Project approval and securing of rights-of-way, e.g., detailed field requirements and identification of site-specific avoidance or mitigation measures respecting potential effects on rare and endangered plants as part of a subsequent Environmental Protection Plan (EnvPP) prepared for the Project (Chapter 8).

Design and implementation of field studies for the Keeyask Transmission Project were supported by information collected by the Keeyask Transmission Study Team during studies relating to the Keeyask Generation Project. In particular, studies for the siting regarding the south access road to the Keeyask Generating Station largely encompassed a large portion of the Keeyask Transmission Project Study Area. Other information collected as a component of the Keeyask Generation studies also assisted in characterizing the Keeyask Transmission Study Area and encompassing region.

Details regarding the methods used and the results of gathered data are provided in the separate technical reports. This compendium of technical reports includes the results of studies regarding the biological (aquatic and terrestrial) environments, socio-economic

environments, heritage, and a Tataskweyak Cree Nation report (TCN 2011; ECOSTEM 2012; InterGroup 2012; NLHS 2012; North/South 2012; Stantec 2012a,b; WRCS 2012).

3.3.3 Routes/Sites Comparison and Preferred Routes and Sites Selection

Through the Study Area characterization process, the locations of sensitive biophysical, socio-economic and cultural features (potential effect areas) and routing opportunities (e.g., existing transmission line rights-of-way, other linear rights-of-way) were identified. Routing and siting opportunities were utilized in the identification and evaluation of alternative routes and sites. Environmental considerations were evaluated in the context of overall technical (engineering) and cost implications.

Chapter 6 provides a description and evaluation of the alternative routes for proposed transmission lines and station sites. The preferred routes for the Generation Outlet Transmission (GOT) and Construction Power lines were selected on the basis of an evaluation of the potential effects of the Project on key criteria (Section 6.2.1) in the determination of significance. The biophysical, socio-economic and heritage-related criteria that are assessed with respect to Project effects are then weighed in relation to other important factors such as: technical constraints, cost and expressed concerns and opinions of First Nation and other public from several northern communities. The collective weight of the various factors are evaluated and used in determining the preferred routes.

Selection of the preferred routes thus balances biophysical, socio-economic, technical factors, and cost in arriving at the option that minimizes potential effects. Following a detailed analysis and comparison of the alternative routes on the basis of biophysical, socio-economic, technical and cost considerations, the preferred routes having the lowest overall adverse effects were selected (Section 6.2). Data from existing published sources was supplemented by field reconnaissance and feedback from the public (including local input and traditional knowledge) and government sources.

The Construction Power Station and Keeyask Switching Station were similarly selected on the basis of an evaluation of technical, cost and public comment. As there was little notable difference between the sites with respect to environmental and expressed public opinion, engineering/technical considerations were the key factors in determining the preferred sites.

3.4 VALUED ENVIRONMENTAL COMPONENTS

The Site Selection and Environmental Assessment process involves the selection and evaluation of preferred final routes for the Construction Power and Generation Outlet Transmission lines, as well as the Construction Power Station and Keeyask Switching

Station sites, largely on the basis of specific biophysical and socio-economic Valued Environmental Components (VECs) that could potentially be affected by the Project. These VECs were identified as being important or valued by members of the study team (e.g., species that are protected) and/or by the public and by other elements of the SSEA process. The identified VECs facilitated assessment of the interactions between the Project components and specific valued components of the environment.

Table 3-1 identifies the VECs that are used in the Keeyask Transmission Project. An overview explanation for the selection of these VECs is provided in this section, with further details provided in the Environmental Setting and Effects chapters (Chapters 4 and 7) and Appendix C.

Table 3-1: Valued Environmental Components s Evaluated to be Used in the Keeyask Transmission Project

Discipline/Environmental Parameter	VEC
Aquatic Environment	Fish Habitat
Terrestrial Environment	
Plants and Habitat	Ecosystem Diversity Fragmentation Priority Plant Species
Wildlife	Raptors Common Nighthawk Olive-sided flycatcher Rusty blackbird Moose Caribou
Socio-economic Environment	Land and Resource Use Economy Population, Infrastructure and Services Personal, Family and Community Life
Heritage	Heritage Resources

VECs are components of the biological or socio-economic environment that may be affected by the Project. VECs are species and/or environmental components that are used to highlight or focus the environmental assessment. They are defined as elements of the environment having scientific, social, cultural, economic, historical, archaeological or aesthetic importance and are identified and described under each environmental component. Project VECs are selected on the basis of their importance or relevance to

stakeholders (e.g., species such as moose that are hunted) and/or as indicators of environmental effects to a broader range of animals. They are determined with the input from regulators and stakeholders, Aboriginal people and discipline experts, as well as literature reviews and experience with other projects. Environmental indicators and measurable parameters or variables are identified and described for each VEC. The same indicators and parameters/variables are used to describe environmental effects and residual environmental effects, and to monitor changes or trends over time during the Project construction and operation/maintenance phases.

This Keeyask Transmission Environmental Assessment (EA) Report considers the construction and operational effects of the Project on a broad range of environmental components. The selection and use of VECs are intended to permit the analyses to be fairly consistent with the Bipole III Transmission and Keeyask Generation projects. Since the Keeyask Transmission and Generation projects are occurring in the same region, the factors influencing the different components are similar and entail considering using many of the same VECs, particularly those that are potentially affected by transmission projects. The analysis and write-up of VECs highlights the interrelationship of a species and its environment in a manner that augments the other key sources of information (e.g., field data, models, literature).

3.5 ENVIRONMENTAL EFFECTS ASSESSMENT

The environmental assessment involved identifying and analyzing potential effects associated with the preferred routes that could not be avoided during the route selection process. During the route selection process, detailed socio-economic and biophysical studies (including supplementary field studies where required) were conducted to determine potential effects more precisely. Potential Project effects and mitigation measures are detailed in Chapter 7. Appropriate mitigation measures have been identified to reduce negative effects during all phases of Project development.

3.5.1 Residual Effects significance evaluation

Residual effects are the actual or anticipated Project effects that remain after considering mitigation and the effects of other past and likely future developments and activities. The significance of the residual environmental effects were evaluated using factors adapted from the Canadian Environmental Assessment Agency (1994; Hegman *et al.* 1999). Significance was evaluated based on the criteria and ratings described below and summarized in Section 7.5.

Each potential Project effect on a VEC is initially evaluated using the following criteria:

- Direction or nature (i.e., positive, neutral or adverse) of the effect.

- Magnitude (i.e., severity) of the effect.
- Duration (temporal boundaries).
- Geographic Extent (spatial boundaries).

To apply these criteria, each criterion has been defined as follows:

- **Direction or Nature of the Effect** – Describes the nature of the residual effect and the difference or trend of the effect compared with existing baseline or pre-Project conditions. Direction is described as:

  - Positive – A beneficial or desirable effect on the environment.
  - Neutral or negligible – No measurable change in the environment.
  - Adverse – An adverse or undesirable effect on the environment.

  The overall direction of change (positive, neutral or negative/adverse) is typically clear for a specific VEC. Neutral or negligible effects were considered in the EA Report to be equivalent to there being no residual effect. Issues can arise when a specific species or habitat has positive effects in some areas and is harmed in other areas.

  The assessment of overall direction of change for socio-economic effects also considers the following:

  - The relevance of perceptions in affecting how people view changes.
  - Differing perspectives and values among different groups of people about their community and region, as well as their individual and family circumstances.

  When assessing effects of the Project on people, it is recognized that there are challenges inherent in assessing separately effects on different aspects or components (i.e., different VECs) of people's lives, e.g., different VECs that contribute to overall personal, family and community life. Potential effects may be either positive or negative, depending on the people affected. Effects may also be both positive and negative when different groups are affected differently, when different elements of a VEC are affected differently, or when different VECs are considered for the same group.

- **Magnitude** – The predicted severity or degree of disturbance the residual effect has on a component of the biophysical or socio-economic environment. Magnitude is described as:

  - Small – No definable, detectable or measurable effect; or below established thresholds of acceptable change; or within range of natural variability; or minimum impairment of ecosystem component's function.

  - Moderate – Effects that could be measured and could be determined within normal range of variation of a well-designed monitoring program; or are generally below or only marginally beyond guidelines or established thresholds of acceptable change; or are marginally beyond the range of natural variability or marginally beyond minimal impairment of ecosystem component's function.

  - Large – Effects that are easily observable, measured and described (i.e., readily detectable without a monitoring program) and well beyond guidelines or established thresholds of acceptable change; or well beyond the range of natural variability; or well beyond minimal impairment of ecosystem component's functions.

- **Geographic Extent** – The spatial boundary within which the residual environmental effect is expected to occur. Geographic extent is described as:

  - Small geographic extent – Effects that are confined to a small portion of one or more small areas where direct and indirect effects can occur (e.g., rights-of-way or component sites and adjacent buffer areas).

  - Medium geographic extent – Effects that extend into local surrounding areas where direct and indirect effects can occur, i.e., generally within the Study Area (Map 1-1).

  - Large geographic extent – Effects that extend into the wider regional area where indirect or cumulative effects may occur.

- **Duration** – The temporal boundary or length of time within which the predicted residual environmental effect would last. Duration is described as:

  - Short-term – Low-level effects that generally occur within the construction period or initial period of impoundment, or occur within only one generation or recovery cycle of the VEC.

  - Medium-term – Medium-level effects that extend through a transition period during the operations phase, or occur within one or two generations or recovery cycles.

- Long-term – High-level effects that extend for a long-term during the operations phase or are permanent, or extend for two or more generations or recovery cycles.

  The effects on VECs and their potential significance are assessed on the basis of the criteria illustrated in Figure 3-2.

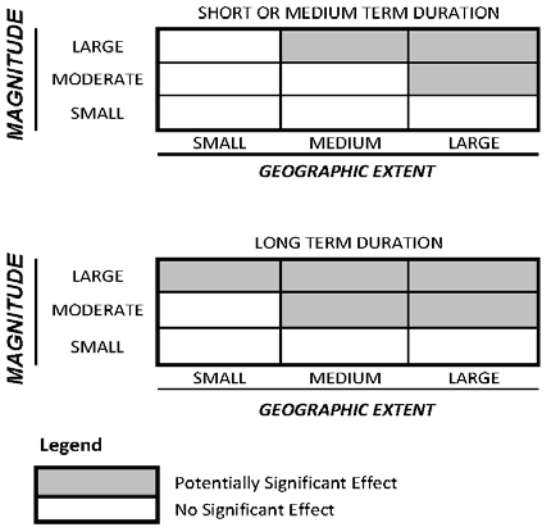

Figure 3-2: Regulatory Significance Assessment

Although both positive and negative environmental effects of the Project are assessed, the EA Report focuses on assessing the significance of potential negative (or adverse) environmental effects of the Project on VECs. In this first step on the process, the adverse effects are categorized as to whether further evaluation is required to determine if the effect may be significant, as follows:

- Requiring further evaluation:

  - Small in geographic extent (i.e., within the Project site or footprint, large in magnitude and long-term in duration).

  - Medium in geographic extent (generally occurring locally within the Study Area) and either large in magnitude (regardless of duration) or moderate in magnitude and long-term in duration.

- Large (or regional) in geographic extent and either moderate or high in magnitude (regardless of duration).

- Not requiring further evaluation:

  - Regardless of duration or geographic extent, small in magnitude as the effect cannot be detected.

  - Small in geographic extent and small in magnitude and duration (i.e., not long-term).

  - Not extending beyond the local Study Area in geographic extent (i.e., medium), short-term or medium-term in duration and not large in magnitude.

  - No definable effects at any level or insufficient to be termed a low effect, and generally indistinguishable from Project baseline conditions.

  For a VEC requiring further evaluation the frequency, reversibility, and ecological context of the potential residual environmental effects were also considered using additional criteria, as follows:

- **Frequency** – How often the predicted residual environmental effect would occur. Frequency is described as:

  - Infrequent – Low-level effects that occur only once or seldom during the life of the Project (e.g., initial clearing of right-of-way).

  - Sporadic/Intermittent – Moderate-level effects that are sporadic or intermittent, occurring only occasionally and without any predictable pattern during the life of the Project (e.g., wildlife- vehicle collisions, bird strikes with transmission lines).

  - Regular/Continuous – High-level effects that occur continuously or at regular periodic intervals during the life of the Project.

- **Reversibility** – The potential for recovery from an adverse effect. Reversibility is described as:

  - Reversible – Effect that is reversible during the life of the Project.

  - Irreversible – A long-term effect that is permanent (remains indefinite as a residual effect).

- **Ecological Context** – Ecological context of the biophysical VEC, sensitivity to disturbance, capacity to adapt to change. Includes the rarity, uniqueness and fragility

within the ecosystem, and importance to scientific studies (i.e., rare species/habitats, critical habitats, breeding areas, etc.). Ecological Context is described as:

- Low – The VEC is not rare or unique, resilient to imposed change, or of minor ecosystem importance and limited scientific importance.

- Moderate – The VEC has some capacity to adapt to imposed change, is moderately/seasonally fragile or is somewhat important to ecosystem functions or relationship, or scientific investigation.

- High – The VEC is a protected/designated species or fragile with low resilience to imposed change, very fragile ecosystem, and scientifically important.

For example, if an environmental VEC is known to be highly resilient (i.e., adaptable and recovers well from disturbance), effects that could otherwise be considered significant may (for the purposes of regulatory determination of significance) be determined as insignificant. Conversely, where the loss of even a few individuals may affect the long-term viability of a population, the effect on a VEC may be significant, even where the magnitude and geographic extent are in the medium range. For socio-economic VECs, additional factors that may need to be considered include concurrent effects on other socio-economic VECs affecting the same group of people or others in the same community or region, or the degree to which the affected people have any control over mitigation (which may affect "vulnerability" in socio-economic terms), and overall confidence in the assessment after consideration of proposed mitigation measures.

The assessment may also address the certainty/uncertainty (i.e., level of confidence) of the analysis/prediction. The Canadian Environmental Assessment Agency's guidance document explains that the level of uncertainty is a condition resulting from the adequacy of scientific information (Canadian Environmental Assessment Agency 1999). Certain effects are predicable with a high level of certainty while other effects may be unknown until they occur. Sources and degrees of uncertainty for each of the biophysical and socio-economic analyses are identified where relevant and feasible in Chapter 7 (Environmental Effects Assessment).

Proposed monitoring and follow up activities outlined in Chapter 7 address, among other matters, management plans to deal with instances, where conclusions about whether the Project will cause an effect and/or the extent of such effects differ when based on Aboriginal Traditional Knowledge as compared to technical science. These differences, where known, are reported in the EA Report and considered to reflect uncertainty that will require resolution in the monitoring and follow up in sections associated with each environmental factor described in Chapter 7.

In the event that significant adverse effects are predicted for residual effects on VECs, the likelihood is discussed in terms of both the probability of occurrence of the significant adverse effect and the degree of uncertainty. Based on this, a conclusion is made as to whether a significant adverse environmental effect is likely.

Cumulative effects assessment is addressed in Sections 3.5.2 and 7.6. The significance determinations in Chapter 7 for adverse environmental effects are reviewed where relevant for cumulative effects related to reasonably foreseeable future projects.

3.5.2 Cumulative Effects Assessment

A cumulative effect is the effect on the environment which results when the effects of a project overlaps spatially and temporally with those of the past, current and future projects and activities (Hegman *et al.* 1999).

Cumulative Effects Assessment formed an integral part of the biophysical and socio-economic environmental assessment. The assessment looked at potential adverse effects that are likely to result from the Project when they are anticipated to occur in combination with other projects or activities that have been, or will be carried out.

3.5.2.1 Past and Current Projects and Activities

The effects of past and current projects and activities were generally considered to form an integral part of the existing biophysical/socio-economic environment against which predicted effects are assessed. As such, the effects of these past and current projects and activities are properly accounted for in the description of the environmental setting.

Past and current projects and activities considered as influencing the baseline setting conditions (as required for assessment of each specific environmental component) include the following:

- Keeyask Infrastructure Project.
- Churchill River Diversion, Lake Winnipeg regulation and development of the Lower Nelson River generating stations, and other existing Manitoba Hydro facilities (e.g., other generating stations, transmission facilities).
- Existing transmission lines in the region, e.g., Bipole I and II, KN36, etc.
- Provincial Road (PR) 280 and other existing public or forestry roads and exploration trails/cut lines; it is assumed that the new trails will be balanced by vegetation regeneration of old ones, though regeneration may not be identical to original vegetation in the region.

- Population growth as it normally affects communities in areas in the Project region (e.g., Gillam, Split Lake, Ilford, York Landing and Bird).

- Other various community-driven initiatives, projects and activities in the Project Study Area, including: resource-use activities (e.g., domestic harvest, commercial fishing, commercial trapping and ecotourism).

3.5.2.2 Future Projects and Activities

The following list of future activities was considered in the cumulative effects assessment for the Project:

- Keeyask Generation Project – The Keeyask Generation Project will be developed concurrently with the Keeyask Transmission Project. In at least some areas, environmental effects of the Keeyask Transmission Project will overlap spatially and temporally with the environmental effects of the Keeyask Generation Project.

- Bipole III Transmission Project – The projects are being considered by Manitoba Hydro for possible construction within the next ten to 15 years. The potential overlap of the effects of Bipole III (and other projects) on residual effects of Keeyask Transmission is described in Section 7.6.

- Conawapa Generation Project – The potential overlap of this Project with respect to wide-ranging species such as caribou and migratory birds was considered.

Appendix E provides further description of past and current projects and activities and information on future projects and activities considered in the cumulative effects assessment. More information on these projects can be found on the Manitoba Hydro website (http://www.hydro.mb.ca/).

3.6 ENVIRONMENTAL MONITORING

The EA Report describes proposed monitoring activities for the effects on the physical, biological and socio-economic environments arising from project pre-construction (i.e., site preparation), construction, operation and maintenance, and eventual decommissioning (Appendix G). The EA Report also describes the process for environmental protection and identifies mitigation measures, monitoring and other follow-up actions to be implemented through an Environmental Protection Program. Manitoba Hydro's program consists of a framework for implementing, managing, monitoring and evaluating environmental protection measures in a consistent and responsible manner with regulatory requirements, corporate commitments, best practices and public expectations.

Manitoba Hydro's Environmental Protection Program involves the development and implementation of Project-specific Environmental Protection Plans (EnvPPs). This program consists of an implementation framework that outlines how environmental protection is delivered and managed, and environmental protection plans that prescribe measures and practices to avoid and minimize adverse environmental effects. A Draft EnvPP has been prepared for the Project as part of this EA Report submission and is the main implementation tool for achieving effective implementation of mitigation measures and follow-up requirements identified in the environmental assessment (Appendix F).

Following receipt of the required environmental license, the required content tentatively identified in the draft EnvPP will be finalized taking into account supplementary provisions following from any conditions attached by the regulatory authorities to approval of the facilities. The final EnvPP will outline specific mitigation measures, including any required monitoring, to be implemented during the construction, operation and maintenance phases of the Project. The EnvPP will generally be implemented to accomplish the following goals:

- To address the terms and conditions outlined in the *Environment Act* Licence (Manitoba).
- To facilitate the mitigation of environmental effects throughout the life cycle of the Project by providing clear reporting protocols for field construction and operating personnel.
- To incorporate issues and concerns identified during the environmental assessment consultation process.
- To identify modifications to construction methods or schedules, summarize environmental sensitivities and mitigation actions.
- To provide specific information on practices to be utilized during the clearing, construction and operation and maintenance phases of the Project.
- To monitor and where required modify clearing, construction and operation and maintenance activities to ensure that work proceeds in accordance with the EnvPP(s).

Upon final approval and completion of Project development, follow-up activities are used to verify the accuracy of the environmental assessment of a project or to determine the effectiveness of measures taken to mitigate adverse effects. The main components of environmental protection implementation and follow-up include the following:

- **Inspection** – To oversee adherence to and implementation of the terms and conditions of Project approval during Project construction and operation.

- **Effects monitoring** – To measure the environmental changes that can be attributed to Project construction and/or operation and check the effectiveness of mitigation measures.

- **Compliance monitoring** – To ensure that applicable regulatory standards and requirements are being met (e.g., for waste discharge and pollutant emissions).

- **Management** – Prepare plans to address important management issues, regulatory requirements and corporate commitments (e.g., access management, emergency response, waste management).

- **Environmental auditing** – To verify the implementation of terms and conditions, the accuracy of the predictions, the effectiveness of mitigation measures, and the compliance with regulatory requirements and standards.

- **Updating and review** – Update and finalize the draft EnvPP to include stipulated license terms, conditions and other regulatory requirements, prepare construction phase EnvPPs and operational phase EnvPPs (one for each separate project component by phase), and to annually review and update the EnvPPs to ensure their continued effectiveness.

Further detail on Manitoba Hydro's Environmental Protection Program to be implemented for the Project is provided in Chapter 8 of this EA Report and is more fully outlined in the Draft Environmental Protection Plan prepared as part of the EA Report submission for regulatory review (Appendix F).