

CHAPTER 8

MONITORING AND FOLLOW-UP

CHAPTER 8

TABLE OF CONTENTS

| | Page |
|--|-------------|
| 8.0 MONITORING AND FOLLOW-UP | 8-1 |
| 8.1 INTRODUCTION AND APPROACH..... | 8-1 |
| 8.1.1 Overview of the Program..... | 8-2 |
| 8.1.2 Approach of Environmental Protection Program | 8-3 |
| 8.1.2.1 Environmental Protection Plans..... | 8-4 |
| 8.1.2.2 Environmental Management Plans..... | 8-5 |
| 8.1.2.3 Environmental Monitoring Plans | 8-6 |
| 8.1.2.4 Monitoring Principles..... | 8-6 |
| 8.1.3 Adaptive Management | 8-7 |
| 8.2 OVERVIEW OF MONITORING ACTIVITIES..... | 8-9 |
| 8.2.1 Physical Environment Monitoring..... | 8-9 |
| 8.2.2 Aquatic Environment Monitoring..... | 8-12 |
| 8.2.3 Terrestrial Environment Monitoring | 8-18 |
| 8.2.4 Socio-Economic Environment Monitoring..... | 8-27 |
| 8.2.5 Resource Use Monitoring | 8-34 |
| 8.2.6 Heritage Resources Monitoring..... | 8-37 |
| 8.2.7 Aboriginal Traditional Knowledge Monitoring Programs..... | 8-39 |
| 8.3 ENVIRONMENTAL PROTECTION PROGRAM IMPLEMENTATION | 8-40 |
| 8.3.1 Partnership and Regulatory Communication | 8-40 |
| 8.3.1.1 Working as Partners | 8-40 |
| 8.3.1.2 Working with Regulators..... | 8-41 |
| 8.3.1.3 Reporting | 8-41 |
| 8.3.2 Environmental Protection Plan Implementation..... | 8-41 |
| 8.3.2.1 Tenders and Contracts | 8-42 |
| 8.3.2.2 Training and Orientation | 8-42 |
| 8.3.2.3 Inspection and Compliance..... | 8-42 |
| 8.3.2.4 Working with Contractors | 8-42 |
| 8.3.2.5 Work Stoppages..... | 8-42 |

8.3.3 Implementation of Management Plans8-43
8.3.4 Monitoring Implementation8-43



LIST OF TABLES

| | Page |
|--|-------------|
| Table 8-1: Monitoring and Follow-Up Plans for the Physical Environment | 8-10 |
| Table 8-2: Monitoring and Follow-Up Plans for Physical Environment Parameters Conducted to Support Other Monitoring Programs* | 8-11 |
| Table 8-3: Monitoring and Follow-Up Plans for the Aquatic Environment | 8-13 |
| Table 8-4: Monitoring and Follow-Up Plans for the Terrestrial Environment | 8-19 |
| Table 8-5: Monitoring and Follow-Up Plans for the Socio-Economic Environment | 8-28 |
| Table 8-6: Monitoring and Follow-Up Program for Resource Use | 8-36 |
| Table 8-7: Monitoring and Follow-Up Program for Heritage Resources | 8-38 |

LIST OF FIGURES

| | Page |
|--|-------------|
| Figure 8-1: Environmental Protection Program | 8-3 |

8.0 MONITORING AND FOLLOW-UP

The Keeyask Hydropower Limited Partnership (the Partnership) is committed to constructing and operating the Keeyask Generation Project (the Project) in a manner that facilitates the long-term integrity and productivity of the economy, environment, and natural resources, and that safeguards human health. Manitoba Hydro's continual improvement of environmental performance is demonstrated through the company's Environmental Management System, which is ISO 14001 certified. The Keeyask Cree Nations (KCNs) share a worldview that includes a responsibility to care for and protect *Askeji* - the word used by the *Ininewak* for the whole of the land, water, animals and plants, including medicines, people, all other creatures and the interconnections between all things. The KCNs' shared worldview and the Manitoba Hydro environmental commitments are described in Chapter 2: Partners' Context, Worldviews and Evaluation Process.

An Environmental Protection Program (the Program), comprised of three different types of plans (Environmental Protection Plans, Environmental Management Plans and Environmental Monitoring Plans), is being developed to mitigate, manage and monitor potential environmental effects during the construction and operation phases of the Project. While the description of the existing environment is based on measurement and observation, the description of effects and the mitigation designed to address adverse effects are predictions based on technical scientific studies and analysis, professional experience and Aboriginal traditional knowledge (ATK). Monitoring is required to determine if the predictions are correct and if the mitigation packages are working as anticipated. The Program will be used to test predictions made in this Environmental Impact Statement (EIS). If unexpected effects are detected through monitoring, the Program will outline the process for determining what actions, including adaptive management where possible, will be taken.

The Program facilitates the ability of the Partnership (and its contractors) to meet the environmental commitments set out in this EIS and the regulatory requirements.

8.1 INTRODUCTION AND APPROACH

The EIS guidelines require a description of a follow-up program to be undertaken to test and respond, if necessary, to predictions and the effectiveness of mitigation in reducing environmental and social effects of the Project. The purpose of this Chapter is to outline such a program and describe how it will be implemented and how information resulting from the program will be applied.

This chapter provides the reader with information of the planned Environmental Protection Program and its associated plans that describe extensive monitoring and follow-up activities associated with the construction and operation of the Project.

8.1.1 OVERVIEW OF THE PROGRAM

The Project is a large, complex development that has been the subject of over a decade of study and planning, including both its engineering design and its potential effects on the environment. The planning phase also includes ways to prevent, mitigate or compensate for adverse effects the Project might bring forth. Predictions of effects have been made based on technical science and ATK, and mitigation plans have been developed to address potential adverse effects of the development. These predicted potential effects and planned mitigation measures have been set out in Chapters 6 and 7. The environmental assessment has been comprehensive and has utilized the best scientific practice and ATK, comprised of generations of knowledge and experience. However, due

to factors such as the complexities of ecosystems and difficulties predicting details of future development, all environmental assessments (EA) involve some level of uncertainty regarding the identification of environmental effects, the assessment of their significance and the effectiveness of mitigation measures. The Act implicitly recognizes uncertainty by requiring a follow-up program for all projects that undergo an assessment by comprehensive study or a review panel¹.

The monitoring and follow-up process addresses areas where uncertainty exists in the predictions, including those areas where there are differences between the predictions based on technical analysis and ATK. Variations in predicted and actual results identified through monitoring will be assessed by the Partnership and regulatory authorities for follow-up actions such as mitigation adjustments and adaptive management.

The development of the Program is an incremental process culminating with incorporation of terms and conditions of the environmental licence and other regulatory approvals into the appropriate plans. As a result, details associated with the Program components will be provided subsequent to the submission of this EIS. This chapter provides an outline of the Program. The form of the Program is illustrated below in Figure 8-1.

¹ CEAA Operational Policy Statement: Adaptive management Measures under the *Canadian Environmental Assessment Act*.

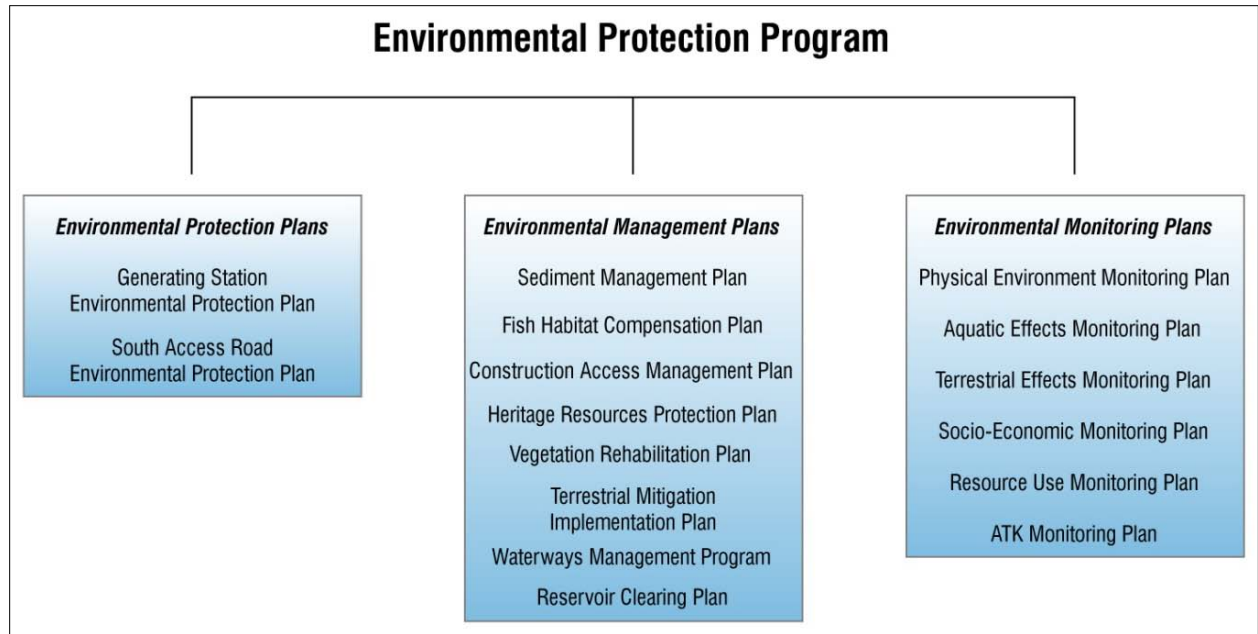


Figure 8-1: Environmental Protection Program

8.1.2 APPROACH OF ENVIRONMENTAL PROTECTION PROGRAM

The Program described in this chapter is based on the assessment information provided in Chapters 6 and 7 and associated supporting volumes, construction and operational activities and regulatory requirements. The preliminary plans developed as part of the Program will undergo regulatory review. Input received during the regulatory review process will be incorporated into the documents prior to their being finalized.

The Program includes the “who, what, when, where and how” aspects of protecting and monitoring the environment within the area affected by the Project. Responsibility for implementation of the Program is a delegated responsibility from the Partnership to Manitoba Hydro.

The Program will contain three different types of plans:

- Environmental Protection Plans (EnvPPs), which provide detailed, site-specific environmental protection measures to be implemented by the contractors and construction staff to minimize environmental effects from construction of the generating station and the south access road;
- Environmental Management Plans, which are focused on specific environmental issues, such as sediment management, access management, fish habitat and heritage resources. The plans often include both mitigation and monitoring to determine if the mitigation implemented is successful; and

- Environmental Monitoring Plans, which describe the activities to be undertaken for monitoring the effects of construction and operational activities on the biophysical, physical and socio-economic environments.

Each plan includes an implementation strategy. Depending upon the plan, the implementation strategy may include contractual arrangements, training, compliance inspections and communication of results.

8.1.2.1 ENVIRONMENTAL PROTECTION PLANS

An EnvPP provides detailed site-specific environmental protection procedures to be implemented by the construction team or operational personnel during various phases of the Project. They are designed for use as reference documents providing the best management practices to meet or exceed regulatory requirements. The purpose of EnvPPs is to guide construction and operational activities to have the least adverse effect on the environment and to remain within limits set by various environmental guidelines, regulations and approvals. EnvPPs are organized by construction component, highlighting measures to reduce the impact of a specific work activity (*e.g.*, tree clearing or cofferdam construction). Environmental Protection Plans will be in place for construction of the generating station and the south access road.

The Partnership requires all contractors and site staff to work in compliance with the EnvPP. The contents of the EnvPP include, but are not necessarily limited to the following:

- Mitigation measures – includes those measures outlined in Chapters 6 and 7, licence requirements and other sources that apply to construction;
- Erosion and sediment control measures – engineering drawings and/or specifications for materials and methods to be applied to prevent erosion and sediment input from land into water;
- Timing restrictions – restrictions on construction activities (*e.g.*, blasting) for wildlife nesting, calving and spawning;
- Environmental sensitivity maps – detailed maps of the construction area that show setback distances from environmental features that are particularly sensitive (*e.g.*, caribou calving areas and rare habitat features). They provide a visual tool for the contractors that assist them in applying appropriate mitigation to reduce negative effects;
- Emergency response plan – spill containment equipment, clean up and communication protocols;
- Regulatory guidance documents – pertinent federal and provincial guidelines for work being undertaken;
- Permits, licences, and authorizations received; and

- Inspection sheets – an environmental officer will monitor contractors' compliance with the mitigation measures.

8.1.2.2 ENVIRONMENTAL MANAGEMENT PLANS

Environmental management plans focus on minimizing effects of a specific environmental parameter. They outline specific actions that must be taken during construction and in some cases following construction to mitigate Project effects. Many of the management plans include monitoring to determine success of the actions taken and to determine other actions that need to be undertaken (adaptive management).

The following eight environmental management plans will be developed for the Project:

- Sediment Management Plan – Describes procedures to measure the concentration of suspended sediments in the Nelson River due to construction of the Project during in-stream construction and Project commissioning, as well as prescribing actions to be taken if total suspended solids (TSS) due to the Project exceed target levels.
- Fish Habitat Compensation Plan – Describes works to be installed that compensate for the loss of fish habitat due to the Project and monitoring and follow up activities to determine the success of the structures and modifications if required.
- Construction Access Management Plan – Describes specific measures that will be undertaken to ensure the safe, coordinated access for authorized users during construction to protect the area's natural resources, including limiting worker impact on the surrounding area, heritage resources, local communities, fisheries, and wildlife resources.
- Heritage Resource Protection Plan – Describes procedures for responding to heritage resources or human remains found during construction and operation of the Project.
- Vegetation Rehabilitation Plan – Describes where Project areas not needed for operation will be decommissioned and rehabilitated.
- Terrestrial Mitigation Implementation Plan – Describes how the mitigation measures outlined particularly in the terrestrial section of Chapter 6 will be implemented, including wetland restoration or creation plans and bird nesting structures, *etc.*
- Waterways Management Program – A Program created as part of the JKDA committing the Keeyask Hydropower Limited Partnership to activities during both pre and post-flooding to have a multi-purpose boat patrol to monitor shoreline and waterway activities, provide for safe travel and plan and implement protective measures for historic resources.

- Reservoir Clearing Plan – A Program created as part of the JKDA that describes in detail the areas that will be flooded in the reservoir that must be cleared of trees prior to impoundment and the methods to be undertaken to do so.

8.1.2.3 ENVIRONMENTAL MONITORING PLANS

Environmental monitoring plans are designed to measure the actual effects of the Project, test predictions or identify unanticipated effects. They will also include monitoring commitments made to regulatory authorities. During the course of the environmental assessment, various requirements for monitoring were identified. The Project-specific monitoring plans are developed and presented in the context of the environmental components: physical, aquatic, terrestrial and socio-economic environments and resource use. The monitoring plans will cover the construction phase and continue into the operation phase as appropriate.

The following environmental monitoring plans will be developed (more specific details are provided in Section 8.2):

- Physical Environment Monitoring Plan – Describes monitoring for the effects on physical environmental components such as water regime, erosion and sedimentation.
- Aquatic Effects Monitoring Plan – Describes monitoring for the effects on aquatic environmental components such as water quality, aquatic habitat, lower trophic levels, and fish community.
- Terrestrial Effects Monitoring Plan – Describes monitoring for the effects on terrestrial environmental components such as birds, amphibians, wildlife, plants and terrestrial habitat.
- Socio-Economic Monitoring Plan – Describes monitoring for the effects on components such as employment, business opportunities, traffic, and safety.
- Resource Use Monitoring Plan – Describes monitoring of effects to resource use (this plan will consist largely of a compilation of monitoring activities done as other parts of the program, *e.g.*, reporting on ice conditions (Physical Environment Monitoring Plan and how it affects resource users).
- ATK Monitoring Plans – Describes monitoring by and for the KCNs communities related to the effects on their relationship with *Askiy*.

8.1.2.4 MONITORING PRINCIPLES

In order to achieve a level of consistency and appropriate focus, the development and implementation of monitoring plans will be guided by the following principles:

- KCNs involvement and ATK will be utilized along with technical science and recognized as an integral component of the monitoring (see Section 8.2.7);
- Monitoring design will include, where applicable, the nature of potential adaptive management measures;
- Monitoring activities will make use of both qualitative and quantitative methodologies as appropriate; and
- Where monitoring reveals that a prediction is incorrect or that mitigation measures are not working as designed, appropriate follow-up action will be initiated and continued until the situation is deemed to be stable/satisfactory by the Partnership and the regulators.

Although monitoring activities will be developed related to needs identified for specific Valued Environmental Components (VECs) or supporting topics, efforts will be made to facilitate efficient implementation by:

- Setting practical temporal and spatial scope for the monitoring based on the effects of the Project; and
- Building strategic and logistical efficiencies into fieldwork and data collection activities to serve multiple monitoring programs.

8.1.3 ADAPTIVE MANAGEMENT

In the context of the Project, adaptive management is a planned process for responding to uncertainty or to an unanticipated or underestimated Project effect. It is the application of information learned from monitoring actual Project effects and comparing them with predicted effects. If there is a variance between the actual and the predicted effects, a determination will be made as to whether modifications are required in existing mitigation measures, other actions are necessary to address the variance or, in cases where there may be no mitigating options available, the appropriate information is disseminated in a timely manner.

Where appropriate, potential adaptive management activities are included in the monitoring and management plans that are being developed as a part of the Environmental Protection Program or through an on-going process during monitoring in consultation with regulators.

The EA undertaken for the Project has utilized technical science and ATK, most prominently from the four KCNs whose current and traditional homelands are in the Keeyask area. Mitigation measures have been carefully planned and designed to prevent or reduce, to the extent practical, adverse effects from the Project. As noted previously, however, there are uncertainties associated with predicted effects and the effectiveness of planned mitigation measures. To address these uncertainties many of the predictions and

mitigation measures are supported by monitoring to enable verification of the predictions and timely response when actual results differ from the predictions.

Where there is a reasonable understanding of an area of uncertainty such that a choice was made between two or more potential outcomes, it is reasonable to have prepared, in advance, a conceptually appropriate response should one of the optional outcomes occur. However, in other cases, the effects will be unforeseen and the response will be designed upon receipt and analysis of the data/information resulting from the monitoring. In a few cases, especially in areas of greater certainty, the monitoring is for information and communication purposes and there may be no potential adaptive management opportunities available.

Examples of each of these situations are set out below:

1. The following are examples of predetermined adaptive measures:
 - Terrestrial habitat – For rehabilitated areas that are not regenerating as anticipated, additional and/or different rehabilitation prescriptions will be applied.
 - Suspended sediment – Construction activities will be modified or temporarily suspended if suspended sediment concentrations increase above specified limits.
 - Lake sturgeon spawning structure – If the structure is not as effective as anticipated, alternative measures such as redesigning or providing additional spawning areas would be implemented.
 - Lake sturgeon stocking program – The number and/or age of fish released and the location where they are released could be modified, if required.
 - Colonial waterbirds – The use of tern nesting structures and any new/enhanced nesting islands by waterbirds will be monitored and, if required, the number and location of nesting structures will be adjusted and the enhancement of other existing islands/reefs will be considered.
2. The following are examples of adaptive management to be designed based on monitoring:
 - Fish passage – Fish will be moved upstream past the generating station as part of the planned trap/catch and transport program and their movements monitored. Modifications to this program cannot be determined until information on fish movements both downstream and upstream of the generating is obtained, including the response of the fish that are transported as part of the trap/catch and transport program.
 - Employment – Concerns respecting employment will be reviewed by the Advisory Group on Employment, which may make recommendations to the Project Manager and, if deemed necessary by the Partnership, to determine if any new measures are appropriate.

- Worker interaction – Should interaction between the construction workforce and local population be identified as a problem, the Partnership will work with the appropriate local authorities to evaluate the situation and develop strategies to reduce the likelihood of future occurrences.
3. The following are examples of monitoring with no probable adaptive measures available:
- Methylmercury in fish in the reservoir and Stephens Lake – Concentrations of methylmercury will be measured so that increases and eventual decreases can be recorded, but there is no means by which elevated levels can be changed. Results will be communicated to resource users and health service providers, so that consumption of fish from these areas can be modified appropriately.
 - Water quality effects in the flooded areas during operation – There is uncertainty in the magnitude of predicted increases in sediments, nutrients, and metals, and decreases in dissolved oxygen in the terrestrial flooded area. Water quality will be monitored to improve predictive ability for future projects and assist in interpreting effects to the biological community; however, these effects to water quality cannot be mitigated.
 - Dissolved oxygen and temperature – If dissolved oxygen concentrations are lower and temperatures are higher than predicted in back bays of the reservoir, no practical means are available to improve conditions.

8.2 OVERVIEW OF MONITORING ACTIVITIES

8.2.1 PHYSICAL ENVIRONMENT MONITORING

The expected changes in the physical environment resulting from the construction and operation of the Project are described in Section 6.3. There are uncertainties in the predictive models and the effectiveness of planned mitigation measures. KCNs are also uncertain about the effectiveness of the planned mitigation measures and ATK anticipates a larger spatial extent of effects, extending upstream to Split Lake and downstream to the Nelson River estuary. For these reasons, a comprehensive Physical Environment Monitoring Plan as outlined in Table 8-1 and Table 8-2 will be implemented during construction, the initial operating period (considered to be the first five to ten years) and beyond if necessary to verify predicted results and the effectiveness of planned mitigation measures. Specific monitoring requirements and the need to continue or discontinue any monitoring during construction and the initial operating period, or over a longer period, will be routinely assessed based on monitoring results and programs adjusted accordingly.

Table 8-1: Monitoring and Follow-Up Plans for the Physical Environment

| Supporting Topic or VEC | Issue/Rationale | Monitoring | Timelines |
|--|---|---|---|
| Climate (supporting topic) | <ul style="list-style-type: none"> To verify GHG emissions from the Project. | <ul style="list-style-type: none"> CO₂ and CH₄ GHG emissions from the reservoir will be monitored once the reservoir is fully impounded. | During the initial operating period. |
| Water regime (supporting topic) | <ul style="list-style-type: none"> To verify results of water level predictions. To verify predictions on depth and velocity. | <ul style="list-style-type: none"> Monitoring of water levels at various locations upstream and downstream of Keeyask. Monitoring of water depth and velocity under a variety of flow conditions during open water upstream and downstream of Keeyask | <p>During construction and operation.</p> <p>During the initial operating period.</p> |
| Ice regime (supporting topic) | <ul style="list-style-type: none"> To verify results of ice regime predictions. | <ul style="list-style-type: none"> Annual observation of ice formation and breakup upstream and downstream. | During construction and initial operating period. |
| Shoreline erosion (peat and mineral) (supporting topic) | <ul style="list-style-type: none"> To verify results of erosion modeling, rates and locations of peat resurfacing, shoreline peat land breakdown, and shoreline recession. | <ul style="list-style-type: none"> Monitoring of shoreline erosion and peat breakdown. | During construction and the initial operating period. |
| Sedimentation (supporting topic) | <ul style="list-style-type: none"> To verify sedimentation predictions. | <ul style="list-style-type: none"> Monitoring of sediment parameters (<i>e.g.</i>, suspended sediment, turbidity, bedload) upstream and downstream of Keeyask. Monitoring of sediment deposition upstream and downstream of Keeyask. | During construction and the initial operating period. |

Table 8-2: Monitoring and Follow-Up Plans for Physical Environment Parameters Conducted to Support Other Monitoring Programs*

| Supporting Topic or VEC | Issue/Rationale | Monitoring | Timelines |
|--|--|---|--------------------------------------|
| Woody debris (supporting topic) | <ul style="list-style-type: none"> Debris may pose a potential risk to the safety of river travel and other activities. | <ul style="list-style-type: none"> Monitoring of debris in the waterways to record the amount of debris being removed and the locations from which it was removed by the Waterways Management Program (WMP). | During construction and operation. |
| Dissolved oxygen and water temperature (supporting topic) | <ul style="list-style-type: none"> To verify predictions of dissolved oxygen and water temperature in backbays. | <ul style="list-style-type: none"> Monitoring of DO and water temperature in the reservoir mainstem and flooded backbays and downstream of Keeyask. | During the initial operating period. |
| Total dissolved gas pressure (supporting topic) | <ul style="list-style-type: none"> To verify the predicted effect of the Project on total dissolved gas pressure. | <ul style="list-style-type: none"> Monitoring of total dissolved gas pressure upstream and downstream of Keeyask under a variety of flow conditions. | During the initial operating period. |

*Note: These physical environment parameters are being collected solely to support other monitoring programs and will not be reported in physical environment reports.

8.2.2 AQUATIC ENVIRONMENT MONITORING

Predicted changes and planned mitigation for the aquatic environment are described in Section 6.4. In general, predicted changes in the technical assessment are based on models and observed changes in other reservoirs. Adverse effects are expected primarily within the reservoir, with fewer changes predicted downstream in Stephens Lake. Based on planned mitigation, it is expected that, in the long term, the aquatic environment will be productive and support VEC fish species upstream and downstream of the GS. However, given uncertainties in the predictive models and planned mitigation measures, conditions during construction and operation need to be monitored, and mitigation measures modified if required. ATK anticipates a much larger spatial extent of effects, extending upstream to Split Lake and downstream in the Nelson River past the Kettle GS. In addition, the KCNs are not confident that the reservoir will evolve to be a productive environment, and have expressed uncertainty as to the effectiveness of planned mitigation measures. For these reasons, monitoring for certain components of the aquatic environment will be extended beyond the area where effects are predicted in the technical assessment.

As described in the AE SV, the Aquatic Effects Monitoring Plan provides a detailed description of the rationale, schedule, sampling locations and sampling methodology for the technical monitoring that is proposed for the Project. This plan will be implemented in consultation with regulators, in particular DFO and MCWS, and it is expected that it will change based on regulatory review and on-going review of monitoring results. A description of the ATK-based monitoring is provided in Section 8.2.7. A brief summary of the AEMP is provided in Table 8-3.

Table 8-3: Monitoring and Follow-Up Plans for the Aquatic Environment

| Supporting Topic or VEC | Issue/Rationale | Monitoring | Timelines |
|------------------------------------|--|---|---|
| Water quality (VEC) | <ul style="list-style-type: none"> To address the effectiveness of management measures (<i>e.g.</i>, sediment management plan) during construction. To verify that predicted effects in the reservoir are not greater than anticipated and that effects do not extend upstream of the reservoir or downstream of the GS (apart from reduced suspended sediment concentrations). | <ul style="list-style-type: none"> Sampling at sites along the Nelson River from immediately downstream of the Kelsey GS to downstream of the Kettle GS. In addition, targeted sampling programs in relation to specific activities (instream construction) and site-specific effects (<i>e.g.</i>, inputs from flooded terrain). | Multiple times each year during construction and during the initial 10 years after full supply level is reached; less frequently for the following 20–30 years, depending on results. |
| Aquatic habitat (Supporting Topic) | <ul style="list-style-type: none"> To verify modeled predictions for post-Project habitat, in particular in relation to sensitive or highly altered habitats (<i>e.g.</i>, lake sturgeon spawning and young-of-the year habitat, terrestrial flooded areas). To confirm that conditions on constructed habitat areas are suitable and do not deteriorate over time (<i>e.g.</i>, potential for sedimentation). | <ul style="list-style-type: none"> Sampling in flooded terrestrial and aquatic habitat for changes in substrate type and the development of rooted aquatic plant beds. Monitoring in the main channel and on constructed habitats for changes in substrate type. | Annually for the first three years after full supply level is reached, and then at least every five years for the following 20- 30 years, depending on results. |

Table 8-3: Monitoring and Follow-Up Plans for the Aquatic Environment

| Supporting Topic or VEC | Issue/Rationale | Monitoring | Timelines |
|---|--|--|--|
| Aquatic vegetation, phytoplankton, zooplankton and macro-invertebrates (Supporting Topic) | <ul style="list-style-type: none"> To confirm predicted response of biota to construction activities (<i>e.g.</i>, sediment inputs). To determine whether plants and invertebrates colonize the flooded areas as predicted. Productivity may be limited by habitat conditions in the initial years after full supply level is reached. | <ul style="list-style-type: none"> Sampling downstream of in-stream construction activities. Sampling at all habitat types in the reservoir after full supply level is reached, in particular in flooded areas. | Annually of selected components during instream construction and the first three years after full supply level is reached and then at least every five years for the following 20-30 years, depending on results. |
| Fish community (Supporting Topic) (additional monitoring for VEC species listed below) | <ul style="list-style-type: none"> To provide information on responses to specific construction activities (<i>e.g.</i>, sediment inputs, blasting). To provide information on the fish community within the reservoir, and in Split and Stephens lakes. Determine effectiveness of mitigation and compensation measures. To address concerns of the KCNs, all fish species (as well as general fish health) in the reservoir will be monitored. | <ul style="list-style-type: none"> Sampling in relation to specific environmental changes during construction (<i>e.g.</i>, fish would be sampled upstream and downstream of the construction site for analysis of gill histology if peak sediment inputs exceed target levels). Monitoring the relative abundance and composition of the fish community, as well as indicators of fish health after full supply level is reached. | <p>During construction, in relation to specific activities that may affect fish distribution and health.</p> <p>Annually during the first three years after full supply level is reached and then at least every five years for the following 20-30 years, depending on results.</p> |

Table 8-3: Monitoring and Follow-Up Plans for the Aquatic Environment

| Supporting Topic or VEC | Issue/Rationale | Monitoring | Timelines |
|-------------------------|---|---|--|
| Lake sturgeon (VEC) | <ul style="list-style-type: none"> • To address uncertainties with respect to the behavioural response of sturgeon to disturbances during construction and the initial period of reservoir creation. • To assess the need for further mitigation with respect to fish passage. • To determine whether predicted effects to spawning activity and young-of-the-year survival occur during construction and after full supply level is reached and record performance of constructed habitat. • To determine whether the reservoir and Stephens Lake provide suitable habitat for sub-adult and adult lake sturgeon, as predicted in the EIS. • To determine the survival of stocked fish. • To determine whether predicted positive effects to the regional sturgeon population occur. | <ul style="list-style-type: none"> • Monitoring movement of adult lake sturgeon using long-term telemetry tags, including individuals transported from Stephens Lake to the reservoir. • Monitoring of fish behaviour immediately downstream and upstream of the GS to provide information for the modification of upstream and downstream fish passage methods, if required. • Monitoring of the frequency and survival of fish passing the station via the turbines or spillway. • Sampling for spawning and young-of-the-year sturgeon in predicted locations after full supply level is reach, including constructed habitats. Continue year-class strength monitoring in Gull and Stephens lakes. • Sampling of sub-adult and adult lake sturgeon and measurement of relative abundance, condition and other indicators of fish health, and population size. • Marking and sampling of stocked fish. • Sampling to estimate population size in the region (Kelsey GS to Kettle GS). | <p>Varying frequency depending on the program. Annually of selected components during in-stream construction and the first three years after full supply level is reached and then at least every five years for the following 20-30 years, or longer, depending on the program and results.</p> <p>Monitoring of lake sturgeon populations will continue in conjunction with mitigation programs such as stocking until stocking/habitat mitigation create self-sustaining populations.</p> |

Table 8-3: Monitoring and Follow-Up Plans for the Aquatic Environment

| Supporting Topic or VEC | Issue/Rationale | Monitoring | Timelines |
|--|--|--|---|
| <p>Lake whitefish, walleye (pickerel), and northern pike (jackfish) (VEC)</p> <p>Note that these species are also addressed in the fish community, above).</p> | <ul style="list-style-type: none"> To verify that habitat to support spawning is available in the reservoir and downstream, and that constructed habitat is functioning as intended. To assess the need for further mitigation with respect to fish passage. | <ul style="list-style-type: none"> Monitoring for spawning activity/larval fish, at locations where these would be expected to occur post-Project, including on constructed habitats. Monitoring of fish movements, including individuals transported from Stephens Lake to the reservoir. Monitoring of fish behaviour immediately downstream and upstream of the GS to provide information for the modification of upstream and downstream fish passage methods, if required. Monitoring of the frequency and survival of fish passing the station via the turbines or spillway. | <p>Sampling for spawning and larval fish would occur at a minimum every two years during construction and annually during the first three years after full supply level is reached and then at a minimum every five years for the following 20-30 years, depending on results.</p> <p>Fish movement studies would occur for the first five years after full supply level is reached; further monitoring would depend on results and subsequent development of fish passage.</p> |

Table 8-3: Monitoring and Follow-Up Plans for the Aquatic Environment

| Supporting Topic or VEC | Issue/Rationale | Monitoring | Timelines |
|---|---|---|---|
| Mercury in fish flesh (Supporting Topic) | <ul style="list-style-type: none"> To verify predicted increases in mercury levels in fish in the Keeyask reservoir and Stephens Lake and address uncertainties regarding the duration and magnitude of increases. Results will be used in health communications undertaken in mercury-in-food programs outlined in the Socio-Economic and Resource Use mitigation sections in Chapter 6. | <ul style="list-style-type: none"> Monitoring of mercury levels in selected fish species in the Keeyask reservoir and Stephens Lake. To address concerns of the KCNs, sampling will also be conducted in Split Lake and tributaries such as the Aiken River where no increase is predicted. | Annually after full supply levels are reached until maximum levels are recorded and then every three years thereafter until concentrations reach stable levels. |

8.2.3 TERRESTRIAL ENVIRONMENT MONITORING

Monitoring will be required to verify the long-term effects of the Project on the terrestrial environment. As outlined in Table 8-4, the recommended monitoring and follow-up includes both VECs and some supporting topics during the construction and operation phases. While this table provides a preliminary summary of the topics requiring monitoring, information on the methods and procedures are outlined in the Terrestrial Environment Supporting Volume and will be provided in further detail in a Terrestrial Effects Monitoring Plan.

Monitoring is planned for situations where ATK and technical assessments differ, where a prediction has substantial uncertainty, or where a difference between predicted and actual residual effects could substantially alter the effects assessment.

Table 8-4: Monitoring and Follow-Up Plans for the Terrestrial Environment

| Supporting Topic/ VEC | Issue/Rationale | Monitoring | Timelines |
|---|---|---|--|
| Terrestrial Habitat and Ecosystems | | | |
| Terrestrial habitat (Supporting Topic) | <ul style="list-style-type: none"> To verify the predicted amounts and composition of direct and indirect habitat loss, alteration and disturbance during construction and operation. To verify the effectiveness of rehabilitation efforts in temporarily cleared or modified areas. | <ul style="list-style-type: none"> Measure direct habitat loss and disturbance, by habitat type, in the Project Footprint. Measure indirect habitat loss and change, by habitat type, in areas where indirect effects are predicted to occur. Monitor under storey vegetation and soil effects in areas where indirect effects are predicted to occur. Collect vegetation and soils data in the rehabilitated areas to assess degree of habitat recovery. | <p>Once at the end of construction.</p> <p>Periodically during first 30 years of operation, with frequency decreasing over time.</p> <p>Periodically during first 30 years of operation, with frequency decreasing over time.</p> <p>Periodically after regeneration is implemented, until vegetation is successfully established.</p> |
| Ecosystem Diversity (VEC) | <ul style="list-style-type: none"> To verify that the priority habitat patches that are to be avoided are not disturbed. | <ul style="list-style-type: none"> Monitor to confirm avoidance of priority habitat patches. | Regularly during clearing activities. |
| Fire regime (Supporting Topic) | <ul style="list-style-type: none"> To confirm the Project does not create large accidental fires. | <ul style="list-style-type: none"> In the event that any accidental Project-related fires occur, document the amount and composition of affected habitat and subsequent regeneration. | Contingent upon the nature of the event, if it occurs. |

Table 8-4: Monitoring and Follow-Up Plans for the Terrestrial Environment

| Supporting Topic/ VEC | Issue/Rationale | Monitoring | Timelines |
|------------------------------|--|---|---|
| Intactness (VEC) | <ul style="list-style-type: none"> To confirm that portions of trails that are blocked and revegetated are successfully regenerating. To verify Project effects on linear feature density and core area abundance. | <ul style="list-style-type: none"> Collect vegetation data in the rehabilitated portions of linear features to assess degree of vegetation regeneration. Measure linear features associated with Project development. Monitor the contribution of habitat recovery to increased core area using terrestrial habitat monitoring data. | <p>Periodically after regeneration is implemented.</p> <p>Once at end of construction.</p> <p>Once after revegetation is successfully established.</p> |
| Wetland function (VEC) | <ul style="list-style-type: none"> To verify predicted Project effects on wetlands. To verify effectiveness of wetland mitigation measures. | <ul style="list-style-type: none"> Monitor the amount and composition of inland wetland loss and alteration. Sample shoreline wetlands in areas that may be indirectly affected by groundwater changes and edge effects. Collect vegetation, soils and other environmental data in the wetland mitigation areas to assess degree of wetland development. | <p>See Terrestrial Habitat Monitoring Section.</p> <p>Periodically during first 30 years of operation, with frequency declining as reservoir expansion slows.</p> <p>Periodically after measures are implemented, as needed to assess success of wetland establishment.</p> |

Table 8-4: Monitoring and Follow-Up Plans for the Terrestrial Environment

| Supporting Topic/ VEC | Issue/Rationale | Monitoring | Timelines |
|--|--|--|---|
| TERRESTRIAL PLANTS | | | |
| Priority plants (VEC) | <ul style="list-style-type: none"> To verify that the priority plant patches that are to be avoided are not disturbed. To verify predicted effects on priority plant species. | <ul style="list-style-type: none"> Monitor to confirm avoidance of priority plant patches. Monitor effects on priority plants and their habitat using terrestrial habitat monitoring data. | <p>Regularly during clearing activities.</p> <p>See Terrestrial Habitat Monitoring Section.</p> |
| Invasive plants (Supporting Topic) | <ul style="list-style-type: none"> To verify that mitigation measures limit the further introduction and spreading of invasive non-native plants. | <ul style="list-style-type: none"> Conduct invasive plant surveys within and near to the Project Footprint. | <p>Periodically during construction and first five years of operation.</p> |
| AMPHIBIANS | | | |
| Priority amphibians (Supporting Topic) | <ul style="list-style-type: none"> To verify predicted effects of the Project on amphibians. | <ul style="list-style-type: none"> Monitor changes in the distribution of amphibians within the Regional Study Area. | <p>Annually during the first three years of operation and periodically until shoreline wetland habitat re-establishes.</p> |
| BIRDS | | | |
| Mallard and Canada Goose (VECs) | <ul style="list-style-type: none"> To verify predicted effects of the Project on waterfowl. To verify success of nesting platforms/boxes to enhance mallard breeding habitat in suitable wetlands. | <ul style="list-style-type: none"> Monitor to assess abundance and distribution of waterfowl within the Regional Study Area. Monitor success of nesting platforms/boxes. | <p>Annually during the first three years of operation, and periodically until shoreline wetland habitat re-establishes.</p> <p>Annually during the first two years of deployment.</p> |

Table 8-4: Monitoring and Follow-Up Plans for the Terrestrial Environment

| Supporting Topic/ VEC | Issue/Rationale | Monitoring | Timelines |
|--|---|--|--|
| Bald Eagle (VEC) | <ul style="list-style-type: none"> To verify predicted effects of the Project on bald eagle. To verify success of any nesting platforms established to replace nests disturbed by the Project. | <ul style="list-style-type: none"> Monitor to assess the distribution and abundance of bald eagles along the Nelson River. Monitor to assess the effectiveness of any installed nesting platforms. | <p>Annually during the first three years of operation.</p> <p>Annually for the first three years following platform installation.</p> |
| Olive-sided Flycatcher (VEC), Rusty Blackbird (VEC), Common Nighthawk (VEC), and Other Species at Risk (Supporting Topic). | <ul style="list-style-type: none"> To verify the predicted effects of the Project on bird species at risk. | <ul style="list-style-type: none"> Monitor listed species' abundance and distribution within the Regional Study Area. | <p>Annually during construction and for the first three years of operation.</p> |
| Colonial waterbirds (Supporting Topic) | <ul style="list-style-type: none"> To verify the predicted effects of the Project on colonial waterbirds. To verify the effectiveness of mitigation measures to offset losses in colonial waterbird breeding habitat. | <ul style="list-style-type: none"> Monitor abundance and distribution of colonial waterbirds within the Regional Study Area. Monitor the effectiveness of mitigation measures implemented for colonial waterbirds. | <p>Annually during the first three years of operation.</p> <p>Annually during the first three years of operation or until mitigation measures are deemed to be successful.</p> |

Table 8-4: Monitoring and Follow-Up Plans for the Terrestrial Environment

| Supporting Topic/ VEC | Issue/Rationale | Monitoring | Timelines |
|----------------------------------|---|--|--|
| Ruffed grouse (Supporting Topic) | <ul style="list-style-type: none"> To verify the predicted effects of the Project on ruffed grouse. | <ul style="list-style-type: none"> Monitor ruffed grouse abundance and distribution along north and south access roads and in other suitable ruffed grouse habitat located within the Regional Study Area. | Annually during construction. Annually during the first three years of operation, and periodically until disturbed habitat re-establishes. |
| MAMMALS | | | |
| Caribou (VEC) | <ul style="list-style-type: none"> To address uncertainties with respect to cumulative effects and the viability of caribou populations in the lower Nelson River region. To verify direct and indirect predicted effects to summer resident caribou and habitat and evaluate performance of mitigation measures. To address uncertainties associated with productivity, distribution, movements and accidental caribou mortality. | <ul style="list-style-type: none"> Monitoring vital measures of caribou populations including productivity, mortality and recruitment using sample counts and records from the lower Nelson River Area. Sampling, site records and mapping for summer resident caribou calving and rearing habitat effects in areas associated with Project effects. Collect caribou activity, movements, and mortality data in areas where effects are predicted to occur. | <p>Regularly during construction and continuing for up to 30 years of operation, depending on results.</p> <p>Regularly during construction and continuing for up to 30 years of operation, depending on results.</p> <p>Regularly during construction and continuing for up to 30 years of operation, depending on results.</p> |

Table 8-4: Monitoring and Follow-Up Plans for the Terrestrial Environment

| Supporting Topic/ VEC | Issue/Rationale | Monitoring | Timelines |
|-----------------------|--|---|--|
| Moose (VEC) | <ul style="list-style-type: none"> To determine whether predicted effects to moose habitat occur and to evaluate performance of mitigation measures. To address uncertainties associated with productivity, distribution and accidental moose mortality. To address uncertainties with respect to the redistribution of harvest effort affecting the viability of moose in Split Lake Resource Management Area. | <ul style="list-style-type: none"> Sampling, site records and mapping for moose habitat effects in predicted locations. Collect moose activity, movements, and mortality data in areas where effects may occur. Monitor vital measures of moose population including productivity, mortality and recruitment using sample counts and records from the Split Lake Resource Management Area. Use special moose management units, harvest strategies and models to project the future population and adjust protocols as needed. | <p>Regularly during construction and continuing for up to 30 years of operation, depending on results.</p> <p>Regularly during construction and continuing for up to 30 years of operation, depending on results.</p> <p>Regularly during construction and continuing for up to 30 years of operation, depending on results.</p> |

Table 8-4: Monitoring and Follow-Up Plans for the Terrestrial Environment

| Supporting Topic/ VEC | Issue/Rationale | Monitoring | Timelines |
|--|---|--|---|
| Beaver (VEC) | <ul style="list-style-type: none"> To verify whether predicted effects to regional beaver population occur. To address uncertainties of future habitat quality in the reservoir, wetland mitigation areas, and adjacent creeks. | <ul style="list-style-type: none"> Monitor beaver population in locations within the Project Footprint and the Regional Study Area post-impoundment using counts. Monitor the removal of beaver (and muskrat) during reservoir clearing and adjusting protocol as needed. Monitor habitat changes during operation using mapping. | <p>Regularly during construction and continuing for up to 15 years of operation, depending on results.</p> <p>Regularly during reservoir clearing activities.</p> <p>Periodically during operation, for up to 15 years.</p> |
| Rare or Regionally Rare Species (Supporting Topic) | <ul style="list-style-type: none"> To address uncertainties with respect to the behavioural response of little brown myotis and wolverine associated with Project disturbances. | <ul style="list-style-type: none"> Monitor little brown myotis and wolverine abundance in the Gull and Stephens lakes area using sample counts and marking measures. | <p>Annually during construction, annually during the first five years of operation, and then every five years for up to 30 years of operation, depending on results.</p> |

Table 8-4: Monitoring and Follow-Up Plans for the Terrestrial Environment

| Supporting Topic/ VEC | Issue/Rationale | Monitoring | Timelines |
|--|---|---|---|
| Gray Wolf and Other Predators (Supporting Topic) | <ul style="list-style-type: none"> To address uncertainties with respect to the behavioural response of predators associated with disturbances and habitat effects. | <ul style="list-style-type: none"> Monitoring gray wolf and black bear distribution and abundance using sample counts and marking measures. | Annually during construction, annually during the first five years of operation, and then every five years until caribou and moose monitoring is concluded. |
| Other Mammals (Supporting Topic) | <ul style="list-style-type: none"> To confirm effects predictions where problem wildlife control measures are implemented in construction camps and worksites. | <ul style="list-style-type: none"> Monitor relocation and mortality of black bear, gray wolf, red fox, arctic fox and beaver using site records. | Regularly during construction. |
| Mercury in Wildlife (Supporting Topic) | <ul style="list-style-type: none"> To verify predicted increases and address uncertainties regarding duration of mercury levels in country foods and top-level predators during operation. | <ul style="list-style-type: none"> Monitor mercury levels in beaver, muskrat, river otter and mink, and in other wild game samples voluntarily supplied in the Keeyask and Stephens Lake areas, and in nearby off-system areas where no increase in mercury levels is predicted. | Annually during operation until maximum levels are reached and then every three years until concentrations reach pre-impoundment levels (up to 30 years). |

8.2.4 SOCIO-ECONOMIC ENVIRONMENT MONITORING

Monitoring of socio-economic effects will be organized into a coordinated Socio-Economic Monitoring Plan (SEMP), the details of which will be developed after the Project has been filed. It will be adjusted upon receipt of the Project's approvals and licence to incorporate any required terms of the licence. The program will define in detail the process, scope, methods, documentation and application of the socio-economic monitoring for the Project. It will be part of a larger strategy to identify where the proposed approaches to conducting the Project and mitigating its effects may have to be adjusted in order to address observed Projects effects that do not align with what had been predicted. This adaptive management approach will be inherent in the design and implementation of the SEMF.

The plan will be designed to satisfy licence conditions and to address monitoring proposals set out in the EIS.

The SEMF will be developed by the Partnership with representatives of the KCNs expected to play a central role in its development and implementation.

Table 8-5 summarizes the monitoring and follow-up programs for the socio-economic environment; more information is provided in the Socio-Economic Supporting Volume under each VEC.

Table 8-5: Monitoring and Follow-Up Plans for the Socio-Economic Environment

| Supporting Topic or VEC | Issue/Rationale | Monitoring | Timelines |
|---|---|--|---|
| Economy¹ | | | |
| Employment and Training Opportunities (VEC) | <ul style="list-style-type: none"> To determine overall employment outcomes of Project construction, with particular emphasis on Aboriginal and northern resident employment outcomes. To determine extent to which recipients of pre-Project training (HNTEI) participated in Keeyask construction jobs, and received on the job training. | <ul style="list-style-type: none"> Track total opportunity available including the amount (<i>e.g.</i>, total person years) and type (<i>e.g.</i>, job classification) of work available, and the total number of hires and total number of employees. Breakdown by Aboriginal, non-Aboriginal, northern, Manitoban and CBN region. Collect trainee status by on-site contractors and Manitoba Hydro, including information on trainee participation in HNTEI pre-Project training, trainee designation and apprenticeship level at the point of hire, at the point of separation and at any point during employment when reclassification occurs. | During the construction period. |
| Business Opportunities (VEC) | <ul style="list-style-type: none"> To track construction business outcomes of Project construction, with particular focus on the KCNs, Aboriginal and northern business participation, and to understand any indirect business opportunities generated as a result of Project-related expenditures in Gillam, Thompson and the KCNs communities. | <ul style="list-style-type: none"> Track direct purchases made by the Partnership. At the peak of the General Civil Contract, undertake a Key Person Interview program in Thompson, Gillam and each of the KCNs communities to ascertain any indirect business opportunities generated as a result of the Project. Conduct KPIs of key participants involved in managing the DNCs. | <p>Annually during construction.</p> <p>Business Survey: Yr 3 or 4: mid-way through the general civil contract, coinciding with peak construction activity.</p> |

¹ Socio-economic monitoring is not required for Economy VECs Cost of Living and Resource Economy during the Construction phase. Monitoring for Economy VECs is not required during the operation phase.

Table 8-5: Monitoring and Follow-Up Plans for the Socio-Economic Environment

| Supporting Topic or VEC | Issue/Rationale | Monitoring | Timelines |
|--|--|---|---|
| Income (VEC) | <ul style="list-style-type: none"> To determine the levels of employment income generated by Project construction, particularly for KCNs and CBN region employees. | <ul style="list-style-type: none"> Estimate total labour income generated by the Project based on total person-years of employment generated by the Project and applicable wage rates from the BNA. Break down of labour income by the KCNs, CBN region, Aboriginal, non-Aboriginal, northern, Manitoban. | During the construction period. |
| Population, Infrastructure and Services¹ | | | |
| Population (Supporting Topic) | <ul style="list-style-type: none"> Confirm extent of Project-induced in-migration in the KCNs communities and Gillam. Confirm EA prediction that there is minimal Project-induced in-migration in the KCNs communities and Gillam. Population growth in Gillam in response to operation employment will increase the demand for housing, infrastructure and services. | <ul style="list-style-type: none"> Track overall trends in the population of Gillam and the KCNs communities, including in- and out-migration. If construction related in-migration is greater than anticipated, undertake KPIs to understand the influence of the Project on population. Monitor population change in Gillam to enable service providers and community planning process to plan and respond to anticipated change. | <p>During the construction period.</p> <p>During the operation period (first five years).</p> |
| Housing (VEC) | <ul style="list-style-type: none"> To confirm EA prediction of minimal demand on housing in KCNs communities and Gillam due to the Project. To determine any Project effects on infrastructure and provision of services. | <ul style="list-style-type: none"> Gillam: Demand for housing is considered in the Gillam Land Use Planning process. Monitor population changes in Gillam. See above. KCNs: Conduct a one-time set of KPI's with representatives of the Housing Authorities in the KCNs. Monitor population changes. See above. | During the construction period. |

¹ Monitoring is not required for Population, Infrastructure and Services VECs of Land and Transportation Infrastructure during the construction phase; and for Land during the operation phase.

Table 8-5: Monitoring and Follow-Up Plans for the Socio-Economic Environment

| Supporting Topic or VEC | Issue/Rationale | Monitoring | Timelines |
|--|--|---|---|
| Housing – Gillam (VEC) | <ul style="list-style-type: none"> Increases in population in Gillam re: operation employment; part of planning process. | <ul style="list-style-type: none"> Demand for housing is considered in the Gillam Land Use Planning process. Monitor population changes in Gillam. See above. | During the operation period (first five years). |
| Infrastructure and Services - KCNs (VEC) | <ul style="list-style-type: none"> To confirm EA prediction of minimal effect on KCNs infrastructure and services due to the Project. | <ul style="list-style-type: none"> Conduct a one-time set of KPIs with contractors and service providers in the KCNs communities. | 2 nd or 3 rd year of construction period. |
| Infrastructure and Services – Gillam (VEC) | <ul style="list-style-type: none"> To understand the effects from an influx of non-local construction workers on demand for infrastructure and services. Increases in population in Gillam re: operation employment; part of planning process. | <ul style="list-style-type: none"> Work with Manitoba Hydro, Town of Gillam and Fox lake Cree Nation to assess related effects from an influx of workers. Assess demand on infrastructure and services in Gillam to feed into ongoing community planning process. | <p>During the construction period.</p> <p>During the operation period (first five years).</p> |
| Transportation Infrastructure (VEC) | <ul style="list-style-type: none"> Concerns about the predicted effects on open water levels at Split Lake that could affect ferry service, landing sites and the winter road. | <ul style="list-style-type: none"> Monitor water levels at Split Lake and inform TCN and YFFN of the results. | During the operation period– annually. |

Table 8-5: Monitoring and Follow-Up Plans for the Socio-Economic Environment

| Supporting Topic or VEC | Issue/Rationale | Monitoring | Timelines |
|---|---|--|--|
| Personal, Family and Community Life – Construction Phase^{1 2} | | | |
| Public Safety and Worker Interaction (VEC) | <ul style="list-style-type: none"> There is potential for adverse interactions between non-local construction workers and TCN and FLCN Members and Gillam residents. Mechanism to help identify incidents and enable process to address problems with construction workforce. | <ul style="list-style-type: none"> Manitoba Hydro, working with FLCN and TCN (where appropriate) will determine the best mechanism to track the number and type of adverse incidents on a regular basis, including possible discussion with local justice and social agencies in the gathering of data. Work closely with RCMP in Thompson, Gillam and other KCNs communities. | During the construction period. |
| Travel, Access and Safety (VEC) | <ul style="list-style-type: none"> Community concern regarding increased traffic on PR 280. Community concern regarding ice and open water travel. To monitor the safety of open water, ice crossing and ice trails. Travel, access and safety are concerns for KCNs Members who use Split and Gull lakes for traditional activities. To monitor the safety of open water, ice crossing and ice trails | <ul style="list-style-type: none"> Road travel – Track statistics collected by MIT on traffic-related incidents and complaints on PR280. Ice and Open water travel – Monitoring from Split Lake to Stephens Lake is contained under the Waterways Management Program Phase I (Sch. 11-2 of the JKDA). Monitoring from Split Lake to Stephens Lake is contained under the Waterways Management Program Phase II (Sch. 11-2 of the JKDA). | <p>During the construction period.</p> <p>During the operation period.</p> |

¹ Socio-economic monitoring for the Personal Family and Community Life VECs Community Health, Mercury and Human Health and the Way the Landscape Looks (Aesthetics) is not required during the construction phase. The Way the Landscape Looks is expected to be addressed in the ATK monitoring program.

² Monitoring for the Personal Family and Community Life VECs Governance, Goals and Plans, Community Health, Public Safety/Worker Interaction and The Way the Landscape Looks (Aesthetics) is not required during the Operation Phase. Governance, Goals and Plans and the Way the Landscape Looks are expected to be addressed through the ATK monitoring program.

Table 8-5: Monitoring and Follow-Up Plans for the Socio-Economic Environment

| Supporting Topic or VEC | Issue/Rationale | Monitoring | Timelines |
|--------------------------------|---|---|--|
| Culture and Spirituality (VEC) | <ul style="list-style-type: none"> Uncertain how much the construction phase of the Project will affect culture of KCNs. Uncertain about how employment experience during Project construction will affect the culture of workers and their families. | <ul style="list-style-type: none"> Adverse Effects Agreements have been negotiated with each of the KCNs based on each community's assessment of the Project's potential effects, including any interference with its traditional customs and practices. On an annual basis, each community undertakes its own internal evaluation of the AEA offsetting programs and determines whether they continue to address the adverse effects of the Project. If required, these agreements provide flexibility for the AEA offsetting programs to be modified to more adequately address Project effects as they are experienced. | <p>KCNs community Review and Evaluation: During the construction period.</p> |
| | <ul style="list-style-type: none"> Uncertain how much operation of the Project will affect the culture of KCNs. | <ul style="list-style-type: none"> Conduct a worker and family survey of a sample of KCNs workers employed on Project construction and their families to assess employment experience such as cross-cultural awareness training, work and camp life, counselling, ceremonies, effects on family, community life and traditional life. | <p>Worker family survey in the third year of construction.</p> |
| | | <ul style="list-style-type: none"> As noted above under construction, the AEAs have been negotiated with each of the KCNs and include an annual evaluation; as well as flexibility to modify the AEA offsetting programs to more adequately address Keeyask Generation Project effects as they are experienced. | <p>Operation period.</p> |

Table 8-5: Monitoring and Follow-Up Plans for the Socio-Economic Environment

| Supporting Topic or VEC | Issue/Rationale | Monitoring | Timelines |
|--------------------------------|--|--|--|
| Mercury and Human Health (VEC) | <ul style="list-style-type: none"> Increase in mercury levels in country foods used by local communities; mitigation component. | <ul style="list-style-type: none"> Mercury monitoring undertaken under the Aquatic and Terrestrial Monitoring Programs re: country foods. Collection on voluntary basis of samples of wild game, waterfowl and plants for mercury testing to confirm mercury concentrations remain acceptable for domestic consumption. Conduct periodic survey of consumption of country food in KCNs communities. | <p>Post-impoundment: on annual basis or until mercury levels return to baseline conditions.</p> <p>For food consumption survey, every five years starting in 2022.</p> |

8.2.5 RESOURCE USE MONITORING

Many of the monitoring needs for resource use overlap with monitoring for other environmental components due to resource user reliance on fish (Section 8.2.2), plants (Section 8.2.3), birds (Section 8.2.3) and mammals (Section 8.2.3) for domestic and commercial pursuits and the ability to safely access resource harvest areas (Section 8.2.6).

Though all KCNs Members have been provided substitute opportunities to participate in AEA offsetting programs in unaffected locations, it is expected that domestic resource use will continue to be practiced in the resource use Local Study Area by authorized KCNs resource users. The Keeyask Generation Project Construction Access Management Plan (Construction AMP) is expected to limit workforce fishing and prohibit harvest of wildlife by not allowing recreational vehicles (*i.e.*, ATVs and boats) and firearms on the Project site (as per Keeyask Camp Rules). The Construction AMP will also prevent unauthorized use of the area by the public. Despite these measures, KCNs concerns remain with respect to workforce harvest competing for domestic resources. Hunting of wildlife resources will be prohibited on site by the construction workforce, therefore only workforce harvest of fish will be monitored.

Harvesting activities conducted by domestic resource users authorized to harvest within the Project site will be monitored at the north and south access gates. Annual interviews will also be conducted with the Environmental Officer (see Section 8.3.2 for definition) to investigate and monitor any fish harvest by construction workers.

In the resource use Regional Study Area, where increasing domestic resource use is expected from AEA offsetting program participation, monitoring traditionally practiced by KCNs resource users is expected to result in sustainable use of resources. The CNP have also developed moose and fish harvest sustainability plans to address the long-term sustainability of these species in the Split Lake RMA in cooperation with the Split Lake Resource Management Board.

Increasing populations in Gillam in the operations phase may increase recreational resource use, which is expected by the KCNs to compete for domestic resources. Monitoring of non-Aboriginal recreational harvest undertaken by Gillam residents is not proposed, as this is a provincial management responsibility. Local resource management boards (Split Lake, York Factory and Fox Lake), which are comprised of representatives from First Nations, Provincial Government and Manitoba Hydro, are expected to provide the venue for communication on resource harvesting conflicts and allow for appropriate responses to potential increases in recreational resource use during construction and operation. It should be noted that after conservation, domestic resource by Aboriginal people is given priority by provincial management agencies when allocating resources for harvest.

Resource use observations and ATK may be communicated through the ATK monitoring site visits as part of ATK monitoring programs (Section 8.2.7).

Table 8-6 provides a summary of monitoring and follow-up program timelines for issues that may affect resource use and associated environmental components.

Table 8-6: Monitoring and Follow-Up Program for Resource Use

| Supporting Topic or VEC | Issue/Rationale | Monitoring | Timelines |
|--|--|--|--|
| Domestic Fishing (VEC) | <ul style="list-style-type: none"> To determine if the construction workforce is increasing competition for fish resources that, in turn, would affect domestic fishing success. | <ul style="list-style-type: none"> As part of the resource use monitoring plan, ongoing access gate monitoring will document harvest within the Project site. Annual interviews with the Environmental Officer will investigate and monitor workforce harvest. | During the construction period. |
| Domestic Fishing (VEC) | <ul style="list-style-type: none"> To understand changes to the quality and availability of fish resources for domestic use. | <ul style="list-style-type: none"> See aquatic environment monitoring plan for fish abundance (fish community and lake sturgeon) and quality monitoring (mercury in fish flesh). See socio-economic monitoring plans (mercury and human health). | During the operation period. |
| Domestic Fishing (VEC); Domestic Hunting and Gathering (VEC) | <ul style="list-style-type: none"> To address resource user safety and access to domestic harvest locations as potentially affected by changing water and ice conditions in the local study area. | <ul style="list-style-type: none"> Waterways Management Program will monitor issues relating to travel, access and safety. | During the construction and operation periods. |
| Domestic Hunting and Gathering (VEC) | <ul style="list-style-type: none"> To understand if construction and operation disturbances will reduce local study area wildlife abundance, in turn, potentially affecting hunting success. | <ul style="list-style-type: none"> See terrestrial monitoring plans (moose, caribou, beaver, mallard and Canada goose) population monitoring. | During the construction and operation periods. |

8.2.6 HERITAGE RESOURCES MONITORING

As outlined in Chapter 6, heritage resources are at risk during construction and operation phases of the Project. Mitigation measures, as outlined in the Heritage Resources Protection Plan and periodic shoreline surveys implemented with the Waterways Management Program, will assist in protecting or removing existing heritage resources when avoidance or buffering of these sites may not be possible. Environmental Officers will be trained to identify heritage resources and offer proper courses of action, which will include contacting the Project Archaeologist and appropriate government authorities. When required, the Project Archaeologist will implement prescribed archaeological protection measures. However, uncertainty exists as to the effect on undiscovered heritage resources over the duration of the Project's lifespan. The KCNs communities have provided information on the presence of burial locations within the Gull Lake area, which have not yet been physically located. On-going monitoring as a mitigation measure is a viable solution for unknown heritage resources and/or burial locations.

Table 8-7: Monitoring and Follow-Up Program for Heritage Resources

| Supporting Topic or VEC | Issue/Rationale | Monitoring | Timelines |
|--------------------------------|--|--|---|
| Heritage Resources (VEC) | <ul style="list-style-type: none"> Loss of heritage resources, unknown heritage resources and/or burials; mitigation component. Reclamation of disturbed sites along shorelines. Protection and preservation of heritage resources. | <ul style="list-style-type: none"> As part of the Waterways Management Program (JKDA, Schedule 11-2), monitor shoreline, plan and implement the remaining protection and preservation measures at high priority, spiritually and culturally significant, historical or heritage sites. Implement Heritage Resources Protection Plan upon potential discovery of heritage resources or human remains. | <ul style="list-style-type: none"> During the construction period Continual involvement of Environmental Officers. Periodic shorelines surveyed, as required. During the operation Phase: Periodic shorelines surveyed, as required. |

8.2.7 ABORIGINAL TRADITIONAL KNOWLEDGE MONITORING PROGRAMS

Each of the KCNs is working with Manitoba Hydro (on behalf of the Partnership) to develop community-specific ATK monitoring programs for the Keeyask Generation Project. These ATK monitoring programs will be based on Cree perspectives and understandings about the potential effects of the Project, and related activities will take place at key milestones during the Project's construction and operation phases. KCNs involvement in Project monitoring will facilitate capacity building by providing employment and training opportunities for KCNs Members in environmental and socioeconomic monitoring over the life of the Project and into the future.

It is expected that ATK monitoring will involve the development and implementation of annual monitoring programs based on construction and/or operational activities and related community concerns about potential effects. As part of these programs, the following types of activities are anticipated:

- Site visits by Elders, resources users and others to observe and communicate conditions on lands and waters before, during and following key Project milestones. The results of these site visits will ensure that ATK is an integral part of assessing the accuracy of predictions in the Project EIS, and the efficacy of mitigation measures. The involvement of youth will also ensure that the ATK held by Elders and resources users is passed on to the next generation, and that there is long-term continuity in the monitoring programs.
- Community-based activities to monitor socio-economic Project effects on the personal, family and community lives of Members, and the effectiveness of related mitigation measures. This could include working directly with community agencies to ensure a coordinated response to Project effects at the community level and activities such as conducting workshops and key-person interviews.
- The involvement of community Members in scientific-based monitoring programs. The KCNs will continue to be actively involved in the development of scientific monitoring programs through their participation in the Partnership through the Monitoring Advisory Committee (MAC) and the Board of Directors. Community Members will also continue to work on field programs with the scientific monitoring team.
- Facilitating communication among Hydro and its Partner communities through various forums, such as open houses, for the purpose of keeping community Members updated on Project activities, adverse effects, and proposed mitigation strategies.

8.3 ENVIRONMENTAL PROTECTION PROGRAM IMPLEMENTATION

As noted previously, the Environmental Protection Program is multi-faceted and includes implementation of an Environmental Protection Plan, management plans, additional Project mitigation activities outlined in the EIS and ongoing Project monitoring. Various aspects of these activities will take place prior to and during Project construction and many will continue into Project operation.

Manitoba Hydro, acting on behalf of the Partnership, is responsible for overall implementation of the Environmental Protection Program. In this capacity, Manitoba Hydro will be guided both by discussions with the KCNs through the Project's MAC and the Partnership Board of Directors, and ongoing communication with Regulators.

The following sections describe implementation of the various activities to be undertaken as part of the Environmental Protection Program, starting with a focus on the communication mechanisms in place to ensure ongoing involvement of regulators and the KCNs.

8.3.1 PARTNERSHIP AND REGULATORY COMMUNICATION

8.3.1.1 WORKING AS PARTNERS

The Partnership is committed to environmental stewardship and have agreed that long-term success of the Environmental Protection Program requires equal consideration of both ATK and technical science. Although Manitoba Hydro is responsible for construction and operation of the Keeyask Generation Project, the Partnership has put mechanisms in place to ensure that all partners are involved in implementing the Program and reviewing Program outcomes. There are two key mechanisms in place to accomplish this goal: 1) the Keeyask MAC and the Partnership Board of Directors; and 2) ATK monitoring to be undertaken by each of the KCNs. Together, it is anticipated that these two activities will improve understanding and respect among the partners, foster an environment of sharing and collaboration in undertaking environmental stewardship activities and lead to the implementation of a more robust environmental protection program.

The MAC is an advisory committee to the Partnership Board of Directors and will review the outcomes of programs outlined in the Environmental Protection Program and, if appropriate, may provide advice and recommendations to the Partnership on additional or alternative mitigation measures that may be required. The committee will be comprised of Manitoba Hydro representatives involved in the Environmental Protection Program and participants from each of the KCNs. It is anticipated that the outcomes of both the technical science and ATK monitoring programs, as well as those of other aspects of the

Environmental Protection Program, will be reviewed and discussed at the MAC. In this way, the MAC will provide a forum for ensuring collaboration among all partners on these activities and an opportunity to review and discuss outcomes from both a western science and ATK perspective. On behalf of the Partnership, the MAC will also ensure that the outcomes of the Environmental Protection Program are communicated more broadly on an annual basis to Members of the KCNs communities, regulators and the general public.

8.3.1.2 WORKING WITH REGULATORS

Licences and regulatory approvals for the proposed Project require environmental and compliance monitoring and production of monitoring reports. Regulatory authorities will be notified by the Project Manager or by a delegate about situations where the environment is affected that were not previously predicted. Full cooperation will be given to environmental regulators conducting inspections and a Project staff member will be available to escort the regulator around the construction site and answer questions and discuss concerns as required.

8.3.1.3 REPORTING

In fulfillment of the Project *Environment Act* licence and *Fisheries Act* authorization requirements, reports will be submitted by Manitoba Hydro (on behalf of the Partnership) to Manitoba Conservation and Water Stewardship and Fisheries and Oceans Canada in accordance with the schedule outlined in these approvals. Reports that will be prepared include:

- A compliance monitoring report in connection with the EnvPP;
- Technical reports of the activities and results of the monitoring plans including the outcomes of both ATK and western scientific monitoring; and
- In addition to the reports prepared for the regulator a summary document of all monitoring activities will be prepared annually by the Partnership for the KCNs and the general public.

8.3.2 ENVIRONMENTAL PROTECTION PLAN IMPLEMENTATION

For the Keeyask Generation Project two EnvPPs are being prepared to assist in reducing the impact of construction activities. One plan will cover the work associated with the generating station and the other is for the South Access Road. Manitoba Hydro's Construction Manager is ultimately responsible for ensuring that the Project is compliant with the EnvPPs and all regulatory requirements. An Environmental Officer will monitor and report on contractors' compliance with the EnvPPs.

8.3.2.1 TENDERS AND CONTRACTS

All environmental requirements, including the EnvPP, will be included in the tender packages and the binding construction contracts for the Project work. This will require contractors to budget and base their work on meeting the environmental requirements and conducting activities in an environmentally acceptable manner. The selected contractors will be required to comply with and implement the plans.

8.3.2.2 TRAINING AND ORIENTATION

Prior to construction, an environmental orientation program will be developed and delivered to contractors and Manitoba Hydro Project personnel so they are aware of the environmental requirements and sensitivities associated with the Project. They will be familiar with components of the Environmental Protection Program, particularly the EnvPP, as it has direct implications on day-to-day work. Periodic update sessions will occur during construction on specific environmental issues.

The Environmental Officer will receive specific training to fulfill the position including use of the EnvPP, how to perform inspections, reporting incidents and routine reporting, the protocol for emergency response, as well as what resources are available if an environmental issue arises.

8.3.2.3 INSPECTION AND COMPLIANCE

Environmental inspection is an essential function in environmental protection and implementation of mitigation measures. The Environmental Officer will be responsible for undertaking compliance monitoring of the work site to confirm that activities are not in contravention with regulatory requirements or the EnvPP. The inspector will visit work sites daily and record all inspection activities. Any incidents of concern or non-compliance will be recorded and reported so that appropriate action to rectify the problem is implemented.

8.3.2.4 WORKING WITH CONTRACTORS

Meetings will be held regularly with the Project Manager, Resident Engineer, Environmental Officer and contractors to discuss environmental issues and what needs to be done to protect the environment as construction progresses. Compliance with the EnvPP and regulatory requirements will also be included in these meetings.

8.3.2.5 WORK STOPPAGES

Construction activities may be stopped in the event unexpected effects are occurring to the environment or when mitigation measures are proving to be insufficient to prevent a

potential effect. For example, if a heritage resource is discovered, work in the immediate area must be stopped and the find reported.

The Project Manager, Resident Engineer, and Environmental Officer will all have authority to issue stop work orders. The contractor can also voluntarily stop work where circumstances indicate that some environmental damage or harm to heritage resources could result from continuation of a particular activity. Work will not resume until the situation has been assessed and resolved.

8.3.3 IMPLEMENTATION OF MANAGEMENT PLANS

All of the various management plans will be the responsibility of Manitoba Hydro to implement. Various environmental staff both at the construction site and in the Winnipeg office, under the direction of the Project Manager, will be assigned to oversee the implementation of the plans and make the necessary arrangements to have the required processes, procedures, equipment and human resources in place to have them fulfilled.

The plans will each have their own schedule for implementation based on how they are linked to construction activities; the Construction Access Management Plan will be implemented from the first day of construction until it is complete, *i.e.*, the Sediment Management Plan will be operational in advance of any in-stream construction activities in the Nelson River; the Reservoir Clearing Plan will be implemented in the three years prior to impoundment of the reservoir; and the Vegetation Rehabilitation Plan will be activated when areas that have been cleared for construction activities are no longer required.

8.3.4 MONITORING IMPLEMENTATION

The Partnership is proposing to undertake comprehensive monitoring for construction and into operations. Monitoring is outlined in Section 8.2 above and includes both technical, western-science based monitoring and ATK-based monitoring.

The KCNs will be involved in implementation of these monitoring programs in two ways: leading the ATK monitoring program, and working side-by-side with scientists as part of technical science based monitoring. Manitoba Hydro will be responsible for making the arrangements to have the scientific expertise required to carry out the monitoring in place, primarily through contractual arrangements with consulting companies. Manitoba Hydro will oversee the monitoring activities to ensure that the work is being conducted in accordance with the finalized, regulator approved plans.