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9.0 CUMULATIVE EFFECTS ASSESSMENT

9.1 INTRODUCTION

Cumulative effects are changes to the environment that are caused by an action in combination with other past, present and future human actions (Hegmann et al. 1999). The cumulative effects assessment for the Project was conducted with consideration of the guidance provided by the following:

- The Bipole III Transmission Project Environmental Assessment Scoping Document (Manitoba Hydro June 2010);
- The *Canadian Environmental Assessment Act* (1992); and
- Review of other guidance documents for cumulative effects assessment (e.g., Cumulative Effects Assessment Practitioners Guide Hegmann et al. 1999).

The foregoing Scoping Document directed that the framework for this cumulative effects assessment be based upon the work of the Canadian Environmental Assessment Agency (CEAA). Accordingly, it is not inappropriate to note that the CEAA requires that a cumulative effects assessment include any cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out and their significance.

Guidance documents such as the Operational Policy Addressing Cumulative Effects under the *Canadian Environmental Assessment Act* and the Cumulative Effects Practitioners Guide have been used to formulate the Cumulative Effects Assessment EA process.

Additional guidance is also provided by the Cumulative Effects Working Group (CEWG), which was established to give direction on conducting cumulative effects assessments in Canada. In addressing the assessment of a single project, such as is required in this Environmental Impact Statement for the Project, the CEWG states that:

> "… an assessment of a single project (which is what almost all assessments do) must determine if that project is incrementally responsible for adversely affecting a VEC beyond an acceptable point (by whatever definition). Therefore, although the total cumulative effect on a VEC due to many actions (defined as projects and activities) must be identified, the CEA must also make clear to what degree the project under review is alone contributing to that total effect. Regulatory reviewers may consider both of these contributions in their deliberation on the project application (Hegmann et al. 1999)."

9.2 SCOPING CUMULATIVE EFFECTS ASSESSMENT

The spatial boundary considered for the cumulative effects assessment is the broad, regional Bipole III Project Study Area (see Map 1-1). Cumulative effects of the Project are assessed for the construction and operations phases as reviewed in Chapter 4, and residual effects significance continues to be evaluated as set out in Chapter 4, section 4.2.10.

The cumulative effects assessment approach considers those adverse residual effects of the Project on Valued Environmental Components (VECs) (as identified in the effects assessment provided in Chapter 8) that have the potential to act in concert with the effects of other past, existing or potential future projects or human activities. VECs with no residual effect or a positive residual effect from the Project, as identified in Chapter 8, are not included in the cumulative effects assessment. Further, the cumulative effects assessment only includes VECs with an adverse effect of the Project that overlaps both temporally and spatially with the effects of other identified projects and human activities.

Projects and human activities selected for inclusion in this cumulative effects assessment have been selected as follows:

- Past projects and activities where on-going effects of such projects are expected to measurably change over time. The effects of past and current projects and activities form an integral part of, and have been incorporated into, the description of the existing environment (Chapter 6). Accordingly, effects that are likely to result from the Project in combination with other projects or activities that have been carried out have generally been assessed in Chapter 8. Past projects are further addressed in this cumulative effects assessment (Chapter 9) only if on-going effects from such other projects are expected to change over time to the extent that there would be a measurable effect on the existing environment that was not already addressed in Chapter 8.
- Current and future projects and activities that have already been approved and are being constructed or are planned to be constructed/carried out, or, though not yet approved, are in a planning / approvals process preparatory to being constructed/carried out. In addition, to be included, an identified project or human activity had to be currently defined in sufficient detail to allow effects to be characterized for cumulative effects assessment. The environmental effects of future projects not meeting these criteria were not considered.

9.2.1 Past and Existing Projects and Activities

Table 9.2-1 below provides a list of past and existing projects initially considered as part of this cumulative effects assessment and the rationale for inclusion or exclusion, which focused on past and existing projects where ongoing effects overlap with the Project's effects and are expected to measurably change over time. The past projects and human activities that follow are generally described and addressed as part of the baseline (Chapter 6) and earlier effects assessment (Chapter 8). Projects were not considered further in the cumulative effects assessment where there was no expected spatial or temporal overlap with the Project. In addition, Table 9.2-1 notes where past and existing projects that overlap with the Project are primarily addressed as part of the baseline (Chapter 6) and earlier effects assessment (Chapter 8).

Manitoba Hydro was a proponent for a number of past/existing projects included in Table 9.2-1. Where relevant, this allows for coordination of mitigation and monitoring measures to help ensure any cumulative effects resulting from these projects are identified and addressed. For example, mitigation, monitoring and follow up measures have been identified for the Wuskwatim generation/transmission and Riel Reliability Improvement Initiative projects as part of the planning and development of each of those projects.

Table 9.2-1: Past and Existing Projects and Activities in the Project Study Area

Project or Activity	Summary: On-going effects expected to measurably change over time.	Included / Excluded
Wuskwatim Generating Station Project	Potential for temporary overlap of socio-economic effects on regional infrastructure (e.g., Thompson, air travel, highway traffic). Construction activity and related workforce interactions are not expected to overlap temporally with Project with completion of Wuskwatim expected in 2012. Addressed as part of the baseline (Chapter 6) and earlier effects assessment (Chapter 8).	Not included – no expected overlap of effects with effects of Project.
Wuskwatim Transmission Project (230 kV transmission lines, Thompson-Birchtree Station)	Development of the Wuskwatim transmission lines associated with the Wuskwatim G.S. and an associated transformer station (near Thompson) has been completed or is expected to be completed in 2011. Overlap with the Project: • Incremental additive interaction from the transmission lines routed between Herblet Lake Station at Snow Lake and Rall's Island Station at The Pas. • No additive interaction would be expected from the new transformer station. • Minor loss of wildlife habitat during the course of right-of-way construction. • Spatial overlap and potential to contribute to fragmentation of habitat in a regional context (potential effects on mammals and habitat, birds and habitat, amphibians and reptiles and on related resource use in area). • The potential residual effects on wildlife habitat are stated to be minor in context of local areas and ecodistricts. These effects are expected to be minimal with the implementation of mitigation measures and the preparation of an environmental protection plan. • Primarily addressed as part of the baseline (Chapter 6) and earlier effects assessment (Chapter 8).	Included but primarily addressed as part of earlier baseline and effects assessment.
Upgrades and/or rehabilitation of existing northern hydro-electric projects. (Kettle Generating Station)	Potential modest risk of cumulative socio-economic effects on Gillam and other communities, and on regional infrastructure, during construction activity associated with upgrades and/or rehabilitation work. Effects determination depends on the size of the work forces and the extent of temporal overlap.	Included
Dorsey-Forbes 500 kV Transmission Line	• Work likely to be within the existing station sites. • No material prospect of overlap with the Project. • Addressed as part of the baseline (Chapter 6) and earlier effects assessment (Chapter 8).	Not included – no overlap of effects with effects of Project.
Riel Sectionalization Project - The Riel Reliability Improvement Initiative	The Riel Reliability Improvement Initiative is being implemented to improve the reliability of Manitoba Hydro's existing transmission system and will provide an alternative connection of the existing high voltage international transmission line to the transmission system serving Winnipeg and southern Manitoba. It will be implemented at the Riel site, just east of Winnipeg in the RM of Springfield. Site preparation and installation of transformer and switching facilities and associated equipment and infrastructure will be required. The ingress point for Bipole III will not require any additional right-of-way requirements at the station site as it will be located within an existing right-of-way parallel to an	Included but primarily addressed as part of earlier baseline and effects assessment.

Project or Activity	Summary: On-going effects expected to measurably change over time.	Included / Excluded
	existing 230 kV transmission line. Overlap of Project effects with the sectionalization project will be confined biophysically to the Riel site. • Construction is underway and the project is set to be completed and in-service by May 2014. • Delays in completion of the sectionalization project may result in a temporal overlap with the Project. This may prolong of construction activity and requirements and lead to prospective cumulative effects related to noise, traffic, etc. • The potential for a cumulative effect of the ultimate combination of developing the Riel Converter Station and the HVdc transmission line may generate other residual effects, including disturbance (i.e., lighting, noise and traffic) and aesthetic effects on rural residences in the vicinity. The combination of these effects relating to the additional physical presence of these project components may represent a cumulative effect in terms of perception held by area residents, although the potential for additive interaction effects considered incremental and minor in nature. • Primarily addressed as part of the baseline (Chapter 6) and earlier effects assessment (Chapter 8).	
Multiple existing (utility) corridors, such as water pipelines, fibre optics line and Provincial Highways and Roads, winter road development	Along Project corridor, multiple existing (utility) corridors, such as water pipelines and fibre optics line serve local and regional needs. • Corridors may result in habitat disruption and fragmentation effects. • Contribute to direct mortality of VEC individuals and increased access to adjacent areas by recreational users (e.g. snowmobilers). • For cleared corridors in forested areas the cleared Project right-of-way may represent a cumulative effect relative to the density of linear features (and the relevance of that measure in the context of fragmentation). • Existing corridors are considered where relevant as part of the existing environment (Chapter 6) and in the effects assessment in Chapter 8 and are not considered further in Chapter 9.	Included but primarily addressed as part of earlier baseline and effects assessment.
Forestry operations and road development (Tolko, Louisiana Pacific)	Tolko's forest management license (FML) area overlaps with the Churchill River Upland, Hayes River Upland, and Mid-Boreal Lowlands ecoregions. Tolko Industries harvests timber in Forest Management License Area # 2 (FML 2) for processing at its mill in The Pas, Manitoba. The company is responsible for all forest management activities on those lands it sources timber from and is authorized under provincial environmental licensing. The BP III transmission line will pass through FML 2. Louisiana-Pacific's FML area overlaps with a number of ecoregions, including the Mid-Boreal Uplands, Mid-Boreal Lowlands, Interlake Plain, Lake Manitoba Plain, Boreal Transition and Aspen Parkland ecoregions. Louisiana-Pacific harvests timber in Forest Management License Area # 3 (FML 3) for processing at their mill in Minitonas, Manitoba. The company is responsible for all forest management activities on those lands it sources timber from and is authorized under provincial environmental licensing. The BP III transmission line will pass through FML 3. Forestry management activities are based on a renewable resource and are conducted in a sustainable fashion. Forest management activities have effects beyond cutting areas on some wildlife species, most notably on wide ranging species such as some migrant birds and woodland caribou, that have a preference for undisturbed late-seral stage forest stands. Other wildlife species prefer early-seral stage forests and are attracted to forestry activities; including some migrant birds and ungulates such as deer, elk and moose, the latter being attracted by the new abundant browse.	Included but primarily addressed as part of earlier baseline and effects assessment.

Project or Activity	Summary: On-going effects expected to measurably change over time.	Included / Excluded
	Wildlife species that require old growth or late-seral stage forest (e.g. woodland caribou) may experience a reduction in available habitat. Forest fragmentation may result in a reduction of some wildlife species populations (e.g., marten habitats are anticipated to be reduced via avoidance of cleared forest areas, thus causing a reduction in marten populations). Timber harvesting in areas overlapping the Project Footprint would result in a temporary cumulative effect (beyond the permanent effect of clearing and vegetation management within the Project rights-of-way). Development of access roads might, where the roads run through forested areas, contribute cumulatively to density of linear features and a corresponding fragmentation effect. The duration of the effect is similar to the life span of the access trail/road.	
Floodway Expansion Project	Any spatial overlap would be limited to the already licensed Riel site and, in a very small way, to the sectionalization of R49R in the Riel 230 kV switchyard. R49R occupies a floodway right-of-way, but the effect of its sectionalization at Riel is small.	Not included
St. Joseph's Wind Farm Project	No spatial overlap with the Project.	Not included – no overlap of effects with effects of Project.
Mineral licence area exploration, mineral lease, mining claim, and quarry lease developments (Crowflight Minerals Inc., HudBay Minerals Inc., Vale Inc.)	Mineral exploration and development is a dominant land use activity within the northern portion of the assessment area. The actual establishment of mine sites, above ground mining activities and their related access roads are considered deforestation activities. Potential impacts of the mining activities within the Project area (including exploration) have been stated to include clearing/disturbance for forested areas, noise disturbance (ventilation fans, generators and human activity), surface vibrations/noise related to underground blasting, waste disposal, and increased public access to previously remote areas (Bucko Mines EIS 2004). Activities may cause adverse environmental effects to both aquatic and terrestrial systems, runoff may result increases in water quality in surrounding aquatic systems; exploration may result in ground disturbances and increased access where such investigations occur. Route adjustment has located the HVdc transmission line outside areas of concern regarding effects on mining. Potential for interactions with quarrying operations.	Included but primarily addressed as part of earlier baseline and effects assessment.

In summary, Table 9.2-1 identifies the following past and existing projects with effects that overlap with the residual adverse effects of the Project (and notes that potential cumulative effects of the Project in combination with these past and existing projects have been primarily addressed as part of the earlier Chapter 8 effects assessment):

- Wuskwatim Transmission Project (230 kV transmission lines, Thompson-Birchtree Station);
- Upgrades and/or rehabilitation of existing northern hydroelectric projects. (Kettle Generating Station);

- Riel Sectionalization Project - The Riel Reliability Improvement Initiative;
- Multiple existing (utility) corridors, such as water pipelines, fibre optics line and Provincial Highways and Roads, winter road development;
- Forestry operations and road development (Tolko, Louisiana Pacific); and
- Mineral licence area exploration, mineral lease, mining claim, and quarry lease developments (Crowflight Minerals Inc., HudBay Minerals Inc., Vale Inc.).

In general, effects of the above past and existing projects and activities where relevant to the cumulative effects assessment of the Project have been identified in the existing environment and are not expected to measurably change over time in a way to materially modify the significance assessments in Chapter 8.

9.2.2 Future Projects and Activities

Future projects and human activities that have already been approved and are being constructed or are planned to be constructed/carried out, or are in a planning / approvals process preparatory to being constructed/carried out, and were initially considered as part of this cumulative effects assessment (based on potential for overlap with the adverse effects of the Project), are listed in Table 9.2-2 and the rationale for inclusion or exclusion in this assessment is also noted. Projects were not considered further in the cumulative effects assessment where review indicated that there was no expected spatial or temporal overlap with the Project.

Manitoba Hydro is participating in several of the future projects considered in the cumulative effects assessment. This facilitates Manitoba Hydro management and/or reduction of potential cumulative effects. As part of the licensing process for these other projects, Manitoba Hydro will be required to develop sufficient mitigation measures, monitoring and follow-up programs to ensure there will not be significant residual adverse effects for these projects.

Table 9.2-2: Future Projects and Activities in the Project Study Area

Project or Activity	Summary: Projects approved and are being constructed or are planned to be constructed/carried out, or are in a planning and/or approvals process preparatory to being constructed/carried out.	Included / Excluded
Keewatinoow wastewater management	Keewatinoow wastewater management will proceed as a separate project to be licensed by Manitoba to comply with all wastewater treatment environmental requirements. • Treatment of wastewater from work camps and station operation in a lagoon system. • Likely semi-annual discharge of treated effluent from lagoon; no effect on fish habitat from effluent discharge.	Included – temporal and spatial overlap.
Keeyask Generation; (includes northern camp; southern camp; infrastructure)	Keeyask Generation Station as proposed will be a 695-MW hydroelectric generating station and associated facilities at Gull (Keeyask) Rapids on the lower Nelson River, immediately upstream of Stephens Lake in northern Manitoba and in the Split Lake Resource Management Area. Keeyask Generation is being developed by the Keeyask Hydropower Limited Partnership, established pursuant to the Joint Keeyask Development Agreement in May 2009 between Manitoba Hydro and the Keeyask Cree Nations (Tataskweyak Cree Nation, War Lake First Nation, Fox Lake Cree Nation, and York Factory First Nation). The Keeyask Infrastructure Project (KIP) as already permitted will, starting in mid-2011, construct the north access road and northern camp and work areas. Subsequent construction within the required footprints for Keeyask Generation and related Keeyask Transmission is currently expected to start in 2013 and take approximately eight years. Keeyask Generation construction will occur only after comprehensive site selection and environmental impact assessment, extensive public consultation and approval and licensing by the relevant regulatory authorities. Construction of the Keeyask Generation will affect a local area and be short-term in duration. The targeted in service date is 2019 for the first unit and 2021 for all units. The construction of Keeyask Generation and related facilities is expected to overlap with the construction of the Project. Potential socio-economic effects may extend to region. Temporal overlap with potential socio-economic effects on services, regional infrastructure, and personal, family and community life due to construction activities [e.g., Gillam, Thompson community life and service infrastructure; air, road and rail traffic, etc.].	Temporal overlap of socio-economic effects with effects of Project related to construction activities.
Keeyask Transmission	The Keeyask Transmission Project is being planned and developed solely by Manitoba Hydro. It will include a single transmission line to supply construction power to the Keeyask Generation Project, as well as a new switching station and three new transmission lines which are intended to receive power from the new Keeyask Generation Project and convey it to Manitoba Hydro's Northern Collector System at the existing Radisson Converter Station.	Temporal overlap of socio-economic effects with effects of Project related to construction activities.
Dorsey to Portage 230 kV Transmission Line Project	Manitoba Hydro is planning to implement a new 230 kV transmission line from Dorsey Station to the Potage South Station. The line is necessary to improve the transmission system from Winnipeg to Brandon. The line will be 70 km in length and will be a single circuit design using self-supporting steel towers. The majority of the line right-of-way will be a 15 m expansion of an existing right-of-way, but there will be areas where additional easements are required. Two rail and two water crossings	Not included – no spatial overlap of effects with Project.

Project or Activity	Summary: Projects approved and are being constructed or are planned to be constructed/carried out, or are in a planning and/or approvals process preparatory to being constructed/carried out.	Included / Excluded
	will be required as well as numerous power-line crossings. The proposed Dorsey-Portage 230 kV transmission line is not expected to be in service until 2013 at the earliest. Given its location it is not anticipated that this development would represent an additive interaction in the context of the Project. No spatial overlap.	
Floodway Expansion Project - plans to develop recreational opportunities within the expanded Floodway channel	Plans to develop recreational opportunities within the expanded Floodway channel - undertaken adjacent to the Riel Station component of the Bipole III Project. Any spatial overlap would be limited to the already licensed Riel site and, in a very small way, to the sectionalization of R49R in the Riel 230 kV switchyard. R49R occupies a floodway right-of-way, but the effect of its sectionalization at Riel is small.	Not included - negligible and localized effect and no anticipated overlap of effects with Project.
Urban residential development within the Town of Gillam	Specific plans for residential development in the Project area include the potential for new housing stock within the Town of Gillam. Residential development will be limited to the urban town limits of Gillam. Expected to utilize available land set aside for the purpose of development. Expected to follow municipal and/or provincial development guidelines which would serve to limit interactions with other projects and mitigate any project-related effects.	Included
Construction activities associated with PR 280	Construction activities associated with PR 280 may be viewed as an induced action as a result of ongoing and proposed hydroelectric developments along the Nelson River. Provincial Road construction activities (i.e., crushing and stockpiling, rock cuts and spot grading) were to have commenced in late 2010 with a completion date of late 2011. Related improvements would be confined within the existing roadway profile; Effects expected to be beneficial rather than adverse.	Not included

In summary, Table 9.2-2 indicates that the following future projects and activities have residual adverse effects that would overlap with the residual adverse effects of the Project and these projects therefore are addressed further in this cumulative effects assessment:

- Keewatinoow wastewater management;
- Keeyask Generation (includes northern camp; southern camp; infrastructure);
- Keeyask Transmission (includes right-of-way, interconnection facilities, line and towers); and
- Urban residential development - plans for residential development within the Town of Gillam.

9.2.3 Prospective Future Projects and Activities

Prospective future projects and human activities not yet approved nor in a planning/approvals process preparatory to being constructed/carried out and that were initially considered in this assessment as potentially having effects that overlap with the effects of the Project are listed in Table 9.2-3. Projects were not considered further in the cumulative effects assessment where, after review, there was no expected spatial or temporal overlap with the Project.

Table 9.2-3: Prospective Future Projects & Activities

Project or Activity	Summary: Potential future projects not yet approved or not yet in a planning/approvals process preparatory to being constructed/carried out.	Included / Excluded
New International Transmission Line	Manitoba Hydro is planning to implement an additional US transmission line from Winnipeg to the Canada-US border. The line would also include equipment additions and modifications to the Dorsey and/or Riel stations. • The project would not occur without comprehensive route selection and environmental impact assessment, extensive public consultation and approval and licensing by the relevant regulatory authorities. • Rights-of-way and line effects will have minimal spatial overlap with the Project. • Effects would be incremental and assumed to be essentially within the confines of the existing sites. • The Project is within cleared agricultural land and there is no significant risk of the density of linear features/fragmentation issues associated with forested areas in the north.	Not included – minimal spatial overlap of effects with Project.
Conawapa Generating Station Projects (includes northern camp; southern camp; infrastructure; transmission).	Conawapa Generation Station and associated site infrastructure and facilities have the potential to occur concurrently with the Project and in some areas the residual adverse effects of the Project would overlap with some environmental effects of the Conawapa generating station project throughout the construction and operation phases. • The Conawapa project will be located within the Fox Lake Resource Management Area. • Development will occur only after comprehensive site selection and environmental impact assessment, extensive public consultation and approval and licensing by the relevant regulatory authorities. • Construction is expected to take 8 to 8.5 years, and would not begin prior to 2015 at the earliest. • Potential socio-economic effects associated with the overlap of construction activities (and all of the related northern workforce and infrastructure implications).	Included (limited extent)
Prospect of further development of new transmission lines in southern Manitoba (e.g., Letellier/St. Vital line; St. Vital-LaVerendrye	Based on Manitoba Hydro's Ten Year Development Plan (2009) there is a prospect of further development of new transmission lines in southern Manitoba, principally around the City of Winnipeg and to stations south of Winnipeg (e.g., Letellier/St. Vital line; St. Vital-LaVerendrye 230 kV Transmission Line Project (south loop). • Other proposed southern transmission line concepts that may overlap with the Project would occur only after comprehensive route selection and environmental impact assessment, extensive public consultation and approval and licencing by the relevant regulatory authorities. • In service date is uncertain.	Not included – no spatial overlap of effects with effects of Project.

Project or Activity	Summary: Potential future projects not yet approved or not yet in a planning/approvals process preparatory to being constructed/carried out.	Included / Excluded
	• Minimal spatial overlap with the Project.	
Wind energy developments	• Uncertain timeframe. • No specific projects have been identified with spatial or temporal overlap with the Project. • Planned and possible future projects will be subject to their own environmental review and approval processes.	Not included – no spatial overlap of effects with effects of Project.
Forestry operations including road development other than those covered in existing approved plans (Tolko, Louisiana Pacific)	• Potential effects where activities include clearing and vegetation management within the Project rights-of-way, where these overlap the FML. • Development of access roads may, where the roads run through forested areas, entail a cumulative contribution to density of linear features and a corresponding fragmentation effect. • Planned and possible future projects will be subject to their own environmental review and approval processes.	Included (limited extent)
Mineral licence area exploration, mineral lease, mining claims, and quarry lease developments	• Future mining/exploration operations may provoke additions to the density of linear features (e.g., access roads) but the actual mine sites are likely to be relatively confined spatially and unlikely to entail cumulative biophysical effects. • Any future activity (including exploration) likely to have similar adverse environmental effects to those experienced from similar past activity, including changes in water quality, ground disturbance and access. • Future mine developments are difficult to predict, particularly their spatial footprints as these differ widely depending on minerals being extracted, mining methods used and tailing volumes disposed of. • Planned and possible future projects will be subject to their own environmental review and approval processes.	Included (limited extent)
Current and future agricultural activities	• With proper wetland management practices and landowner conservation agreements and education, residual effects of agricultural development on key VEC habitats are expected to be reduced.	Included (limited extent)

In summary, Table 9.2-3 indicates that the following prospective future projects and activities could have residual adverse effects that would potentially overlap with the residual adverse effects of the Project (each of these prospective future projects and activities are not yet approved or are not currently in a planning/approvals process preparatory to being constructed/carried out):

- Conawapa Generating Station Projects (includes northern camp; southern camp; infrastructure; transmission);
- Forestry operations including road development (Tolko, Louisiana Pacific);

- Mineral licence area exploration, mineral lease, mining claims, and quarry lease developments; and
- Current and future agricultural activities.

The above future projects identified in Table 9.2-3 will, if and when they proceed, be subject to their own review processes and as part of that review process would need to satisfy regulators that there would be no significant adverse effects (including cumulative effects). Given that these projects and activities are prospective, and the timing and spatial extent of effects are not well understood at this time, they are addressed only to a limited extent in this cumulative effects assessment, i.e., to note prospective overlap issues to be addressed in the future when and if these other projects are subject to regulatory review.

9.3 ASSESSMENT OF CUMULATIVE EFFECTS ON VECS

Valued Environmental Components (VECs) identified in Chapter 4 were selected for the cumulative effects assessment if there was:

- A residual negative effect of the Project on that VEC as identified in Chapter 8 (VECs with no residual effect or a positive residual effect are not included). The VECs selected for the cumulative effects assessment are those that have an overall residual negative effect when all effects (both positive and negative) are combined; and
- A spatial and temporal overlap of the effects of the Project on that VEC with the effects of the other projects and human activities specified in Section 9.2.

Past and current projects were considered to form an integral part of the existing environment against which predicted effects are assessed (as described in detail in Chapter 6). This existing environment is described with consideration of potential overlaps with Project effects, i.e., it is described with potential effects in mind and in sufficient detail to permit the evaluation of significance of Project effects in that environment. These activities, along with their projected future levels, are accounted for in the assessment of Project effects provided in Chapter 8.

9.3.1 Biophysical Environment

This section reviews VECs related to the biophysical environment, where there are identified residual adverse effects related to the Project as evaluated in Chapter 8 with potential to interact cumulatively with residual adverse effects of other projects and

human activities. Table 9.3-1 below provides a high level screening assessment by environmental subcomponent of potential coincidence of effects on the biophysical environment related to the effects of the Project as evaluated in Chapter 8 and other projects noted in Table 9.2-1, Table 9.2-2 and Table 9.2-3 where there is a potential spatial and temporal overlap of residual adverse effects. As reviewed in Chapter 8, adverse biophysical effects of the Project have been identified for at least some VECs included in each of the biophysical subcomponents in Table 9.3-1.

Table 9.3-1: Potential Coincidence of Effects on Biophysical Environment

Other Projects & Activities	Bio-physical Environment Sub-components								
	Soils & Terrain	Air Quality and Climate	Groundwater	Aquatic Environment	Terrestrial Ecosystems & Vegetation	Mammals & Habitat	Birds & Habitat	Amphibians & Reptiles	Terrestrial Invertebrates
Adverse Project Effects on VECs (Not Significant as discussed in Chapter 8) ◊									
No Adverse Cumulative Effects ✓									
Negligible Cumulative Effects (beyond assessment discussed in Chapter 8) □									
Potentially Non-negligible Cumulative Effects □									
Bipole III Project	◊	◊	◊	◊	◊	◊	◊	◊	◊
Wuskwatim Transmission Project (230 kV transmission lines, Thompson-Birchtree Station)	✓	□	□	✓	✓	□	✓	✓	✓
Riel Sectionalization Project - The Riel Reliability Improvement Initiative	□	□	□	✓	✓	✓	✓	✓	✓
Multiple existing (utility) corridors, such as water pipelines, fibre optics line, that serve local and regional needs	□	□	□	□	✓	□	✓	✓	✓
Forestry operations and road development (Tolko, Louisiana Pacific)	✓	✓	□	✓	✓	□	✓	✓	✓
Mineral licence area exploration, mineral lease, mining claim, and quarry lease developments	✓	✓	□	✓	✓	□	✓	✓	✓
Provincial Highways and Roads, Winter road development	□	□	□	✓	✓	□	✓	✓	✓
Keewatinoow wastewater management	✓	□	✓	✓	✓	✓	✓	✓	□
Keeyask Generation/Transmission	□	□	□	✓	□	□	✓	✓	✓
Kettle Generating Station Upgrades	□	□	□	□	□	□	□	□	□
Urban residential development (potential for new housing stock within the Town of Gillam)	□	□	□	□	□	□	□	□	□
Conawapa Generating Station Projects	□	□	✓	✓	□	□	✓	✓	□
Forestry operations including road development (Tolko, Louisiana Pacific)	✓	✓	□	✓	✓	□	✓	✓	✓
Mineral licence area exploration, mineral lease, mining claims, and quarry lease developments	✓	✓	□	✓	✓	□	✓	✓	✓
Current and future agricultural activities	✓	✓	□	✓	✓	✓	✓	✓	✓

In summary, Table 9.3-1 indicates where no cumulative effect is expected on a biophysical subcomponent, and where likely cumulative effects beyond what was assessed in Chapter 8 are expected to be negligible. Potentially non-negligible cumulative biophysical effects are identified for the Mammals subcomponent with regard to the Project in combination with several of the other listed projects and activities.

The following analysis summarizes the cumulative biophysical effects assessment by focusing on the spatial overlap areas for Project effects on VECs as assessed in Chapter 8 for the following:

- Site-specific residual effects of the Project (Project Area/Footprint).
- Local Study Area residual effects of the Project (4.8 km wide band centred on the route and similarly in the local area around other Project components, as defined in Chapters 4 and 8).
- Project Study Area residual effects of the Project, i.e., effects on Mammals, and specifically fragmentation and access-related effects on caribou VECs as identified in Chapter 8.

9.3.2 Site-Specific Residual Effects

Residual adverse effects considered for some biophysical VECs are effectively limited to the immediate rights-of-way and Footprint area sites and as such the only real prospect of a related cumulative biophysical effect would occur where there is a further development on or adjacent to the rights-of-way for the HVdc transmission line, 230 kV ac northern collector lines, the northern converter station or ground electrode site and line. In addition, cumulative effects of the Project on the following VECs in combination with other projects and activities that may overlap with the Project Footprint are expected either not to occur or to remain minimal:

- Soils and Terrain (soil productivity, terrain stability);
- Groundwater (aquifer productivity);
- Terrestrial Ecosystems and Vegetation (plant species and communities of conservation concern; native grasslands/prairie areas); and
- Mammals and Habitat (effects primarily related to construction and operation of Keewatinoow Converter Station, borrow sites and ground electrode and line as they relate to American Martin, Beaver, Wolverine, Moose, Wood Frog and Northern Leopard Frog).

9.3.2.1 Local Study Area Residual Effects Primarily Related to Presence of HVdc Transmission Line

- Residual adverse effects considered for many biophysical VECs primarily relate to alteration/disturbance and associated loss or fragmentation of suitable habitat from clearing and maintenance of the HVdc transmission line right-of-way and tower installation. In the event of increased use of seasonal access trails and rights-of-way during the life of the Project and for a period of time following decommissioning, mortality and vehicle-related effects could increase until access is limited by successional growth. Potentially affected VECs related to the HVdc transmission line, ac collector lines, and (in some instances) site access roads include the following (in a few instances these VECs may also be affected by converter station and ground electrode Project components):
- Mammals and Habitat during construction and operation (American Marten, Beaver, Wolverine, Moose, Elk);
- Birds and Habitat during construction and operation (waterfowl and waterbirds, colonial waterbirds, birds of prey, upland game birds, woodpeckers, songbirds and other birds);
- Amphibians and Reptiles during construction and operation (Plains Spadefoot, Northern Leopard Frog, Red-sided Garter Snake, Northern Prairie Skink);
- Terrestrial Invertebrates during construction (Ottoe Skipper; Uncas Skipper);
- Generally, large scale projects and human activities result in wildlife avoidance of the cause of disturbance, and human activities related to clearing forest areas also reduce the amount of usable Elk, Moose, Wolverine and Marten habitat in the affected area. This includes forestry activities in the Hayes River Upland, Interlake Plain and Mid-Boreal Lowland Ecoregions related to Tolko and Louisiana Pacific operations, as well as clearing for community developments, roads, mining and other infrastructure projects;
- Development of new linear corridors related to clear cutting for forestry, development of access roads for mineral exploration or mines or quarries, development of transmission rights-of-way may contribute to the increase in access and increased mortality due to hunting activities in the Local Study Area, as well as increased wolf movement and predation of prey species (such as ungulates and small furbearers) in the Local Study Area;
- There is also potential for increased number of wildlife-vehicle collisions and wildlife mortality due to increased public access to remote areas via access roads and rights-of-way;

- Ungulates in western Manitoba are subject to parasites and viruses such as chronic wasting disease — increased mobility through new linear corridors will contribute to these effects;
- Amphibians, reptiles, and terrestrial invertebrates are subject to cumulative adverse effects when the Project Footprint occurs in close proximity to sandy soil habitat that is affected by other transmission, road, forestry, drainage canal, agricultural or urban development;
- Other project and human activities also also act cumulatively with the Project to affect birds and bird habitats, when assessed against other developments in Manitoba, and as described geographically in the context of ecoregions, the residual effects of the Project are not expected to be measurable, and should remain within the natural range of variation over periods of 30 years or more[1]; and
- In summary, as a result of the other identified projects and activities, a small magnitude, medium-term cumulative effect is expected on the biophysical VECs identified above from the Project due to impacts on habitat in the Local Study Area and consequent fragmentation and other effects as noted. Habitat fragmentation is likely to adversely affect species with large home ranges, such as moose and elk. Marten and other species that avoid cleared areas will also be affected by habitat loss and fragmentation. Fragmentation and habitat impacts can also affect amphibians and reptiles and terrestrial invertebrates as noted.

Generally, the above effects were considered to the extent feasible in the Chapter 8 assessment of Project effects on biophysical VECs. Access management and provincial harvest management strategies that regulate hunting are the responsibility of Manitoba Conservation and will play a key role in monitoring changes in mammal population numbers and status related to many of these cumulative effects. Regional planning for creation of access roads and lowering speed limits in active wildlife areas have demonstrated success in reducing the number of vehicle/mammal collisions; further, construction crews and vehicles moving in a convoy are likely to reduce the chances of collisions. Monitoring methods such as testing of elk, moose and deer may help to establish the links between movement of these mammals and transmission of disease and parasites. In conclusion, Local Study Area incremental cumulative effects of the Project during construction and operation on mammals and mammal habitat (with the exception of caribou) and other biophysical components and VECs due to factors discussed above were considered to the extent feasible in the Chapter 8 assessments and are not considered to be significant.

[1] For bird species listed under the Manitoba Endangered Species Act and the federal Species at Risk Act, Project related mitigation efforts include avoidance in order to lessen potential adverse effects. Loss of habitat is typically a primary driver of species decline. No significant cumulative adverse effects are expected with the Project.

9.3.2.2 Project Study Area Residual Effects related to Boreal Caribou (Wabowden, Reed Lake and Bog Ranges)

Boreal Caribou are listed as Threatened under both provincial Endangered Species Act and the federal Species at Risk Act. The current Threatened status of boreal woodland caribou in western Canada is a result of a number of biological and ecological pathways of decline which are spatially and temporally influenced by a combination of human disturbances (including transmission lines, access roads to facilitate forestry and mining operations, and other linear disturbances). Manitoba Conservation currently indicates that it believes the provincial population of boreal woodland caribou is stable. However, with respect to the three ranges affected by the Project, Manitoba Conservation currently records that the Reed and Wabowden ranges are of "medium" conservation concern and The Bog range is of "low" conservation concern. As noted in Chapter 8, both the Province and the federal government are presently working on new recovery strategies for boreal woodland caribou, which are to be finalized in early 2012. The assessments of caribou in this EIS will have to be reviewed when those strategies are finalized and published. Over time large-scale, resource-related activities result in caribou avoidance of affected areas due to intensive landscape and habitat changes. As discussed below, the Project requires relatively small losses of habitat. Further, the disturbances generated by workers and machines will almost entirely be confined to a short term of two to three seasons, one to clear the right-of-way and one to two to erect transmission towers and string the conductors.

From a landscape perspective, the amount of area occupied by transmission lines in Manitoba's boreal woodland caribou range is small in comparison to other human activities. Boreal woodland caribou also occupy extremely large home ranges and exist at very low densities making the risk of rights-of-way impacting forage availability extremely low. Access-related sensory effects from transmission lines are expected to be less than those associated with all weather or winter roads. Indirect ecological impacts from transmission lines are also expected to be minor compared to those associated with other human caused or natural landscape disturbances. Access management planning and provincial harvest management strategies that regulate hunting play an important role in conserving boreal woodland caribou and coastal and barren ground caribou.

The SSEA process provided an opportunity for avoiding the majority of potential effects through the selection of the Final Preferred Route away from a number of boreal woodland caribou core winter and summer ranges, and where possible the HVdc transmission and ac collector lines were routed in proximity to existing linear features to reduce expected effects of additional fragmentation.

Existing and past projects and human activities, as well as other resource development that may act cumulatively with the Project on boreal woodland caribou populations were

considered in the Chapter 8 assessment along with relevant mitigation measures.[2] With implementation of mitigation measures as described in Chapter 8, the Project is not anticipated to have significant residual effects on boreal woodland caribou. The expected residual effects relate primarily to potential increase in predation rates, especially in areas where the HVdc line bisects or intersects known core winter use areas and known calving areas. Compared to the Wabowden range, the Reed Lake and the Bog ranges are less susceptible to predicted effects due to the location of the HVdc line in relation to core winter and summer use areas. There is scientific uncertainty regarding the residual effects resulting from the Project's linear development and how this contributes to the overall cumulative effects from other disturbance within ranges, and there is concern identified in Chapter 8 regarding a risk of unsustainable losses in the population (particularly in the Wabowden range) from the incremental effects of the Project due to the risk of increased predation, increased hunting and increased presence of bears. The nature of effects will be monitored and adaptive management applied as required in the Wabowden range (and potentially in the Bog range).

As noted in Chapter 8, the Wabowden range has the highest degree of fragmentation and anthropogenic disturbance resulting from other past and existing activities including forestry, mining, hydro rights-of-way, and winter and all weather access compared to other ranges affected by the Project, and there has been some range de-occupation observed based on past telemetry. As was recorded in Chapter 8, the Final Preferred Route in the Wabowden area reflects an accommodation to mining stakeholders who requested the line be adjusted eastward in order to facilitate future exploration activity. Aside from this advice and current, known access routes used by the forest industry, Manitoba Hydro is not currently aware of other approved projects in the Wabowden area that would, through the creation of more fragmentation, add to the risks already identified for the Wabowden range. Accordingly, taking into account the proposed mitigation measures, the Project is not expected to change the current assessment of Manitoba Conservation that the population of woodland caribou is stable. No further mitigation measures are being proposed as part of this cumulative assessment. However, there is the potential for functional habitat loss if mitigation measures are ineffective. Ongoing telemetry studies, recruitment/mortality monitoring in this range and the release in early 2012 of new provincial and federal recovery strategies will necessitate that this analysis be revisited. Manitoba Hydro anticipates that adaptive management measures will be desirable but such plans, to be effective, will require the cooperation and support of the Province, which has the authority to restrict both hunting and the use of existing rights-of-way by snowmobilers and other recreational users.

[2] Greater detail is provided in the Bipole III Caribou Technical Report. A fragmentation analysis was done for each range.

9.3.2.3 Coastal and Barren Ground Caribou

Effects on Coastal and Barren Ground Caribou were also considered due to the fact the northern portion of the Project Study Area contains habitat occasionally occupied by this population.

Coastal and barren ground caribou occurrence during winter is associated with occasional migration events. There are no impacts on habitat and functional loss of habitat due to the effects of paralleling the existing rights-of-way is minor. Potential for residual effects such as predation and hunting is not expected to increase or affect these populations due to their more northerly locations and their ability to move beyond areas where access by hunters and predators is easier. Residual cumulative effects are accordingly expected to be negligible with no detectable or measurable change in status of either the Cape Churchill, Pen Island or Quaminiruak caribou. However, Manitoba Hydro continues to recognize that the First Nations and Aboriginal people, who rely upon these herds for food continue to be concerned about their numbers and existing monitoring is expected to continue in cooperation with Manitoba Conservation with a view to detecting any changes inconsistent with this assessment.

9.3.3 Socio-Economic Environment

This section reviews VECs related to the socio-economic environment, where there are identified residual adverse effects related to the Project with potential to interact cumulatively with residual adverse effects of other projects and human activities. Table 9.3-2 provides a high level screening assessment by socio-economic subcomponent of potential coincidence of effects on the biophysical environment related to the effects of the Project as identified in Chapter 8 and other projects noted in Table 9.2-1, Table 9.2-2 and Table 9.2-3 where there is a potential spatial and temporal overlap of residual adverse effects. As reviewed in Chapter 8, adverse socio-economic effects of the Project have been identified for at least some VECs included in each of the socio-economic subcomponents in Table 9.3-2.

In summary, Table 9.3-2 indicates where no cumulative effect is expected on a socio-economic subcomponent, and where likely cumulative effects beyond what was assessed in Chapter 8 are expected to be negligible. Potentially non-negligible cumulative socio-economic effects are identified in relation to effects of construction of the northern portion of the HVdc transmission line and the Keewatinoow Converter Station on services; personal, family and community life, and cultural and heritage resources subcomponents by the Project in combination with other listed projects and activities to be undertaken.

The following analysis summarizes the cumulative socio-economic effects assessment by focusing on the key effects during each Project phase on VECs as assessed in Chapter 8 for the following:

- Site-specific residual effects of the Project (Project Site/Footprint) and Local Study Area residual effects of the Project (4.8 km [3.0 mile] wide band centre on the route and similarly in the local area around other Project components, as defined in Chapters 4 and 8);
- Project Study Area residual effects of the Project;
- Residual adverse effects considered for some socio-economic VECs are effectively limited to the Project Site/Footprint, or to the Local Study Area, and as such the only real prospect of a related cumulative socio-economic effect would occur where there is a further development on or adjacent to the rights-of-way or in the Local Study Area. Cumulative effects of the Project on the following VECs in combination with other projects and activities that may overlap with the Project Site/Footprint are expected either not to occur or to remain minimal (with no material change to the assessment presented in Chapter 8);
- Land use (land tenure and residential development; private forestlands; Aboriginal lands [Reserve Lands and TLE], Designated Protected Areas & PAI, infrastructure, agricultural land use/productivity);
- Resource use (commercial forestry, commercial fishing, mining/aggregates, trapping, recreation and tourism, wild rice harvesting, domestic resource use);
- Personal, family and community life - (public safety [HVdc transmission line, Riel Converter Station and associated facilities], human health and aesthetics); and
- Culture and heritage (cultural and heritage resources).

Table 9.3-2: Potential Coincidence of Effects on Socio-economic Environment

Other Projects & Activities	Socio-economic Environment Sub-components					
Adverse Project Effects on VECs (Not Significant as discussed in Chapter 8) ◊	Land Use	Resource Use	Economy	Services	Personal, Family & Community Life	Culture & Heritage
No Adverse Cumulative Effects ✓						
Negligible Cumulative Effects (beyond assessment discussed in Chapter 8) □						
Potentially Non-negligible Cumulative Effects □						
Bipole III Project	◊	◊	◊	◊	◊	◊
Wuskwatim Transmission Project (230 kV transmission lines, Thompson-Birchtree Station)	✓	✓	□		□	✓
Riel Sectionalization Project - The Riel Reliability Improvement Initiative	✓	□	□		□	✓
Multiple existing (utility) corridors, such as water pipelines, fibre optics line, and serve local and regional needs	✓	✓	□	□	□	✓
Forestry operations and road development (Tolko, Louisiana Pacific)	✓	✓	□	□	□	✓
Mineral licence area exploration, mineral lease, mining claim, and quarry lease developments	✓	✓	□	□	□	✓
Provincial Highways and Roads, Winter road development	✓	✓	□	□	□	✓
Keewatinoow wastewater management	□	□	□	□	□	✓
Keeyask Generation/Transmission	✓	✓	□	□	□	✓
Kettle Generating Station Upgrades	□	□	□	□	□	✓
Urban residential development - plans (potential for new housing stock within the Town of Gillam)	✓	□	□	✓	✓	✓
Conawapa Generating Station Projects	✓	✓	□	□	□	✓
Forestry operations including road development (Tolko, Louisiana Pacific)	✓	✓	□	□	□	✓
Mineral licence area exploration, mineral lease, mining claims, and quarry lease developments	✓	✓	□	□	□	✓
Current and future agricultural activities	✓	✓	□	□	□	□

9.3.3.1 Construction Phase Non-negligible Adverse Cumulative Effects in Project Study Area[3]

In the last 60 years, the First Nations and Aboriginal people living in the regions roughly corresponding to the Split Lake Resource Management Area (RMA) and the Fox Lake RMA have experienced significant, adverse disruptions in their traditional ways of life as a consequence of a number of factors including, importantly, the development of major hydro-electric generating and transmission facilities by Manitoba Hydro; the opening up of the region to major mining projects and forestry development; the continued application, in the initial part of this period, of the residential school policy; and widespread poverty. In the case of the foregoing projects and industries, there have been corresponding effects on a number of biophysical components of the environment, fish, mammals, birds and forests that have made it more difficult to maintain traditional practices and the world view of closely interrelated relationships between people and the environment which is central to all Aboriginal cultures.

Beyond the foregoing RMAs, but still within the Project Study Area, other First Nations and Aboriginal people have been experiencing similar effects, caused by an even wider list of projects and industries, on their traditional way of life for upwards of 150 years in the case of communities in southern Manitoba. Their concerns regarding their cultural losses and heritage were provided in reports and interviews summarized in Chapter 5.

In the last 20 years, there have been some signs of a reversal of the foregoing trends. In the case of Aboriginal people living in northern Manitoba, and particularly those in the Split Lake RMA and the Fox Lake RMA, for example, significant adverse effects agreements have been entered into with Manitoba Hydro to address the effects of past projects and, in the case of the Keeyask Generating Station Project, the Keeyask Hydropower Limited Partnership is committed to the payment of millions of dollars, some of which is already being paid, to fund a variety of innovative programs and facilities whose purpose is to reverse the adverse impacts experienced in the past. The extensive training program funded from 2002 to 2010 by the Provincial and Federal governments, and Manitoba Hydro is another example of a meaningful effort to reverse the foregoing trend. In recognition of the adverse effects past projects have contributed to the history briefly summarized above, much effort has been expended to identify activities required by the Project that could, in the absence of well-considered mitigation measures, add to such negative effects or induce new, undesirable effects. Taking into account the mitigation measures that are being proposed and the ongoing discussions and negotiations in which Manitoba Hydro is engaged with a number of First Nations

[3] Project Study Area effects are also noted in Chapter 8 for Economy VECs; however, all of these effects were positive and thus no further consideration is given in the cumulative effects assessment to these Economy VECs.

and Aboriginal people, it is expected that there will be additions to the recent signs of improvement and that the Project will not result in a cumulative adverse effect to the particular socio-economic VECs identified in the foregoing table as potentially of concern.

Manitoba Hydro's project development activities are expected to be the major development activities in the Gillam area (and in particular in the Split Lake and Fox Lake RMAs). It also is expected that the construction of several of these will overlap the Project's construction period, particularly in the years from 2014, when major work on the two Keeyask projects is presently expected to begin, to 2017, when the Project is to be completed coincident with the second year of construction work on the Conawapa project according to present estimates. In this respect, there is an ability to plan and coordinate mitigation measures and monitoring activities to reduce the likelihood of cumulative adverse effects. The fact that Manitoba Hydro is, or will be, the proponent of many of these projects, and is a major partner in the Keeyask Generating Station Project makes it easier to build upon existing mitigation measures, particularly adverse effects programming, and/or to modify and adapt such programming as new projects begin. Also, as more detailed planning is done to determine the size of project work forces, their peak years and seasons, it becomes easier to coordinate the movement of workers hired from outside the region and the re-allocation of workers recruited within the region. Indeed, significant employment and business opportunities deriving from these projects are expected to be allocated to the First Nations and their members located in the vicinity of the projects, such has already been provided for in the Joint Keeyask Development Agreement Negotiations to realize similar goals are currently taking place with Fox Lake Cree Nation and Tataskweyak Cree Nation.

As noted in Chapter 8, the Project's Keewatinoow Converter Station and associated facilities are expected to have moderate residual adverse effects on community services, travel and transportation, and public safety in the Project Study Area near this activity due to the influx of workers, interactions between visiting workers and residents of the Gillam area and consequent increased stress on community services (emergency, health and social) in the Gillam area. Based on these effects, concerns may also exist with regard to cumulative effects to these VECs and to culture in the Project Study Area.

Residual adverse effects of the Project relate primarily to safety issues related to worker interaction with the community of Gillam. Residual adverse effects related to worker interaction with the community of Gillam have the potential to interact cumulatively with the residual adverse effects of other projects and human activities that are planned to be undertaken in this area during the same timeframe.

Fox Lake Cree Nation members have identified potential adverse effects of construction worker interaction with community members, in particular women and youths, as their greatest concern associated with new major projects being built in their traditional

territory. The community's concern is based on knowledge of what happened during construction of other major projects in the past. The assessment of effects that Project construction would have on the community of Gillam, Fox Lake Cree Nation and surrounding areas (Split Lake and Thompson), as well as the effects of past construction activities is addressed in Chapter 8.

Construction of Keewatinoow Converter Station and associated facilities will require a large workforce relative to the existing population drawn from a wide geographic area, with some portion of the work force expected to come from outside the region. Construction activities for Keewatinoow will overlap with construction activities related to other projects in the Gillam area as indicated in Table 9.3-2, and there is potential for cumulative adverse effects related to worker interactions with the community of Gillam due to the increase in construction workers generally in the Project Study Area. During the first stage of the Project, the start up camp workforce would consist of approximately 350 workers. By 2014, it is estimated that the Project workforce in the area, with the addition of the main work camp (capacity of 550) would increase significantly at certain peak periods. As noted in Chapter 8, the number of visits to Gillam is difficult to predict. The number of visits would be expected to increase noticeably during the first year of construction, reach its highest levels in the second year and remain at high levels until the fourth year of construction, decreasing noticeably in the fifth year.

Table 9.3-2 addresses specifically Manitoba Hydro and Keeyask Hydropower Limited Partnership project development activities that are expected to be the major development activities in the Gillam area that will overlap with the timing of Project construction and, to some extent, spatially with the Project, and thus have residual adverse effects related to worker interaction in Gillam and surrounding areas (see Table 9.3-2). Other developments may also occur in the area, including additions to the housing stock in Gillam.

A number of features that would reduce the number of worker visits to Gillam have been incorporated into the planning for the Project. Chapter 8 has identified and described a robust mitigation approach, monitoring and adaptive management to be implemented to address project effects related to public safety and worker interactions in Gillam. Chapter 8 describes the additional mitigation measures identified in part on the basis of Fox Lake Cree Nation knowledge and experience with past projects. This experience and perspective of a number of Aboriginal communities is further described in the Bipole III Aboriginal Traditional Knowledge Technical Report and appendices.

Considering all future projects, the period between 2014 and 2017 would be considered the most critical when considering the traffic impact in the vicinity of Gillam, PR 280 and PR 290. Road improvements and maintenance and on Provincial Road (PR) 280 and PR 290, particularly on PR 280 between PR 290 and the Keeyask Generating Station

Access, would be required to ensure the safe movement of construction and other vehicles between Thompson, Gillam, and all existing/proposed Manitoba Hydro facilities. The specific infrastructure improvements along the relevant road segments would be the subject of future detailed road corridor studies (Bipole III Transportation Technical Report).

The 1992 NFA Implementation Agreement sets out processes for addressing Tataskweyak Cree Nation's rights and interests with respect to future developments. Since September 2009, Manitoba Hydro and Tataskweyak Cree Nation have been engaged in a process to reach shared understandings of the impacts of the Bipole III Project on the rights and interests of Tataskweyak Cree Nation and are currently working towards an Agreement in Principle to address a range of issues associated with the Bipole III Project. Manitoba Hydro and Tataskweyak have negotiated a Keeyask Adverse Effects agreement to address impacts of that development. Manitoba Hydro will consult with TCN and negotiate appropriate arrangements related to adverse effects associated with future developments as provided for in the 1992 NFA Implementation Agreement.

The 2004 Impact Settlement Agreement (ISA) between Fox Lake Cree Nation, Manitoba Hydro, and Manitoba sets out processes for addressing Fox Lake's rights and interests with respect to future developments. Manitoba Hydro established a Working Group process based on Article 8.5 of the 2004 Impact Settlement Agreement (ISA) as the means for dialogue to address the respective needs and interests of Manitoba Hydro and Fox Lake Cree Nation as they relate to the Keewatinoow Converter Station and other Project components. Regular meetings have been ongoing since late 2009 and are expected to continue as the Project proceeds. Manitoba Hydro will consult with Fox Lake and negotiate appropriate arrangements related to adverse effects associated with future developments as provided for in the ISA.

Manitoba Hydro has been working with other local communities, and will continue to do so, to coordinate monitoring of effects from the various projects as well as to monitor the effectiveness of negotiated measures and programming to address impacts.

Manitoba Hydro's intent in planning the Project, with specific reference to the potential of cumulative adverse effects on key socio-economic VECs has been to develop effective mitigation measures and to engage the First Nations and other Aboriginal people living in the vicinity to discuss them, add to them and modify them. The goal of Manitoba Hydro is to encourage and add to the recent, positive improvements.

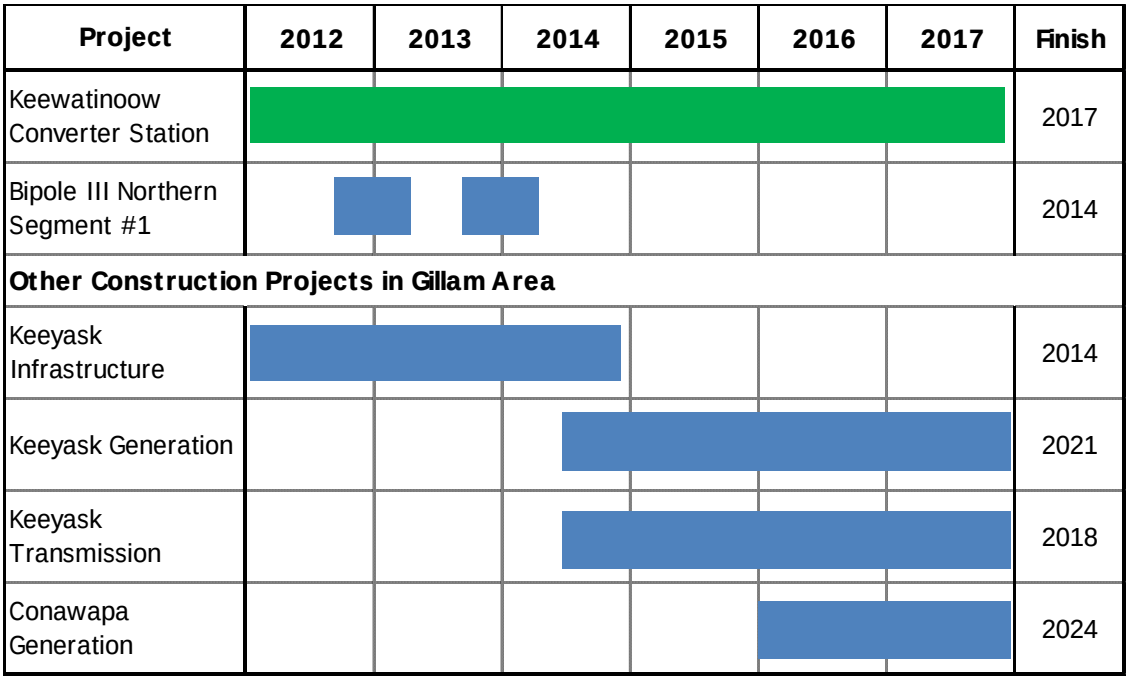

Figure 9.3-1: Major Construction Activity in Gillam Area During Construction of Keewatinoow Converter Station

Source: InterGroup Consultants Ltd. Derived from data obtained from Manitoba Hydro.
Note: This information reflects project information and schedules known at the time of EIS preparation. These schedules are subject to change as projects are defined and planning advances.

9.3.3.2 Operation Phase Non-negligible Adverse Cumulative Effects in Project Study Area

After the construction phase of the Bipole III Project is complete, there will be on-going operation of the converter station facilities, ground electrodes and transmission lines. Operation activities include routine inspection and maintenance of transmission facilities, vegetation management and the presence of a daily workforce to operate and maintain the converter stations. Most operation activities are confined to the Project Site/Footprint. All transmission lines are inspected annually, which involves aerial survey and/or ground survey. Stations have on-site personnel 24 hours/day to conduct operations, and repair and maintain equipment.

There are some residual effects of operation that include habitat alteration and fragmentation from creation of the right-of-way, improved access to new areas for hunters and predators, bird line-strikes, noise and potential disturbance from lines, maintenance vehicles and equipment. These residual effects have the potential to combine with similar effects from other projects and activities in the area including activities associated with forestry, mineral exploration, and other Manitoba Hydro developments as previously discussed in relation to construction activities.

Once the Project is built and operating, the contribution of Bipole III to large workforce presence and related issues will decrease significantly. Similarly the disturbance effects on wildlife decrease with the end of construction. Access and residual effects of increased hunting and predation on wildlife remain and will be monitored and adaptive management implemented if there are measurable effects on wildlife populations or resource uses. Construction of other Manitoba Hydro projects in the area during Bipole III operation will need to consider the current status of resources and services in the Local Study Area, with the Bipole III Project in place. Larger landscape scale projects and activities in forestry and mineral exploration and mining will, by the Project operating stage, have a potentially greater influence on bio-physical and socio-economic components in the Project Study Area. As the operation phase of the Project extends up to the lifetime of the Project at 50 years, there is only limited ability to predict projects and activities within that time frame for consideration in cumulative effects assessment. It is expected that during the operation phase the residual effects of Bipole III will be fully managed and small in their magnitude, and contribute to cumulative effects on a regional scale.