Critical Review of the Cumulative Effects Assessment undertaken by Manitoba Hydro for the Bipole III Project

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[1] The views presented in this report are those of the authors and not of the University of Saskatchewan.

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1.0 INTRODUCTION

1.1 Scope and objectives

This report presents findings of a review of the cumulative effects assessment (CEA) prepared by Manitoba Hydro as part of the Bipole III Environmental Impact Statement (EIS). The review consists of a technical and substantive evaluation of Manitoba Hydro's CEA process, from the initial stages of scoping and baseline trend analysis, through to impact prediction and proposed management strategies for anticipated significant effects.

The objectives of the review, as set forth by the Public Interest Law Centre, Manitoba, are to address:

- the role, if any, that cumulative effects assessment plays in best practice environmental assessment;
- whether the cumulative effects assessment provided by Manitoba Hydro accords with best practice; and
- provide any recommendations that might assist the Manitoba Clean Environment Commission (CEC).

In performing this review, standards and criteria appropriate to the evaluation of CEA practice within the context of a single project development are employed. As such, the evaluation is based on standards of practice that can reasonably be expected of a proponent within the confines of project-based assessment. The linear nature of the proposed Project is also taken into account.

1.2 Qualifications of the authors

Jill Gunn, PhD, MCIP is an Assistant Professor of regional and urban planning and environmental assessment in the Department of Geography & Planning at the University of Saskatchewan. She is cross-appointed to the School of Environment and Sustainability. From 1997-2003 Jill was a consultant to British Columbia Hydro on integrated resource management for electric utility transmission rights-of-way in the northern region of British Columbia, including non-integrated generation sites. This work focused on documenting a decade-long informal program to address a wide variety of environmental, social, and economic management imperatives through innovative, site-specific vegetation management strategies. During the six years Jill advised BC Hydro, she also completed a range of studies investigating impacts of vegetation management strategies on federally- and provincially-listed wildlife species at risk. Jill completed a PhD specializing in strategic and cumulative effects assessment in 2009, funded by the Social Sciences and Humanities Research Council of Canada. Jill's academic contributions regularly appear in internationally regarded periodicals such *Impact Assessment and Project Appraisal*, the *Journal of Environmental Assessment Policy and Management*, and the *Journal of Environmental Planning and Management*. Jill co-authored the Canadian Council of Ministers of the Environment guidance on regional-strategic environmental assessment in Canada which served as a basis for the Alberta government's innovative Land-use Framework. She has also provided expert advice to a range of other organizations including the Canadian Environmental Assessment Agency, Fisheries and Oceans Canada, Alberta Environment, the Canadian International Development Agency, the Canadian Institute of Planners, and the City of Saskatoon.

Bram Noble, PhD, is a Full Professor of environmental assessment in the Department of Geography & Planning at the University of Saskatchewan, and is jointly appointed in the School of Environment and Sustainability. His research is focused on environmental assessment, cumulative effects and strategic environmental assessment methodology. Bram has served in a number of consulting and advisory roles on environmental assessment best-practice for both government and industry, including: Alberta Environment, Saskatchewan Environment, National Energy Board, Canadian Environmental Assessment Agency, Parks Canada, Fisheries and Oceans Canada, the Major Projects Management Office, Auditor General of Canada Commissioner of Environment and Sustainable Development, Aboriginal Affairs and Northern Development Canada, Cameco Corporation, Rath and Company, and Jacques Whitford Environment Limited. Bram is also co-author of the Canadian Council of Ministers of the Environment guidance on regional-strategic environmental assessment in Canada, and was scientific co-lead for a comprehensive regional cumulative effects assessment in Saskatchewan between 2005 and 2007. He also served as an EIS consultant on Nalcor Energy's Lower Churchill Hydroelectric Generation Project. Bram is author of Canada's leading textbook on environmental assessment, *Environmental Impact Assessment: A Guide to Principles and Practice,* and since 2000 has published 46 peer reviewed scientific papers on environmental assessment research in international journals; 12 book chapters; and more than 100 technical reports and presentations. He is also an editorial board member of *Impact Assessment and Project Appraisal*, journal of the International Association for Impact Assessment, *Environmental Impact Assessment Review,* and associate editor of the *Journal of Environmental Assessment Policy and Management.*

1.3 Report format

This report is presented in two parts: an overview of the approach to and findings of the cumulative effects review, including recommendations; followed by an Appendix containing the technical review itself. Following this Introduction section, Section 2.0 provides a brief background on the nature of cumulative environmental effects and the importance of assessing such effects in a project context. The elements of a basic CEA process are also introduced. Section 3.0 describes the approach to our review of the Bipole III CEA. Results are summarized in Section 4.0, followed by recommendations in Section 5.0. The full technical review with supporting evidence is presented in Appendix A.

2.0 CUMULATIVE ENVIRONMENTAL EFFECTS

2.1 What are cumulative effects?

The Bipole III EIS adopts the definition of cumulative effects used in the Cumulative Effects Assessment Practitioners Guide[2]: "Cumulative effects are changes to the environment that are caused by an action in combination with other past, present and future human actions." This is an appropriate definition, and is amongst the most widely used.

Cumulative effects can be described as 'progressive nibbling' – the culmination of effects that occurs through activities many, often small-scale, activities such as forestry operations, linear disturbances such as seismic lines, roads, electric power lines and pipelines, and the incremental filling of wetlands[3]. Others have described cumulative effects as 'death by a thousand cuts' or the 'tyranny of small decisions[4].' Such characterizations are based on the notion that a significant adverse effect can result over time due to the culmination of seemingly small and insignificant actions. For each action, the effects are deemed 'marginal' or 'relatively insignificant' when compared to other types or scales of change or disturbances. But, over time, such seemingly insignificant effects result in significant cumulative environmental change. The US Council on Environmental Quality, for example, notes that the most devastating environmental effects may result from the combination of individually minor effects of multiple actions over time[5].

The following series of images is an illustrative example of 'death by a thousand cuts' (Figure 1). Here, a landscape has been subject to a series of seemingly small disturbances – first a series of access roads and well pads, followed by additional access roads, more well pads and small scale forest cut-blocks. Individually, it is easy to dismiss the significance of any single action or disturbance by looking only at the magnitude of that individual action, or the relative size of its disturbance on the landscape. However, it is impossible to deny the cumulative significance of environmental change.

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[2] See pg. 3 of Hegmann G, Cocklin C, Creasey R, Dupuis S, Kennedy A, Kingsley L, Ross W, Spaling H, Stalker D 1999. Cumulative Effects Assessment Practitioner's Guide. Minister of Public Works and Government Services Canada.

[3] Lee L, Gosselink J 1988. Cumulative impacts on wetlands: linking scientific assessments and regulatory alternatives. *Environmental Management* 12: 591-593.

[4] See Noble BF 2010. Cumulative environmental effects and the tyranny of small decisions: Towards meaningful cumulative effects assessment and management. Natural Resources and Environmental Studies Institute Occasional Paper No. 8. University of Northern British Columbia, Prince George, BC.

[5] Council on Environmental Quality 1997. Considering cumulative effects under the National Environmental Policy Act

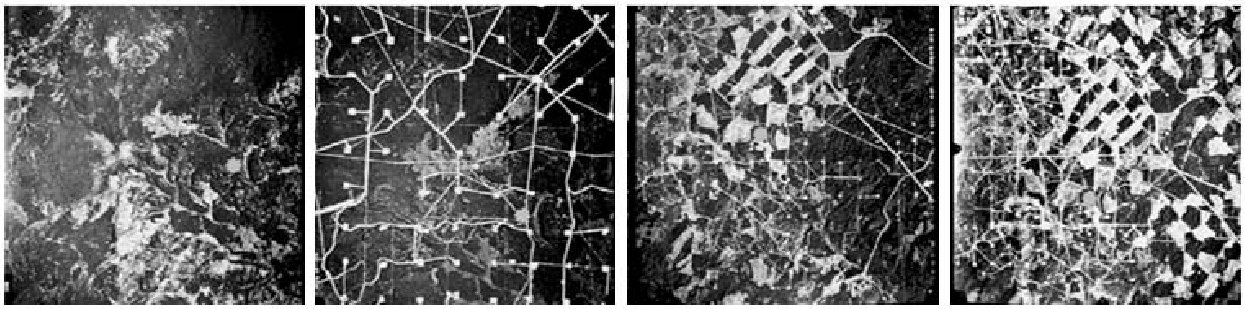

Figure 1. An example of cumulative effects to landscape and habitat
Source: Alberta Sustainable Resource Development

William Odum (Clark University) provides another illustrative example of such seemingly 'small decisions' that have resulted in significant adverse environmental outcomes[6]:

> "Consider, for example, the loss of coastal wetlands on the east coast of the United States between1950 and 1970. No one purposely planned to destroy almost 50% of the existing marshland along the coasts of Connecticut and Massachusetts...However, through hundreds of little decisions and the conversion of hundreds of small tracts of marshland, a major decision in favour of extensive wetlands conversion was made without ever addressing the issue directly."

2.2 The importance of assessing cumulative effects

Each additional disturbance or impact, regardless of its magnitude, can represent a high marginal cost to the environment. So, what happens when cumulative effects are not properly addressed in environmental assessment? Consider the following two examples:

- In southwest Saskatchewan, a 1,940 km^2 ecologically rich land base, consisting of active sand dunes, rare and endangered species, and plants of Aboriginal cultural importance, is subject to the pressures of approximately 1,500 natural gas wells, cattle grazing, and more than 3,000 km of access roads and trails. The landscape is significantly fragmented and biodiversity, in a once native grassland ecosystem, is at risk. Of the 1,500 wells in the area, only five proposals were subject to an environmental assessment - none of which were deemed to have significant environmental effects[7].

- The Athabasca River basin, Alberta, is exposed to a wide range of land use activities including agriculture, forestry, pulp and paper operations and petroleum extraction. Forests have been fragmented by roads, power lines, pipelines and other disturbances, and the amount of old

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6 Odum W 1982. Environmental degradation and the tyranny of small decisions. BioScience 32(9): 728-729.
7 Great Sand Hills Scientific Advisory Committee 2007. Great Sand Hills Regional Environmental Study. Canadian Plains Research Centre, Regina, SK.

growth forest has been significantly reduced[8]. Between 1966-1976 and 1996-2006, the number of pulp mills discharging into the Athabasca basin increased from one to five; total farm area increased from 47.2 million acres to 52.1 million acres; the number of operating oil sands leases increased from two to 3,360; water withdrawals increased from approximately 12 million m^3/yr to 595 million m^3/yr, of which more than 70% can be attributed to oil sands operations. Between these two time periods the cumulative annual flow in the Athabasca River decreased by more than 500 m^3/s and temperature increased by 1.4°C; conductivity, turbidity, and phosphorous levels also increased[9]. None of the actions identified above, including those subject to environmental assessment, were deemed to have a significant cumulative environmental effect on the Athabasca River.

As illustrated by these cases, environmental assessment without CEA misses the point; the need to recognize and prevent irreversible and undesirable environmental effects. It is a widely understood that cumulative effects are the only effects that really matter[10], and that cumulative effects assessment is environmental assessment done right[11]. We agree with this view.

Part of what leads to scenarios like those described above is that cumulative effects are often ignored or diminished in project assessment, sometimes deliberately. Quite often, individual developments are evaluated independently of other activities, and thus deemed 'unlikely' to cause significant adverse environmental effects. In other cases, the magnitude of a project's impacts are also erroneously 'measured against' or 'compared to' the effects of other projects, versus focusing foremost on the overall effects to VEC conditions. When the significance of a project's effects is evaluated from the perspective of the additional stress placed on VECs that are already stressed by other sources, it is far more likely to be deemed unacceptable, particularly in regions of concentrated development where environmental thresholds may already be exceeded.

Project proponents must address cumulative effects as part of their EIS and not pass them off as the responsibility of future proponents, or attribute their project to only a 'small drop in the bucket.' Some imperatives to address cumulative effects include:

- International and Canadian good practice guidelines for environmental assessment require it, as do various Canadian and provincial environmental assessment laws and regulations;
- Increasing political and private commitment to sustainable development initiatives to ensure the effects of present day developments do not fundamentally compromise the ability of future generations to survive;

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8 See Schneider R 2002. Alternative Futures, Alberta's Boreal Forest at the Crossroads. Alberta Centre for Boreal Research. http://www.borealcentre.ca/reports/book/0%20Title.pdf

9 Squires A, Westbrook C, and Dubé M 2010. An approach for assessing cumulative effects in a model river, the Athabasca River Basin. *Integrated Environmental Assessment and Management* 6(1): 119-134.

10 Ross WA 1994. Assessing cumulative environmental effects: Both impossible and essential. Keynote address, in *Conference on Cumulative Effects Assessment in Canada: From Concept to Practice,* A Kennedy (ed.), Calgary, AB: Alberta Society of Professional Biologists.

11 Duinker PN 1994. Cumulative effects assessment: What's the big deal? Pages 11–24 in A. J. Kennedy (ed.), Cumulative effects assessment in Canada: From concept to practice. Alberta Society of Professional Biologists, Calgary, Alberta.

- The continued decline of ecosystems and loss of wildlife habitat documented on local, regional, and global scales;
- Mechanisms for regional, strategic environmental assessment are not yet in place in Canada, meaning that project-based assessment remains the primary process through which environmental impacts, including cumulative effects, must be addressed.

Responsible environmental assessment includes the assessment of cumulative effects.

2.3 The basic process of assessing cumulative effects

There are numerous guidance documents and academic papers[12] that describe the steps involved in CEA practice, including the Canadian Cumulative Effects Assessment Practitioners Guide. Generally speaking, the process of CEA can be described as a four-phased model (Fig. 2).

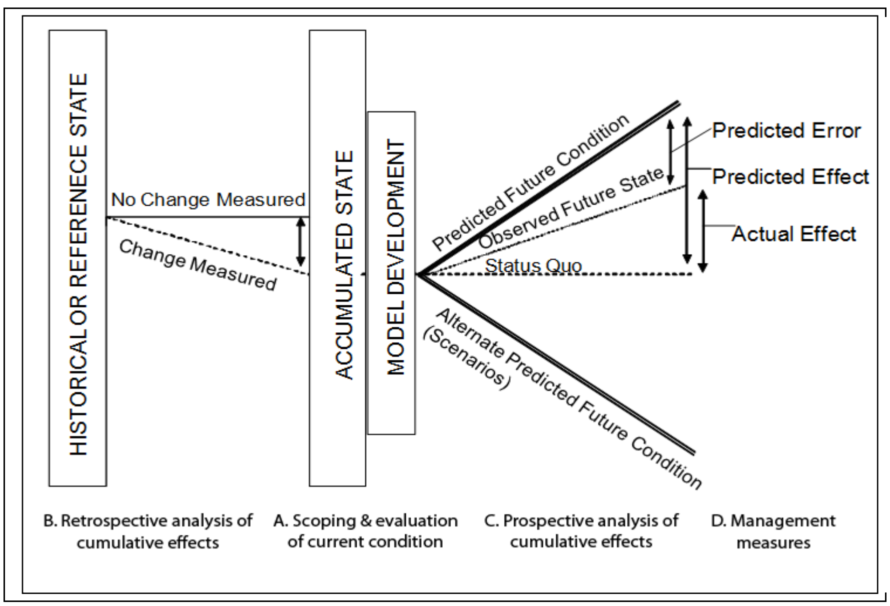

Figure 2. Conceptualization of a cumulative effects assessment model

Source: Based on Dubé M (Canadian Rivers Institute), Duinker P (Dalhousie University), Greig L (ESSA Technologies), Nadorozny N (University of Saskatchewan), Carver M (Aqua Environmental Associates), Noble B (University of Saskatchewan), Schreier H (University of British Columbia), Jackson L (University of Calgary) Westbrook C (University of Saskatchewan), McMaster M (National Water Research Institute), Servos M (University of Waterloo) , Patrick R (University of Saskatchewan),Putz G (University of Saskatchewan), Mazurek K (University of Saskatchewan), Munkittrick K (University of New Brunswick), as developed for the healthy rivers ecosystem assessment initiative, and depicted in the Lower Athabasca Water Quality Monitoring Program Phase I (Environment Canada, Cat. No. En14-42/2011E-PDF. The model is adapted in this report to illustrate the 'retrospective', 'baseline' and 'prospective' analytical phases.

12 Canter L, Ross B 2010. State of practice of cumulative effects assessment and management: the good, the bad and the ugly. *Impact Assessment and Project Appraisal* 28(4): 261-268.

A. Scoping the project to identify the incremental direct and indirect effects of the project on VECs. The scoping stage establishes all that will be included and all that will be excluded when evaluating a project's contribution to regional processes of change, and subsequent impacts on VEC sustainability. Good CEA adopts ecosystem health and functioning as a core determinant of VEC selection; thus effective CEA must be spatially and temporally bound based on the distribution of the VECs affected by both the project in question and the effects of other projects and disturbances – past, present and future.

B. Assessing historical VEC conditions and analyzing trends and changes in conditions over time and against thresholds. The development of a baseline for evaluation of cumulative effects is more than a description of current conditions, which alone can discount the effects of past changes as simply the 'new normal.' Baseline development requires a retrospective analysis of how VEC conditions have changed over time and whether that change is significant in terms of the sustainability of the VEC.

   An attempt is made to identify relationships between indicators of change in VEC conditions (e.g. caribou population; water quality indices) and measures of human or natural disturbance so as to determine trends and associations that can be used to predict VEC conditions or responses to future cumulative change. Select disturbance measures of interest in cumulative effects analysis may include the density of linear features per unit area on the landscape (e.g. road or trail density – kms / km^2), percentage disturbed landscape (e.g. cleared area)[13], edge density or perimeter area ratio[14], the rate of land conversion (e.g. rate and area of change from forested to non-forested), the number or density of river crossings (e.g. number of crossings per river km in a river reach), density of impervious or hard surfaces in a watershed (e.g. road surfaces, parking lots, etc. have been related to contaminant transfer and measurable responses in water quality)[15] and broader natural processes of change such as flood or fire frequency. The objective is to identify measures of the drivers of change in the region; characterize VEC or indicator responses over space and time; and identify – when and where appropriate – thresholds, management targets, or maximum allowable limits of change.

   These may be ecological thresholds, regulatory thresholds, best-practice management targets, or what is deemed socially acceptable based on consultation with resource users. Thresholds can be limits of change in a VEC indicator (e.g. a water quality parameter should

[13] For an example application of linear features and surface disturbance and metrics for cumulative effects assessment see Great Sand Hills Scientific Advisory Committee 2007. Great Sand Hills Regional Environmental Study. Canadian Plains Research Centre, Regina, SK

[14] Edge density and perimeter area ratio are fragmentation metrics or indicators of fragmentation on the landscape. Edge density is the linear distance of edge per unit area of landscape (m/ha). Perimeter area ratio is the ratio of the perimeter of a habitat patch to the total area of that patch. For example, patches that had elongated shapes, indented perimeters, or inclusions of open habitat within the fragment have been shown to have fewer species and individuals than forest stands with compact shapes and unbroken perimeters. See Long J, Nelson T, Wulder M 2010. Characterizing forest fragmentation: distinguishing change in composition from configuration. *Applied Geography* 30: 426-435.

[15] See Brydon J, Oh I, Wilson J, Hall K, Schreier H 2009. Evaluation of mitigation methods to manage contaminant transfer in urban watersheds. Canadian Journal of Water Quality Research 44(1): 1-15.

not exceed 'X'); or a limit of change in a stress or human disturbance, beyond which VEC conditions deteriorate (e.g. number of river crossings or density of linear features should not exceed 'Y').

Such thresholds or limits are considered when examining in the accumulated state (i.e., baseline) in order to understand the significance of past cumulative effects and the significance of potential future stress on the VEC of concern. It may be that a VEC is already in an unhealthy condition, thus any future changes in VEC condition would be considered significant. In many cases cause-and-effect relationships between disturbances and VEC responses may not be known, but correlations or qualitative associations can be relied upon.

C. Connecting the project and other actions in the region to the VECs in terms of potential condition changes and assessing the significance of aggregate effects on VEC condition. This is the prospective phase of CEA. Models are developed (spatial, linear, quantitative, qualitative), based on retrospective analysis and information gained from new data or lessons from elsewhere, to predict how VEC indicators (e.g., caribou population; water quality index) may respond to additional stress in the future – stress caused by the project and by other projects and actions in the regional environment (e.g., fragmentation; river crossings).

   The focus of analysis is on the VEC condition, and understanding VEC response to disturbance. This might include 'summing up' individual effects such that the total effects on VECs are evaluated and summarized into trend information; focusing on regional environmental issues and whether they will grow worse or better; assessing the effects on VECs of broad regional change agents such as 'surface disturbance' that are, by definition, cumulative and provide a measure of ecosystem health. Predicting such future conditions is often uncertain, and data are often incomplete. Hence, the use of scenario analysis is recommended, particularly for large projects, to address the range of possible future VEC conditions under different development/ disturbance regimes.

D. Identifying appropriate mitigation for those VECs subject to negative incremental effects from the project. Are the incremental or cumulative effects caused by the project significant? This requires consideration of the TOTAL effects on the VEC, including those effects of the project and other sources, rather than considering the 'relative magnitude' of the project's effects in comparison to effects caused by other actions. **Important to this determination is understanding how much more change in VEC conditions is tolerable.** This requires some assessment against the thresholds, management targets, or maximum allowable limits of change identified during the retrospective or baseline assessment. Viable management measures are then proposed, considering the range of possible future outcomes or VEC conditions, to mitigate or avoid the incremental effect of the project. In those cases where a VEC is already unhealthy or unsustainable, the management efforts must focus on rectification or restoration of conditions.

3.0 Approach to Reviewing the Bipole III Cumulative Effects Assessment

Section 4.2.1 of the EIS, 'Objectives and Process Overview,' states: "The environmental assessment process for the Project is consistent with provincial and federal environmental assessment legislation, guidelines and procedures, as well as best practices." Section 9.1 of the EIS further notes: "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)."

Although the Scoping Document for the EIS (Section 8.0) says that "The cumulative effects assessment framework will be defined in the EIS and will be based on CEAA guidance as well as best and current practices including the consideration of regional and strategic environmental assessment approaches;" we do not hold the proponent to this standard. A single project proponent can only accomplish so much in cumulative effects assessment under a project-based framework. Consistent with the Canadian Council of Ministers of the Environment[16], regional-strategic environmental assessment is a much better suited approach to cumulative effects assessment and such an approach is ultimately the responsibility of government. However, this does not mean that there are not expectations or good practice requirements for cumulative effects assessment under the project-based approach.

The EIS explicitly refers to 'best practices', but our review focuses on what we consider 'good' or 'reasonable' practice - a minimum standard of practice that acknowledges the constraints of assessing cumulative effects under a project-based framework. Our framework for review consists of four broad components, namely:

i. Scoping practices for cumulative effects assessment;
ii. Retrospective analysis of cumulative effects;
iii. Prospective analysis of cumulative effects; and
iv. Cumulative effects management measures.

These components reflect the basic elements of any good cumulative effects assessment. For each component we applied a number of criteria, in the form of questions, to evaluate the quality of the cumulative effects assessment in the Bipole III EIS (Table 1).

16 Canadian Council of Ministers of the Environment 2009. Regional Strategic Environmental Assessment in Canada: principles and Guidance. PN 1428. Canadian Council of Ministers of the Environment, Winnipeg, MB.

Table 1. Review criteria for the Bipole III cumulative effects assessment

Cumulative effects assessment component	Guiding criteria (review questions) for good practice
A. Scoping practices for cumulative effects	i) Is the cumulative effects assessment methodology distinct from the project impact assessment? ii) Does the CEA consider all types of activities and stresses (human-induced and natural disturbances) that may interact with the project's effects on VECs? iii) Does the cumulative effects assessment adopt 'ambitious', ecologically-based scoping? iv) Is an explicit rationale for valued ecosystem component selection documented? v) Do the spatial boundaries reflect the natural distribution patterns (present and historic) of valued ecosystem components selected for the cumulative effects assessment? vi) Does the CEA adopt 'pre-disturbance' conditions as the historic temporal limit and capture other certain and reasonably foreseeable future projects and activities?
B. Retrospective analysis of cumulative effects	i) Does the baseline analysis delineate past and present cumulative effects (i.e. VEC condition and condition change) in the study area? ii) Does the baseline analysis establish trends in VEC conditions (spatial or temporal) and known or suspected relationships between changes in VEC conditions and the primary drivers of change? iii) Are thresholds specified against which cumulative change and the significance of effects can be assessed?
C. Prospective analysis of cumulative effects	i) Is the time scale of cumulative effects predictions/analysis sufficient to capture the scope of impacts associated with the project's life cycle? ii) Is there sufficient analysis/evidence to support conclusions about potential cumulative effects? iii) Are the tools and techniques used capable of capturing the complexities (e.g. non-linear relationships, critical thresholds) of cumulative effects pathways and uncertainties of future developments? iv) Are trends and linkages established between VEC conditions and disturbances in the baseline analysis used to inform predictions about cumulative impacts? v) Is the cumulative effects analysis centred on the total effects on VECs in the project's regional environment?
D. Cumulative effects management measures	i) Is the significance of a project's cumulative effects measured against a past reference condition and not simply the current, cumulative or disturbed condition? ii) Is the significance of cumulative effects adequately described and justified (e.g. based on regulatory thresholds, environmental policies, expert evaluation, public concerns, etc.) and based on VEC sustainability, defined by a desired or healthy condition or threshold as opposed to the magnitude of the individual project stress on that VEC? iii) Are the incremental impacts of the proposed initiative 'traded off' against the significance of all other disturbances of activities in the region (i.e. minimized or masked)? iv) Are mitigation measures identified that help offset significant cumulative environmental effects, and if so, is consideration is given to multi-stakeholder collaboration to develop joint management measures? v) Is adaptive management identified for significant cumulative effects contingent upon future and uncertain developments and impact interactions?

These principles and criteria are not new and have existed in the scientific literature and good practice cumulative effects assessment guidance for some time. The principles and criteria are derived from a number of sources, including the Cumulative Effects Assessment Practitioner's Guide; the two leading international scientific journals on environmental assessment practice (*Environmental Impact Assessment Review* and *Impact Assessment and Project Appraisal*); publically available books and technical guidance on good practices in cumulative effects assessment in Canada[17-18]; select guidance from other jurisdictions (e.g. Canadian Council of Ministers of the Environment, Government of Alberta)[19]; and other project-based reviews of cumulative effects assessment in Canada. We also referred to Canter and Ross's recent review of 'the good, the bad and the ugly' in cumulative effects assessment and the lessons emerging for practice[20]. The information sources used to develop our criteria for review are all available in the public domain through the Internet and University libraries.

Our approach is typical of any review of cumulative effects assessment practice, and was modeled after a previous review of cumulative effects assessment in 12 EISs across Canada by Baxter et al[21]. Their review focused on a range of projects, including hydroelectric projects, linear developments, and mining and energy developments. To complete our review, we went beyond the information contained in the cumulative effects chapter of the EIS (Chapter 9) to include other relevant sections of the EIS and accompanying technical reports (Table 2). We adopted this approach because Chapter 9 of the EIS is largely descriptive of cumulative effects, presenting overall conclusions rather than analysis, and because the chapter refers explicitly to other chapters of the EIS for the cumulative effects analysis which, in turn, refer to the supporting technical reports. We did not attempt a detailed analysis of VEC-specific methods; we leave that to the experts in the respective disciplines.

Table 2. EIS materials reviewed

Environmental Impact Statement Chapters[1]	Additional EIS Supporting Documentation and Reports[2]
▪ EIS Executive Summary ▪ Chapter 1 – Introduction ▪ Chapter 3 – Project Description ▪ Chapter 4 – Environmental Assessment Approach ▪ Chapter 6 – Existing Environment ▪ Chapter 7 – Identification and Evaluation of Alternative Routes and Sites ▪ Chapter 8 – Effects Assessment and	▪ EIS Scoping Document ▪ Aquatic Environment Technical Report (November 2011) ▪ Caribou Technical Report (November 2011) ▪ Environmental Impact Statement – Supplemental Material (July 2012) ▪ Forestry Technical Report (November 2011) ▪ Habitat Fragmentation Technical Report (November 2011) ▪ Mammals Technical Report (November 2011) ▪ Socio-economic Baseline Report (November 2011)

17 Noble B 2010. Introduction to Environmental Impact Assessment: A Guide to Principles and Practice. Don Mills, ON: OUP

18 Beanlands G, Duinker P 1983. An Ecological Framework for Environmental Impact Assessment in Canada. Institute for Resource and Environmental Studies, Halifax, NS and Federal Environmental Assessment Review office, Hull, Quebec.

19 See, for example, http://environment.alberta.ca/documents/CEA-in-EIA-Reports-Required-under-EPEA.pdf; http://www.fpb.gov.bc.ca/SR39_Cumulative_Effects_From_Assessment_Towards_Management.pdf; http://www.ccme.ca/assets/pdf/rsea_in_canada_principles_and_guidance_1428.pdf

20 Canter L, Ross B 2010. State of practice of cumulative effects assessment and management: the good, the bad and the ugly. *Impact Assessment and Project Appraisal* 28(4): 261-268.

21 Baxter W, Ross W, Spaling H 2001. Improving the practice of cumulative effects assessment in Canada. *Impact Assessment and Project Appraisal* 19(4): 253-262.

Mitigation ▪ Chapter 9 – Cumulative Effects Assessment ▪ Chapter 11 – Environmental Protection, Follow-up and Monitoring	▪ Supplemental Caribou Technical Report (August 2012) ▪ Terrestrial Ecosystem and Vegetation Technical Report (November 2011) ▪ Terrain and Soils Technical Report (2011)

[1] Includes appendices and maps where applicable.
[2] Our review of the technical reports focused primarily on supporting evidence for the conclusions made about cumulative effects in Chapter 9. For example, spatial and temporal scope of the technical reports, analytical approach to cumulative effects, and how future and prospective projects and activities were considered.

4.0 Overall Assessment

The results of our review of the Bipole III CEA are detailed in Appendix A and include reference to specific sections of the EIS and accompanying technical reports. Below, we provide an overview of our findings and conclusions.

Overall, we conclude that the Bipole III cumulative effects assessment falls short of good practice, and significantly short of the standard identified in the EIS Scoping Document, which commits to a cumulative effects assessment that is based on "...guidance as well as best and current practices including the consideration of regional and strategic environmental assessment approaches". The cumulative effects assessment is limited in spatial and temporal scale, focused on the relative magnitude of the Project's additional effects as opposed to cumulative effects, and based largely on assertions without supporting analyses.

There are a number of concerns about the quality of the cumulative effects assessment, the Proponent's approach to cumulative effects assessment, and the absence of supporting evidence to support the Proponent's conclusions about past and future cumulative effects. These concerns are summarized below and, in our view, highlight **significant deficiencies**. Supporting details and evidence are provided in the Appendix.

i) The baseline against which cumulative effects are assessed largely ignores the cumulative effects on VECs of past actions and changing VEC conditions over time. The baseline is defined as current environmental conditions, representing a substantial shift forward in time from a previous or 'pre-disturbance' condition. The effects from past and existing projects are absorbed into the current baseline condition, thereby ignoring incremental changes in VEC conditions over time and discounting the significance of any additional change to VEC conditions caused by the project. The CEC previously identified this approach to establishing the baseline as problematic in the Wuskwatim project, as it dismisses the significance of past effects and does not allow for accurate interpretation of significance of the Project's future effects. The problem in not considering past conditions and changes over time in VEC conditions is that the current state of a VEC may already be in or approaching an unhealthy condition; any additional effect, regardless of the magnitude, may be significant.

ii) There is a lack of supporting evidence/analysis of cumulative effects to support many of the conclusions. Statements about the Project's cumulative effects are often vague, qualitative and inadequately evidenced. The baseline is descriptive in nature; few trends or condition changes are identified and analyzed and thus there is little means to predict or model cumulative effects into the future. We found little evidence of trends analysis, extrapolation, establishing stress-response associations, or modeling of future VEC conditions. Statements are often made about the cumulative effects of future projects and actions that extend beyond the temporal scope of any supporting analysis. We also observed some statements and conclusions about cumulative effects that seem contradictory based on information presented elsewhere in the EIS and accompanying technical reports, or are not supported by that information.

iii) The temporal scope of analysis is insufficient and inconsistent with the lifetime of the project (stated to be 50 years, but more likely 100 years+), and a step backwards from the Wuskwatim EIS for some VECs. The temporal scope of the Wuskwatim cumulative effects assessment was a 10-year time horizon; it was deemed insufficient by the CEC. The Bipole III cumulative effects assessment adopted only a 5-year horizon, based on the recommendation of Manitoba Hydro, for what is arguably one of the VECs of most significant concern: caribou + habitat. However, assertions are made about the cumulative effects of future projects and activities beyond the scope of the 5-year analysis. Within this 5-year timeline it is not possible to capture the potential cumulative effects associated with other projects and activities identified in the EIS. The cumulative effects of future and prospective projects are largely assertions without supporting analyses. In terms of future and prospective projects included in the CEA, no planned activities beyond 2024 were considered.

iv) The CEA is not 'ecologically-driven.' The majority of VEC conditions are not examined with the context of regional ecological health, but rather from the perspective of absorbing the Project's stress; much of the effects analysis does not adopt ecological units or zones as the basis for impact prediction (although it does for description), and is largely restricted to the ROW; and, with the exception of caribou habitat, few thresholds are utilized in significance determination. The most obvious cumulative effect of a linear development is landscape fragmentation and its effects on wildlife habitat. These effects are critically important given the proximity of the Bipole I & II and Bipole III corridors. The CEA also ignores a key ecological stressor under the direct control of the proponent for the entire life of the project: vegetation management, which can either significantly exacerbate or alleviate fragmentation effects depending on its nature.

v) Responsibility for future cumulative effects of the project are either displaced or dismissed by suggesting they will be absorbed through prior established mitigation and compensatory programs, ongoing adaptive resource management initiatives and partnerships with government, and future environmental assessments and licensing processes. This 'passing the buck' or avoiding responsibility for assessing and managing cumulative effects is poor practice, and ensures that the cumulative effects of hydro development are never adequately analysed or addressed by the proponent.

vi) Finally, and perhaps most significantly, the approach to cumulative effects assessment is dismissive of the cumulative effects of the project in combination with the effects of other past, current and future and prospective projects and activities. The EIS often assesses the magnitude of the Project's impacts against or 'compared to' the effects of other actions, versus 'in addition to' past changes in VEC conditions and 'in addition to' the effects of other current and future actions. As a result, the TOTAL or aggregate effects of the Project on VECs are rarely addressed or analyzed; only the coincidence effects with the Project with each other individual project or activity are considered. This is a misrepresentation (or misunderstanding) of a cumulative effect. It dismisses the potential for cumulative effects on VECs because the project's effects are viewed as 'relatively less significant' and therefore non-cumulative. The significance of a cumulative effect should not be measured by the magnitude of a project's incremental contribution; the significance of a cumulative effect is measured based on the significance of the total effect of all actions on the VEC – regardless of how small or large the project's own contribution. A project could add very little additional stress to a VEC, but the cumulative effect could be very significant.

5.0 RECOMMENDATIONS

Our first set of recommendations is specific to the Bipole III Project EIS and cumulative effects assessment, and is based on the deficiencies identified above. Our second set of recommendations addresses broader systemic issues concerning cumulative effects assessment in Manitoba. These are based on the lessons emerging from our review of Bipole III Project EIS and also in consideration of regional and strategic environmental assessment approaches. Collectively, the recommendations are meant to address the need to ensure that the cumulative effects of the Bipole III Project are properly considered, and also that future projects in the region are sufficiently assessed and managed.

5.1 Recommendations specific to the Bipole III Project EIS cumulative effects assessment

i) We recommend that the baseline assessment examine trends or changes in VEC conditions from pre- or previous-disturbance conditions (at a minimum pre-Bipole I and II) to current conditions, and examine the health of VECs against ecological thresholds, regulatory thresholds, or desirable conditions.
ii) We recommend that the baseline assessment examine trends or changes in disturbance conditions (e.g., river crossings, linear features, fragmentation, etc.) in the study area.
iii) We recommend that the temporal scope of the cumulative effects assessment consider in its analysis the full range of future and prospective projects and activities identified in Chapter 9 of the EIS.

iv) We recommend that the analysis of cumulative effects extend beyond the limited 5, 10 and 20-year horizons identified in the EIS to be consistent with: i) the temporal scope of future and prospective projects and activities identified in Chapter 9 of the EIS, and ii) the lifecycle of the Project.

v) We recommend that the predictive component of the cumulative effects assessment identify maximum allowable disturbances or potential thresholds (e.g. density of linear features, fragmentation, number or density of river crossings), that can be used to evaluate the risks to VEC sustainability under future development or disturbance conditions.

vi) We recommend that the cumulative effects analysis consider, at a minimum, all other hydroelectric generating and transmission projects – including the effects of past projects and future and prospective projects.

vii) Given the noted uncertainty in the EIS of the nature and types of prospective developments in the region, we recommend that the cumulative effects analysis adopt a scenario-based approach to modeling the effects of future surface disturbances, such as those associated with linear features, habitat fragmentation, and river crossings and use appropriate analytical methods and tools to do so.

viii) We recommend that the significance of the Project's cumulative effects are re-examined based on the TOTAL effects of all activities on the VECs of concern, rather than examining the coincidence effects with each individual future or prospective project.

ix) We recommend that an analysis of cumulative effects be undertaken (e.g., modeling, simulation, trends, extrapolation), and the evidence provided in the EIS to support the assertions about cumulative effects.

x) We recommend that the Project not proceed until a cumulative effects assessment is completed that sufficiently addresses the above recommendations.

5.2 Recommendations for ensuring good practice cumulative effects assessment and management

i) We recommend that the *Environment Act* be updated to clearly express requirements for the analysis of the cumulative effects of land-use projects in order that a more realistic assessment of the impacts of human activities can be determined.

ii) We recommend that the *Environment Act* be updated to disallow phased-in approval processes that coincide with project planning and development. Although attractive to developers planning large projects, it serves to fragment a development and potentially limits the effectiveness of efforts to assess cumulative environmental effects.

iii) The EIS Scoping Document refers to regional and strategic approaches to cumulative effects assessment. We recommend that the Government of Manitoba undertake immediately a regional-strategic environmental assessment of the cumulative effects of current and future land uses, particularly in the northern portion of the Bipole III study area[22].

iv) We recommend that the Government of Manitoba implement regional monitoring program

[22] In the Great Sand Hills of southwest Saskatchewan, an area rich in both natural gas and biodiversity, the Government of Saskatchewan imposed a moratorium in 2005 on further gas development (including gas well pads, exploration, and access roads) until a regional environmental assessment of the potential cumulative effects of development, and an accompanying land use plan, were completed.

for watershed health, focused on monitoring river system condition and landscape change (e.g., linear disturbances, riparian habitat, fragmentation) in order to provide project proponents with a reliable dataset on which to base their cumulative effects assessments and to identify thresholds of ecological change or disturbance for the region.

Appendix A

Appendix A contains supporting evidence for the conclusions and recommendations made in the body of the report. A full and detailed analysis of the Bipole III cumulative effects assessment is presented herein; observations are recorded for each stage of the process along with accompanying, illustrative examples drawn from the EIS and associated technical reports.

1.0 Scoping Practices for Cumulative Effects Assessment

Cumulative effects assessment as a process consists of a few core stages which are, broadly speaking, scoping, effects analysis, and effects management[23]. Scoping is a judgment process to determine "from all a project's possible impacts and from all the alternatives that could be addressed, those that are key, significant ones"[24] and should be subject to further assessment. A primary challenge is to balance the need for environmental precaution against the need for efficient decision-making[25]. Scoping for the CEA portion of an EA is a distinct process from scoping performed more generally for the EA, and at a minimum includes: i) a methodology that recognizes cumulative effects as different than project effects; ii) consideration for all types of stressors (human-induced and natural) that may interact with the project's effects on VECs; iii) assessment parameters (VECs, boundaries) that are ecologically meaningful; iv) a clear rationale for VEC selection; v) spatial boundaries that reflect the natural distribution patterns (present and historic) of selected VECs; and vi) temporal boundaries that adopt both a pre-disturbance state as the historic temporal limit and a long-term planning horizon when estimating future conditions. The scoping stage in a CEA is critically important because it determines all that will be included and all that will be excluded when evaluating a project's contribution to regional process of changes and impacts on valuable environmental and social factors important to society.

1.1 Is the cumulative effects assessment methodology distinct from the project impact assessment?

To determine how well a CEA was scoped, one must first determine whether in fact a CEA was performed, and this is based upon whether or not a distinct CEA procedure can be detected. At the heart of any CEA is an effects analysis methodology—i.e. *a scientifically-based, systematic, step-wise procedure*—and this methodology should be easy to locate and clearly described within the EIS. The Bipole III EIS contains a separate CEA chapter; however, because the CEA methodology is enmeshed with the project impact assessment methodology (Chapters 6 and 8), the two are markedly indistinct. At the centre of the Bipole III CEA methodology, as described in Chapter 9, are two "high level screening assessments"; one for bio-physical VECs (see Table 9.3-1) and one for socio-economic

[23] Canter, L 2000. Addressing cumulative effects within impact study documents. Presented at the 20th Annual Meeting of the International Association for Impact Assessment, Hong Kong, June 19-23.

[24] See p. 90 in: Glasson J, Chadwick, Therivel R 1999. Introduction to Environmental Impact Assessment, 2nd ed. London, UK: Spon Press.

[25] Snell T, Cowell R 2006. Scoping in environmental impact assessment: Balancing precaution and efficiency? *Environmental Impact Assessment Review* 26: 359-376.

effects (see Table 9.3-2). Each of these is a simple checklist that screens a short list of environmental sub-components (VECs) for potential coincidence of effects on the environment related to the effects of the Project.

The EIS does not explicitly describe how the "high level screening assessments" were performed, or on what basis decisions were taken when classifying possible adverse effects of the Project on "environmental sub-components" as: "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); or "potentially non-negligible cumulative effects" (see Chapter 9, Table 9.3-1). This is also an issue of concern for evidence-based approaches to the analysis of cumulative effects (see Section 3.2 in this Appendix).

The "high level screening assessments" that form the basis for the Bipole III CEA result simply in a cursory 'check' for potential cumulative effects that could be attributed to the Project. Simply 'checking' for cumulative effects does not equate to actually 'analyzing' those effects in some meaningful way (again, see Section 3.2). It is incorrect to equate a project effects assessment methodology with a CEA methodology, although they may employ some similar types of retrospective and prospective predictive activities. Cumulative effects assessment was introduced because of the widely held view that a *separate analysis* of that class of effects, distinct from the assessment of direct and immediate project effects, was necessary to understand the relationship of projects to their location (political, social, economic, ecological context) and surrounding land uses (other development projects). The Bipole III CEA falls considerably short with regard to this basic principle.

1.2 Does the CEA consider all types of activities and stresses (human-induced and natural disturbances) that may interact with the project's effects on VECs?

Cumulative change can be understood as the result of combined threats to VECs via multiple environmental or pathways emerging from biological, chemical, physical, and psycho-social stressors[26] over space and time. In the Bipole III EIS, a variety of projects and related disturbances are initially considered in the scoping stage of the CEA (see Tables 9.2-1, 9.2-2, 9.2-3), but most are excluded from consideration within the "high level screening assessments" performed later on (see project list for bio-physical screening on p. 9-14; project list for socio-economic screening on p.9-22).

- **Example 1:** With regard to "past and existing projects and activities": all six of these were either excluded from the CEA entirely or said to be dealt with in Chapters 6 and 8 of the EIS. <u>No</u> "past or existing" projects are included in the "high level screening assessments" (Chapter 9, p. 9-7). <u>It is of great concern that there is no explicit consideration for the existing Bipole I & II HVdc transmission right-of-way (ROW) in the CEA</u>: a past project developed by the proponent with likely implications for cumulative linear fragmentation effects in combination

[26] Callahan M, Sexton K 2007. If cumulative risk is the answer, what is the question? *Environmental Health Perspectives* 115(5): 799-806.

with the proposed Project. Proposing to locate major two transmission rights-of-way in relatively close proximity (often within 50 kms of one another) in a roughly parallel fashion extending more than 1,300 kms would seem to pose an obvious questions about fragmentation and habitat consequences that should be explored directly in a CEA. The EIS acknowledges that multiple existing (utility) corridors, such as water pipelines, fiber optics line and provincial highways and roads, winter road development "could result in habitat disruption and fragmentation effects" and "contribute to the direct mortality of VEC individuals and increased access to adjacent areas by recreational users (e.g. snowmobilers)" (see Chapter 9, Table 9.2-1). However, it is claimed these issues are primarily addressed as part of earlier baseline and effects assessment.

- **Example 2:** With respect to "future projects and activities" only four projects are included in the "high level screening assessments" (Chapter 9, p. 9-9); three of these are the proponent's own hydro-electric utility projects and the other is urban residential development in one town: Gillam, Manitoba.

- **Example 3:** With respect to "prospective future projects and activities" again, four projects are included in the "high level screening assessments" (Chapter 9, p. 9-9); one of these is the proponent's own Conawapa Generating Station project and the other three are broad sectors of activity, namely forestry, mineral exploration and development, and agriculture.

The Bipole III CEA is at the same time narrowly focused upon a sub-set of its own activities (exclusive of the Bipole I & II ROW) and too broadly focused on entire development sectors (e.g. "forestry operations" and "road development"), rather than on specific sectoral projects and activities. For example, the CEA could have considered the nickel belt area (segment 4 and other northern segments) away from which the corridor was specifically moved to accommodate future mining activities and where there is close proximity to the Wabowden caribou herd. In general, the proponent's awareness of the future development plans of other sectors is weak. With respect to the other development sectors considered (mining, wind energy, forestry, housing construction, agriculture, etc.) few specifics of planned projects are provided. The following statements made in Chapter 9 (see Tables 9.2-2 and 9.2-3) illustrate this point:

- **Example 1:** "…future mine developments are difficult to predict…"

- **Example 2:** "…no specific (wind energy development) projects have been identified…"

- **Example 3:**. "…current and future agriculture activities (are not specifically identified)…"

Further, natural disturbances on the landscape, and how they may exacerbate the Project's residual negative effects, are not considered in the Bipole III CEA; nor are other types of human-induced stresses such as utility vegetation management regimes. The exception is the consideration of natural fires, as part of the caribou technical report.

- **Example 1:** There is no inclusion of natural disturbance factors or events of an ecological nature that can sometimes, where relevant scientific data and models exist, be predicted with some degree accuracy[27] that is sufficient for long-term planning and assessment, including: 50- or 100-year flood events; climatic cycle variations related to droughts; 'blowdown' events; cyclical, old growth forest fires; etc.

- **Example 2:** There is no consideration of human-induced stresses related to the operation and maintenance of the proposed Project, particularly the transmission ROW. One of the major determinants of stress placed upon the biophysical environment by the Project following completion of the Bipole III transmission ROW is the nature of the vegetation management program which will be in effect for the lifetime of the Project (set at 50 years on p. 9-28 of the Bipole III EIS, but is acknowledged to be 50-plus years in MB Hydro's Vegetation Management Practices policy document for transmission lines and stations, last updated in 2007). A major transmission corridor and its infrastructure will likely remain in place, in full operation and subject to vegetation management interventions, indefinitely into the future). If vegetation management activities consist largely of repetitive, non-selective forms of vegetation suppression (e.g. tractor-based mowing or broadcast herbicide application), the stress to the environment caused by fragmentation will be much greater than if a strategic and site-specific selective mowing and spraying regime is adopted to cultivate a diverse, stable, mid-seral stage vegetative community[28] that is attractive to local wildlife. This is because non-selective, non-site specific vegetation management generally involves suppressing all vegetation on the ROW by pushing it over with tractor mowers every 5-7 years. If hundreds of kilometres of a transmission line are simply mown to the ground repeatedly, some significant stresses to local wildlife can occur related to:
  i. Rendering the ROW impassable to ungulates by creating deep and extensive mats of tangled and broken logs, branches, and stumps;
  ii. Creating a wide opening in forested areas by removing vegetative 'cover' that many wildlife species require to feel safe from predators when crossing open spaces. The removal of vegetation is a major contributing factor to the landscape fragmentation effect. Species can be restricted to one side of the ROW or another if the opening is too wide, or rendered impassable as above. This is of particular to concern to migrating animals trying to reach nesting, rutting, and feeding grounds, and especially local/regionally important water sources; and
  iii. Disadvantageous "edge effects"[29] such as increasing opportunities for predation and hunting along the ROW, if dense, low-growing shrubbery is not encouraged to re-establish.

[27] "Events that could be predicted with some accuracy include 50- and 100-year flood events, if there is a long term Water Survey of Canada stream gauge nearby such as exists for the Nelson River. It would be correct to say that in the next 25-50 years, it is roughly equally likely that floods and droughts would occur in northern Manitoba and thus be of concern for Manitoba Hydro." Source: Westbrook C, 2000. Personal communication. Hydrologist, University of Saskatchewan.

[28] Harriman J 2000. Toward a Conceptual Framework for Integrated Resource Management on Electric Utility Transmission Rights-of-Way. Master's Thesis. University of Northern British Columbia: Prince George, British Columbia.

[29] An "edge-effect" is the effect juxtaposing contrasting environments in an ecosystem; can be associated with increased biodiversity but is also associated with decline in environmental conditions for original species and increased opportunities for predation.

The Bipole III CEA does not consider vegetation maintenance as a significant future activity contributing to environmental stress, though in fact is a core determinant of the severity of the Project's fragmentation effects throughout its lifetime. The proponent, in a Vegetation Management Practices policy document for transmission lines and stations, reports that "currently the most extensively used tree control method on northern transmission line rights-of-way is the Winter Shearing method"[30], in other words, non-selective tractor-based mowing. It is acknowledged that non-selective mowing can be used effectively as part of site-specific vegetation management solutions to bring overgrown vegetation back under control, and that the proponent does employ a range of selective vegetation maintenance techniques (for e.g. hand cutting, basal bark sprays, stump treatments).

However, in order for the fragmentation effect of a ROW to be significantly reduced, site-specific vegetation management strategies would have to be ubiquitously employed and sensitive to the local wildlife habitat context immediately off-site. The site-specific approach to vegetation management (prevalent on BC Hydro's northern transmission lines throughout the 1990s[31] can result in very positive effects for local wildlife and greatly alleviate the stress of landscape fragmentation by:

i) Cultivating diverse forms of shrubbery and other edible plants which provide a supplemental, accessible, and dependable food source to a wide variety of wildlife species that may not be available in elsewhere in the area;
ii) Providing alternative habitat options for small fur-bearers through the establishment of strategically-located wood piles;
iii) Reducing or eliminating entirely the use of herbicidal sprays over large tracts of the ROW; and
iv) Cultivating a dense, mid-seral stage vegetative community that re-establishes cover for wildlife desiring to cross the ROW.

This approach has been proven to (i) increase the long-term cost efficiency of vegetation management programs; (ii) reduce the volume and frequency of treatment cycles required to achieve line clearance and reliability standards; (iii) significantly enhance wildlife habitat; and (iv) enhance social resource values, particularly related to recreation[32]. The Bipole III CEA should have considered alternative vegetation management scenarios in its effects analysis, to help determine the long-term effects of landscape fragmentation set in motion by ROW construction.

- **Example 3:** In responding to certain public Requests for Information about the CEA, the Proponent has also missed the opportunity to consider other potentially significant stressors

30 See p. 4 in: Manitoba Hydro 2007. Transmission Line & Transmission Station Vegetation Management Practices.
31 Harriman J 2000. Toward a Conceptual Framework for Integrated Resource Management on Electric Utility Transmission Rights-of-Way. Master's Thesis. University of Northern British Columbia: Prince George, British Columbia.
32 Harriman J 2000. Toward a Conceptual Framework for Integrated Resource Management on Electric Utility Transmission Rights-of-Way. Master's Thesis. University of Northern British Columbia: Prince George, British Columbia.

such as the designation of a new Wildlife Management Area and the closure of certain existing areas to moose hunting (see CEC/MH-VII-519). If new wildlife management areas (i.e. wildlife population protection or enhancement strategies) are introduced in the Project region, this could possibly displace hunting pressures to the proposed Bipole III transmission ROW. Similarly, if certain hunting areas are close, hunting pressures on the proposed ROW could increase. Transmission ROW access roads, which often traverse the ROW itself, can be very attractive to local game hunters as they provide relatively easy access to wildlife (especially ungulates) attracted to the ROW to browse shrubs.

In summary, the Bipole III CEA exhibits lack of effort to take a broader, more holistic approach to identifying key activities and stressors, at least two of which are their own (Bipole I & II ROW; vegetation management).

1.3 Does the cumulative effects assessment adopt ambitious, ecologically-based scoping?

While the regulatory context will influence CEA scoping decisions, good-practice CEA adopts 'ambitious' ecologically-based scoping. 'Ambitious' (as opposed to restrictive) scoping means adopting a "liberal interpretation of mandate"[33]. When used creatively, 'ambitious' scoping is highly influential in shaping the overall success of an assessment process, and particularly so in CEA which by definition requires an expanded view of project-environment interactions. Ecologically-based scoping is simply that which adopts ecological health and functioning as a core determinant of VEC selection, boundary setting, and other aspects of the CEA analysis.

The EIS Scoping Document appears to reflect this understanding by stating that the CEA framework should adopt an 'ambitious', i.e. regional and strategic approach.

- **Example 1:** (EIS Scoping Document, Appendix 1B, p. 21) "The CEA framework will be defined in the EIS and will be based on CEAA guidance as well as best and current practices **including the consideration of regional and strategic environmental approaches**. These methods, assumptions, analysis and conclusions of the assessment will be documented in the EIS. Cumulative environmental effects will be considered throughout the EIS from scoping to significance evaluation and the results will be presented in a stand-alone chapter."

The EIS also acknowledges that a regional, strategic view of its construction plans should be taken and that core stakeholders are requesting one.

- **Example 2:** (Chapter 5, p. 5-19) "Manitoba Hydro understands that FLCN does not view the Bipole III Project in isolation, but rather, views the previous and future projects as a multi-staged, inter-dependent project. The cumulative impacts of all Manitoba Hydro projects are an important consideration for FLCN."

[33] See p. 367 in: Mulvihill P, Baker D 2001. Ambitious and restrictive scoping. *Environmental Impact Assessment Review* 21(4): 363-384.

However, despite these explicit acknowledgements, the CEA is scoped very narrowly. The scoping phase of an EIS is highly indicative of the willingness of a proponent to address 'big picture' questions. Often times, scoping is little more than a 'rationality ritual'[34] which is, simply put, the tendency to rationalize by whatever means necessary, the proponent's views on what is important to include in impact analysis. This is essentially what happens in the Bipole III CEA: the Project is compared with select list past, current, and future projects (summarized in Section 1.2), to identify only those instances where there is direct spatial and temporal overlap of the Project's effects with effects of the other projects, and where the effects of those other projects *are expected to change measurably over time*, and where that effect was not already addressed in Chapter 8 (effects assessment chapter). Where all such conditions are met, a project then falls within the scope of the CEA. The following statements taken from the Bipole III EIA illustrate how narrowly the CEA is scoped, and that scoping is not ecologically-based:

- **Example 1:** (Ch 9, p. 9-2) "The CEA approach considered those adverse residual effects of the Project on VECs (as identified 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 are not included in the CEA. Further, the CEA only includes VECs with an adverse effect of the Project that overlaps both spatially and temporally with the effects of other identified projects and human activities."

- **Example 2:** (Chapter 9, p. 9-2) The CEA addresses its own significant adverse residual effects "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."

- **Example 3:** (Chapter 9, p. 9-20) The approach to scoping socio-economic sub-components for the CEA is to identify "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."

This approach to scoping is clearly based on residual effects analysis (performed as part of the Chapter 8 effects assessment) and a set of 'rational' decision rules implicit to the proponent, rather than on ecological boundaries or relationships and the health conditions of VECs and regional ecosystems. 'Ecologically-based' scoping would require that CEA is scoped expansively enough to detect and analyze trends related to healthy or unhealthy ecosystem functioning, and the proposed project's possible contributions to those dynamics. Again, this is missing from the Bipole III CEA.

On the positive side, both biophysical and socio-economic sub-components (assumed to be equivalent of VECs, although not explicitly stated in Chapter 9) are featured in the Bipole III CEA and

[34] Gariepy M 1991. Toward a dual-influence system: Assessing the effects of public participation in environmental impact assessment for Hydro-Quebec projects. *Environmental Impact Assessment Review* 11: 353-74.

this is important given both the multifarious interests of CEA in human-environment interactions. It is also important given VECs are defined, whether for project effects assessment or CEA, as "environmental attributes...determined on the basis of perceived public concerns related to social, cultural, economic, or aesthetic values"[35]. Biophysical and socio-economic VECs are reported as follows:

- **Example 1:** In response to Information Request CEC/MH-VI-347a (p. 95), the Proponent explains both biophysical and socio-economic VES are incorporated throughout the assessment process:

Selection of VECs (Ch 4, Ch 6)	**Environmental Baseline (Ch 6)**	**Effects Assessment (Ch 8)**	**Cumulative Effects Assessment (Ch 9)**
46 biophysical	46 biophysical	44 biophysical	1 biophysical
21 socio-economic	21 socio-economic	20 socio-economic	3 socio-economic

- **Example 2:** Chapter 9 (Table 9.3-1, p. 9-14) adopts a slightly larger set of coarse-grained biophysical and socio-economic VECs for CEA (inconsistent with the information provided in CEC/MH-VI-347a), specifically:

Biophysical VECs	Soils & terrain Air quality & climate Groundwater Aquatic environment Terrestrial ecosystems & vegetation Mammals and habitat Birds and habitat Amphibians and reptiles Terrestrial invertebrates
Socio-economic VECs	Land use Resource use Economy Services Personal, family, and community life Culture and heritage

Because the Bipole III CEA is scoped so narrowly, essentially excluding all interactions except for direct spatial and temporal interactions among significant adverse effects of the Project and others, consideration for the biophysical and socio-economic VECs identified is highly restricted by definition. Thus, the Bipole III CEA does not display characteristics of 'ambitious', ecologically-based scoping.

[35] See p. 18 in: Beanlands G, Duinker P 1983. An Ecological Framework for Environmental Impact Assessment in Canada. Institute for Resource and Environmental Studies, Halifax, NS and Federal Environmental Assessment Review office, Hull, Quebec.

1.4 Is an explicit rationale for valued ecosystem component selection documented?

Multiple rationales can be employed to justify the inclusion of a VEC in CEA, and these are typically negotiated among the proponent, government representatives, and the public in a multi-staged consultation process. Valued ecosystem component selection rationales can include: regulatory concerns; ecological function/integrity; conservation/biodiversity value; social/recreational value; economic value; cultural value; traditional aboriginal use value; educational interest; human health interest; and scientific interest. Based on what is presented in Chapter 9, the only rationale for VEC selection in the Bipole III CEA appears to be the presence of significant adverse residual effects (although regulatory compliance is also assumed). Specifically, to be included in the Bipole III CEA, each VEC had to meet all of the following criteria:

i) Be subject to a significant negative residual effect (as determined in Chapter 8) (Chapter 9, p. 9-12);
ii) Be subject to a known spatial and temporal overlap with significant residual negative effects of other projects (CEC/MH-III-104, p. 118); and
iii) the suspected cumulative effect would have to measurably alter the significance of that effect, as determined in Chapter 8 (Chapter 9, p. 9-7 and p. 9-17).

Had the CEA employed ambitious, ecological scoping (described in Section 1.3), the VEC list in CEA should include, at minimum, (a) project VECs with significant adverse residual effects, (b) those that are required by legislation/regulations/policies (species at risk, etc.), and (c) any other project-affected VEC that may be subject to a cumulative effect in combination with other existing or anticipated activities and stresses in the project environment[36]. This latter rationalization for VEC inclusion is particularly important because it recognizes the broader context of the project development and its importance in determining impact significance.

Unfortunately, the Bipole III CEA does not also rationalize that some 'insignificant' Project effects may need to be elevated to the status of "significant, adverse" when considered in combination with the effects of other projects. A cumulative effect on a VEC may be significant, even though "each individual project-specific assessment of that same VEC concludes that VECs are insignificant"[37]. Similarly, the proponent does not take into account that certain significant, adverse cumulative effects may develop from Project interactions with other projects in the future.

- **Example 1:** (Executive Summary, p. 4 and 5) While the proponent predicts there will be significant adverse effects to some VECs for a period of up to at least 5 years (woodland caribou, public safety, transportation, and community services), the CEA is scoped to focus

[36] Hegmann G, Cocklin C, Creasey R, Dupuis S, Kennedy A, Kingsley L, Ross W, Spaling H, Stalker D 1999. Cumulative Effects Assessment Practitioner's Guide. Minister of Public Works and Government Services Canada.

[37] See p. 43 in: Hegmann G, Cocklin C, Creasey R, Dupuis S, Kennedy A, Kingsley L, Ross W, Spaling H, Stalker D 1999. Cumulative Effects Assessment Practitioner's Guide. Minister of Public Works and Government Services Canada.

only immediate and direct spatial and temporal interactions of significant negative residual effects of the Project with those of select other projects.

- **Example 1:** The EIS acknowledges that multiple existing (utility) corridors, such as water pipelines, fibre optics line and provincial highways and roads, winter road development "could result in habitat disruption and fragmentation effects" and "contribute to the direct mortality of VEC individuals and increased access to adjacent areas by recreational users (e.g. snowmobilers)" in the future (Chapter 9, table 9.2-1). However, it is claimed these issues are primarily addressed as part of earlier baseline and effects assessment.

The Bipole III approach to VEC selection is thus via residual effects analysis performed in the effects assessment (see Chapter 8). This is a common approach and, therefore, not unreasonable approach to the task. However, there are also other important rationales for including VECs in project-based CEA which extend beyond a standard residual effects analysis, and that a proponent can reasonably be expected to consider. For example, if wolf pack habitat ranges mapped in Chapter 6 (see map 6-21, roughly from The Pas northward) were briefly reconsidered from the perspective of cumulative habitat fragmentation caused by previous linear corridor developments and other developments in the Project Study Area (including highways, pipelines, the existing Bipole III ROW, etc.), concern for the additional incremental effects of the proposed Bipole III ROW to wolf habitat ranges may have arisen, and prompted the proponent elevate the status of this VEC to a VEC of concern in the CEA. In fact, the EIS acknowledges on the first page of Chapter 9 (p. 9-1) 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."

Yet, this is not done. The CEA could have adopted ecologically-based boundaries, extending beyond the Project Study Area, to determine more accurately the significance of the incremental effects of proposed Bipole III corridor on wolf pack habitat. The proponent misses all opportunities like this to reassess project VECs from the perspective of cumulative environmental change (and perhaps reassign their status with respect to CEA) because a re-evaluation of VEC importance is not included as part of the CEA scoping procedure.

1.5 Do the spatial boundaries reflect the natural distribution patterns (present and historic) of valued ecosystem components selected for the cumulative effects assessment?

As explained above in Section 1.4, CEA focuses on the receiving environment and considers all of the effects on given receptors[38]. For this reason, the spatial boundaries used in effects analysis must be sensitive to the natural distribution patterns of VECs (present and historic). Conversely, in the Bipole III CEA, the spatial boundary employed is that of the Project itself, which misses important fragmentation effects and possibly other cumulative effects. The Bipole III CEA boundaries are described as follows:

- **Example 1:** (Chapter 9, p. 9-2; CEC/MH-III-104, p. 119) The spatial boundary for the CEA is the broad, regional Bipole III Project Study Area (see Map 1-1 of the EIS).

- **Example 2:** (Executive Summary, p. iii) "As potential routing sites (for the Project's HVdc transmission line) were narrowed, Local Study Areas were identified. These consisted on three mile wide bands, down the center of which ran potential routes for the HVdc powerline."

- **Example 3:** (Executive Summary, p. iii) "Included in the Local Study Area were the areas immediately surrounding the other Project components, namely the two converter stations, the electrode sites and connecting electrode lines and the northern ac collector lines."

- **Example 4:** "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" (Chapter 9, p. 9-15).

The CEA boundary is clearly 'project-oriented', rather than 'VEC-centered', save for the case of caribou where "The spatial scale of the VEC assessment extends beyond the Project Study Area and was based on the actual ranges of the caribou populations in consideration" (Supplemental Caribou Technical Report, p. 68). The project-oriented nature of the CEA boundary is also apparent in that the CEA focuses only on direct spatial and temporal interactions of significant negative effects of the Project with those of other projects (stated throughout Chapter 9).

With respect to cumulative effects boundary setting, the Project Study Area (detailed in Chapter 1, Map 1-1) excludes important ecological landscape features beyond its eastern limits including: Lake Cedar; Lake Winnipegosis; Lake Manitoba; the Chitek Lake Reseve area which would be situated directly between the proposed Bipole III transmission corridor and the existing Bipole I and II

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[38] Therivel R, Ross W 2007. Cumulative effects assessment: Does scale matter? *Environmental Impact Assessment Review* 27, 365–385.

corridor; and all of the land east of the proposed Bipole III corridor's Study Area's eastern limit, including the existing Bipole I and II corridor, through to the western shores of Lake Winnipeg.

Boundaries to assess cumulative effects are typically regional in scale and should reflect functional ecological units or scales[39], though the Project in question will (generally) have a localized nature. Thus, CEA boundaries for the Bipole III Project should likely have extended eastward to shores of Lake Winnipeg to at least capture fragmentation effects from the existing Bipole I & II corridor.

The Executive Summary for the EIS points out that the Project assessment boundaries were compartmentalized into 13 segments (Executive Summary, p. iv), further complicating boundary setting for CEA and effects analysis. It is unclear whether, after the compartmentalized assessment of Project effects was completed, there was any subsequent aggregation of results to arrive at an estimation of the 'total' effects of the Project. This is an important point, because Chapter 9 claims that most significant negative residual effects of the Project were already sufficiently considered in Chapter 8. That would be next to impossible if the effects assessment in Chapter 8 was done in numerous small pieces. Even if the results of the 13 separate effects analyses were later 'added up', the Bipole III EIS would suffer from the effects of what is known as the "problem isolation paradigm" in natural resources management[40], which involves:

> "…breaking down a given problem until its simplest and most basic elements have been isolated; solving each element in turn, independently of the others; and recombining individual solutions into a complete solution to the original problem."

This type of approach fails to appreciate the interconnectedness of individual components in an ecosystem, and the life-sustaining dynamics among them.

Finally, no explicit spatial context is provided for the "high level screening assessment" with respect to <u>socio-economic</u> VECs in Chapter 9. Rather, effects of the Project and other projects on socio-economic environment sub-components appear to be generalized to the entire Study Area (see Table 9.3-2) (as was done for biophysical sub-components). In other words, effects on land use, resource use, economy, services, personal, family and community life, and culture and heritage are not localized to particular urban settlements or rural wards, nor systematically addressed on either a community-by-community or aggregated basis. The one exception is that attention is given to "cumulative adverse socio-economic effects" in the town of Gillam resulting from Manitoba Hydro and Keeyask Hydropower Limited Partnership project development activities; specifically, worker interaction with community residents (women and youths) (Chapter 9, p. 9-22). Thus, with respect to both social and ecological processes, the CEA assessment boundaries are generally scoped narrowly and there is little indication they are based on or adjusted to reflect ecological processes or zones.

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[39] Duinker P, Greig L 2006 Scenario analysis in environmental impact assessment: Improving explorations of the future. *Environmental Impact Assessment Review* 27: 206–219.

[40] See p. 6 in: Charland J 1996. The 'problem-isolation paradigm' in natural resources management. *Journal of Forestry* May:6-9.

1.6 Does the CEA adopt 'pre-disturbance' conditions as the historic temporal limit and capture other certain and reasonably foreseeable future projects and activities?

The appropriate baseline for considering the significance of cumulative effects is that time in the past when a VEC was most abundant[41]. In the Bipole III EIS, historical temporal limits of the CEA are not explicitly described. Where historic temporal limits are hinted at in Chapter 9 (see Table 9.2-1), they are project-oriented and not VEC-oriented:

Project	Temporal Reference	Notes
Wuskwatim Generation Station Project	"completion expected in 2012"	considered but not included in the CEA
Wuskwatim Trasmission Project	"has been completed or is expected to be completed in 2011"	included in the CEA, but "primarily addressed as part of the earlier baseline and effects assessment"
Dorsey-Forbes 500 kV Transmission Line	no temporal bounds delineated	considered but not included in the CEA
Riel Sectionalization Project	"is being implemented", "it will be implemented"	included in the CEA, but "primarily addressed as part of the earlier baseline and effects assessment"
Floodway Exansion Project	no temporal bounds delineated	considered but not included in the CEA
St. Joseph's Wind Farm Project	no temporal bounds delineated	considered but not included in the CEA
Mineral and mining developments	no temporal bounds delineated	included in the CEA, but "primarily addressed as part of the earlier baseline and effects assessment"

Further, several "past and existing projects and activities" have actually not yet been completed or were completed only recently. As such, these projects and activities might be more accurately labelled as "future, or prospective". No attempt is made in the CEA to pinpoint historical periods of 'pre-VEC disturbance' conditions on the landscape.

With regard to the socio-economic CEA, consideration is given to the past residual negative effects of hydro development and other activities (ongoing for 60-150 years prior to the proposed Project) (summarized in Chapter 5). However, the EIS explains that since Manitoba Hydro has been engaged for the past 20 years in a program to reverse negative socio-economic trends (Chapter 9, p. 9-24), "it is expected that (through the Project) 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 Table 9.3-2) as potentially of concern" (i.e. land use, resource use, economy, services, personal, family and community life, and culture and heritage). In other words, no historic temporal limit is set for socio-economic effects because they are effectively excluded from the CEA.

Although there is no standard future temporal limit in CEA, it is generally accepted that CEA utilizes

[41] McCold L, Saulsbury J 1996. Including past and present impacts in cumulative impact assessment. *Environmental Management* 20(5):767–76.

long-term boundaries in its analysis[42]. Looking ahead to the future, no specific time horizon for the CEA (e.g. 10 years, 25 years, 50 years, 100 years, or other) is stated even although a Project lifetime of 50 years is anticipated by the proponent (Chapter 9, p. 9-28). The Bipole III CEA does include a short list of both certain and reasonably foreseeable “future” and “prospective future” projects and activities, albeit most of these are the proponents’ own. Based on the descriptions provided in Tables 9.2-2 and 9.2-3, the maximum future temporal limit for the CEA appears to be about 12 years, to 2024. A future temporal limit of about 12 years is unquestionably insufficient as a basis for the Bipole III CEA, given that “…the boundary in the future typically ends when pre-action conditions become re-established”[43]. Other future temporal limit options for CEA include the end of the operational life of the project or that time after which project abandonment and reclamation has been complete.

Future Project/Activity	**Temporal Reference**	**Notes**
Keewatinoow Wastewater Management Project	temporal limit for assessment is not delineated	included in the CEA (spatial and temporal overlap with the proposed Project is explicitly acknowledged)
Keeyask Generating Station and Transmission Projects	construction of northern camps, roads and work areas begins in 2011. Subsequent construction of the generating station and related transmission corridors will begin in 2013 and last approximately eight years (until 2021). Contradictorily, in Chapter 9, p. 9-24, it is stated that major work on the Keeyask project is expected to begin in 2014 and be completed in 2017	included in the CEA
Urban residential development in the town of Gillam	no temporal limits regarding the development are discussed	included in the CEA, but “expected to follow municipal and/or provincial development guidelines which would serve to limit interactions with other projects and mitigate any project-related effects
Dorsey to Potage 230 kV Trasmission Line Project	expected to be in service by 2013 at the earliest	not included in the CEA due to no spatial overlap
Floodway Expansion Project	temporal limits are not delineated	Not included due to negligible and localized effect and no anticipated overlap of effects with Project
Provincial Road 280 Improvement Project	completion date of 2010	not included in the CEA because it’s effects are expected to be within the existing roadway profile and beneficial rather than adverse

[42] Hegmann G, Cocklin C, Creasey R, Dupuis S, Kennedy A, Kingsley L, Ross W, Spaling H, Stalker D 1999. Cumulative Effects Assessment Practitioner’s Guide. Minister of Public Works and Government Services Canada.

[43] See p. 15 in: Hegmann G, Cocklin C, Creasey R, Dupuis S, Kennedy A, Kingsley L, Ross W, Spaling H, Stalker D 1999. Cumulative Effects Assessment Practitioner’s Guide. Minister of Public Works and Government Services Canada.

Prospective Project/Activity	Temporal Reference	Notes
Conawapa Generating Station Projects (generating station, work camps, transmission corridor)	construction would be begin in 2015 at the earliest and take approximately eight or eight and half years (to 2023 or 2024)	included in the CEA
Foresty Operations and Road Development	temporal limits for these projects are not delineated	included in the CEA
Minerals and Mining Exploration, Leases, Projects	temporal limits for these projects are not delineated because “future mine developments are difficult to predict”	included in the CEA
Current and future agriculture activities	temporal limits for these projects are not delineated	included in the CEA
New International Transmission Line Project	temporal limits for this project are not delineated	not included in the CEA due to “minimal spatial overlap of effects with proposed Project
Transmission Lines Projects in southern Manitoba	“service date is uncertain”	not included in the CEA due to “no spatial overlap of effects with effects of Project
Wind Energy Developments	“uncertain timeframe”	not included in the CEA

2.0 Retrospective Analysis of Cumulative Effects

Good-practice cumulative effects assessment requires a retrospective analysis of past and current conditions. Baseline studies to support cumulative effects assessment must provide more than a simple description of conditions past or present. Baseline studies must, at a minimum: **i)** delineate past and present cumulative effects (i.e. VEC condition and changes in VEC conditions) in the study area; **ii)** establish trends in VEC conditions (spatial or temporal) and known or suspected relationships between changes in VEC conditions and the primary drivers of change; and **iii)** establish thresholds or levels of acceptable change in VECs or VEC indicator conditions against which the significance of a change in VEC condition (past, present, or future) can be assessed.

2.1 Does the baseline analysis delineate past and present cumulative effects (i.e. VEC condition and condition change) in the study area?

Section 9.2 of the EIS states: "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."

The approach adopted in the EIS reflects a 'shifting baseline' problem – the magnitude of the cumulative effects of past projects are discounted and treated as part of the current baseline condition. In other words, current conditions are adopted as 'normal' rather than considering current conditions relative to past conditions and evaluating the nature and significance of cumulative change in VECs in the study area. Because the existing environment is a result of the influence of past actions, the EIS approach assigns the effects of past and present actions to the current condition rather than to contributions to cumulative change. The significance of cumulative change brought about by past actions is thus dismissed. Manitoba Hydro has adopted current conditions as the baseline, and assessed the significance of the cumulative effects of the Project only against the current baseline condition. There is insufficient consideration of how the baseline (VEC conditions) today compares to past conditions. This is a flawed approach to baseline analysis in environmental assessment generally[44-45], and inconsistent with good practice cumulative effects assessment[46-47].

> *Consider the following scenario*: The Project is noted in the EIS to have some effects to VECs, some large in magnitude and some small. Regardless of the magnitude of the Project's effects, the current baseline condition will undergo a certain amount of change due to Project development. Let's take the Project's effects to wetlands as an example. The Terrestrial

[44] Kilgour B, Dubé M, Hedley K, Portt C, Munkittrick K 2007. Aquatic environmental effects monitoring guidance for environmental assessment practitioners. *Environmental Monitoring and Assessment* 130(1–3): 423–436.
[45] Noble B 2010. Introduction to Environmental Impact Assessment: A Guide to Principles and Practice. Don Mills, ON: Oxford University Press.
[46] McCold L, Saulsbury J 1996. Including past and present impacts in cumulative impact assessment. *Environmental Management* 20(5):767–76.
[47] Dubé, M 2003. Cumulative effect assessment in Canada: a regional framework for aquatic ecosystems. *Environmental Impact Assessment Review* 23, 723–745.

Ecosystems and Vegetation Technical Report identifies the total area of all wetlands along the local study area as approximately 137,701 ha, with 1,456 ha of wetlands along the preferred route, and Section 3.2.2.5 of the report identifies current threats to wetlands, including agricultural runoff, drainage, forestry activities, and right-of-way activities. The significance of the effects of the Project on wetlands is assessed against the current baseline. There is no characterization of wetland area in the past (e.g. % wetland cover or area), and comparison of past wetland area to the current condition in order to: i) understand the cumulative loss of wetlands in the study area over space and over time, and ii) understand the significance of any additional change brought about by the Project. This approach misses the cumulative effects of past actions to wetlands in the Project's environment.

Now, consider the implications of this approach under the scenario of another transmission line project in the region, five years into the future (i.e. 2017). Assume that CEA for this future project also adopts the same approach as the current Bipole III EIS – it uses the 2017 wetland baseline as the 'new normal' and evaluates the significance of the effects of that project against conditions in 2017, as opposed to considering the baseline conditions that existed at the time of the Bipole III EIS (2012) or earlier. In doing so, the cumulative effects of past projects on the VECs of concern, including the Bipole III Project, are dismissed and another 'new normal' is established that 'disappears' these past effects in the region. The significance of cumulative effects to wetlands is again dismissed.

This is the approach currently adopted in the Bipole III EIS, and even promoted for future projects in the region. Section 9.3 of Chapter 9, for example, with reference to future projects, notes: "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)." The EIS dismisses the cumulative effects of past disturbances.

Ironically, in its 2004 Report on Public Hearings for the Wuskwatim Generation and Transmission Projects[48], the Manitoba Clean Environment Commission (Section 7.4.6) noted the same practice adopted by Manitoba Hydro of absorbing the effects of past projects in current and future project baseline conditions. In addition to wetlands, select examples of this practice in the current Project EIS are as follows:

- **Example 1:** Table 9.2-1 assigns the impacts of included past and existing projects and activities in the project area to the baseline, and in some cases analyzes those effects as part of the effects assessment in Chapter 8. Existing utility corridors and linear disturbances is one such example where the effects of "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." The significance of the cumulative effects of past and

[48] Manitoba Clean Environment Commission 2004. Report on Public Hearings. Wuskwatim Generation and Transmission Projects. Gerard Lecuyer, Chairperson, Clean Environment Commission Panel. Available at www.cecmanitoba.ca

present actions on the VECs of concern is not properly addressed. The assessment of any future cumulative effects assessment therefore does not adequately consider the significance of past cumulative effects and how VEC conditions have changed from past to present. The same approach is adopted for all VECs, with the exception of caribou.

- **Example 2:** The Terrestrial Ecosystem and Vegetation Technical Report (Table 36) identifies cumulative effects to 'plant species and communities of conservation concern,' 'native grassland/prairie areas,' and 'plant species/communities important to Aboriginal people.' Residual environmental effects due to the Project's impacts are identified for each VEC, primarily within the project ROW. However, the significance of losses due to other, past disturbances in the area are neither quantified nor qualified in the EIS baseline against which; i) the status or health of current terrestrial and vegetation conditions can be assessed, and ii) the significance of the Project's additional effects appropriately determined.

  Table 86 identifies more than 80 plant species that have traditional value, and refers to other studies that have identified important plant species that are used for subsistence, medicinal and cultural purposes, some of which are currently found in limited supply. How have the activities of other, past projects affected 'plant species and communities of conservation concern' or 'plant species/ communities important to Aboriginal people?' The EIS does not identify how these VECs have changed over time due to the cumulative effects of other, past actions. Because of this, the significance of the Project's cumulative effects is not appropriately assessed.

  Moreover, the scale of analysis is limited to the ROW and dismisses the cumulative effects of past disturbances due to other projects in the region on the same VECs. At a minimum, the past effects of the Manitoba Hydro's own projects should be considered, such as the Bipole I and II, in order to understand what native grassland/ prairie areas, plant communities have already been lost. There is no temporal analysis of cumulative change and no analysis beyond the immediate Project ROW. In absence of this, it is not possible to determine the significance of the additional, cumulative effects of the project.

It is critical in cumulative effects assessment to consider the historical build-up of effects; it gives an indication of *why* cumulative effects have arisen and *how* they might continue or be better managed in the future[49]. Good practice cumulative effects assessment is to be approached from the VEC's perspective – this is noted in the Cumulative Effects Assessment Practitioner's Guide (pg. 28)[50], which was used by the proponent to inform the Project's cumulative effects assessment. The problem in establishing a 'new normal' is that the current state of a VEC may already be in or approaching an unhealthy condition. Thus, any additional effect could be considered significant. Absorbing adverse effects of past projects into the current baseline conditions discounts the

[49] Therivel R, Ross W 2007. Cumulative effects assessment: Does scale matter? *Environmental Impact Assessment Review* 27, 365–385.

[50] Hegmann G, Cocklin C, Creasey R, Dupuis S, Kennedy A, Kingsley L, Ross W, Spaling H, Stalker D 1999. Cumulative Effects Assessment Practitioner's Guide. Minister of Public Works and Government Services Canada.

significance of the potential cumulative effects of the Project. The approach accepts past effects as 'normal', thus precluding possible restoration or other mitigative actions that may be required to improve current conditions. The limitations of this approach to baseline analysis in the EIS is particularly evident in how aggregate effects to VECs are analyzed in the predictive or futures stage of the cumulative effects assessment, which focuses on the additions of stress to the 'current baseline' rather than on the significance of the additive effects with respect to some past, benchmarked condition. It is also evident in the lack of trends established for VEC conditions in the Project area.

2.2 Does the baseline analysis establish trends in VEC conditions (spatial or temporal) and known or suspected relationships between changes in VEC conditions and the primary drivers of change?

Section 6.1 identifies the scope of the baseline study as providing "a description of the existing environment in the Project Study Area…" For each component of the baseline a descriptive overview is provided with reference to the accompanying technical reports for more detailed descriptions. For example, Section 8.2.5 Terrestrial Ecosystems and Vegetation states: "The purpose of the inventories and data summaries completed for the Project is to provide information for the identification of potential effects on VECs as well as terrestrial ecosystems and vegetation for the Project." But, cumulative effects assessment requires more than an inventory; it requires an analysis of trends or changes in baseline conditions and characterization of the significance of that change.

This is not a novel idea, and is a recognized standard in good practice design. Recognition of the importance of identifying trends and relationships in baseline analysis for cumulative effects assessment pre-dates the 1999 Cumulative Effects Assessment Practitioner's Guide and is rooted in some of earliest guidance concerning 'good practice' environmental assessment. In their 1983 report to the Federal Environmental Review Office on an Ecological Framework for Environmental Impact Assessment in Canada, Beanlands and Duinker[51] report that baseline assessments should not be a description but an analysis that "…adopts the more operative concept of baseline data as a statistical definition of the natural variability of phenomena of concern against which future changes can be predicted or measured." Although cause-effect is not always possible to determine, assertions based on statistical associations are acceptable standards for baseline analysis[52-53].

The EIS provides a baseline that is descriptive of current VEC conditions in both the immediate project environment and region. It offers a useful local and regional geography. The VECs are identified and described and, for most VECs, indicators or measurable parameters are identified either in the EIS itself (see Chapter 6) or in the supporting technical reports. However, the baseline is descriptive of current conditions and not explanatory of changes in VEC conditions over space or

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51 See p. 6 in: Beanlands G, Duinker P 1983. An Ecological Framework for Environmental Impact Assessment in Canada. Institute for Resource and Environmental Studies, Halifax, NS and Federal Environmental Assessment Review office, Hull, Quebec.

52 Great Sand Hills Scientific Advisory Committee 2007. Great Sand Hills Regional Environmental Study. Canadian Plains Research Centre, Regina, SK.

53 Seitz N, Westbrook C, Noble B 2011. Bringing science into river systems cumulative effects assessment practice. *Environmental Impact Assessment Review* 31: 180-186.

time. The analysis of baseline trends is fundamental to cumulative effects assessment, but is missing from the EIS and accompanying technical reports. The exception is the baseline for caribou and habitat fragmentation, which adopt a disturbance-based approach and attempt to identify spatial and temporal patterns or trends in disturbance and caribou populations. The caribou baseline analysis identifies past events and change assessment for natural disturbance dating back to 1929; and for anthropogenic disturbance rates and patters from 1972 (see Section 4.3 Supplemental Caribou Technical Report).

- **Example 1:** The EIS (Chapter 8) and Aquatic Environment Technical Report provide little in terms of trends or changes in VEC conditions over time. For example, Section 5.2.3.1.1 (p. 24) and sec 7.1 (p. 56) of the Aquatic Environment Technical Report notes that in total 317 water courses are intersected by the HVdc transmission line, and includes water courses that do not support fish, those considered to support marginal fish habitat, and important fish habitat. Two VECs were chosen for the aquatic environment study component: surface water quality and fish habitat (see sec. 3.5.1 and 3.5.2). However, the EIS does not establish a relationship between increasing numbers of river crossings and water quality parameters over river reach and over time. Has water quality parameters changed over time in the study area due to river crossings or loss of/ fragmentation of riparian vegetation? Is there a trend or relationship that can be established and used to predict the cumulative effects of the project's crossings?

  The EIS fails to examine or establish a relationship between the potential effect (changes in water quality parameters – nutrients, sediments, etc) and the potential stressor (river crossings). The EIS fails to examine or establish a relationship between the number of river crossings over time and the fragmentation of riparian habitat. This sort of information, establishing temporal trends, is essential to the prediction of the Project's effects and to understanding the cumulative effects of the Project in combination with other past and future river crossings. It is also not reported whether VEC conditions have been deteriorating, relatively stable or improving over time. This is necessary to understand the significance of additional effects due to Project actions.

- **Example 2:** The Terrestrial Ecosystems and Vegetation Technical Report identifies the total area of all wetlands along the local study area as approximately 137,701 ha, with 1,456 ha of wetlands along the preferred route. Page iii of the report identifies potential effects to wetlands. Section 3.2.5 refers to current threats to wetlands, including agricultural runoff, drainage, forestry activities, off-road vehicles, peat extraction, and right-of-way activities. This is interesting information. But, in order to assess the cumulative effects of past actions, and therefore understand the significance of the additional effects of the Project and future projects and activities in the region, it is necessary to identify how wetlands have changed over time in the area and due to what types of disturbances. For example, what are decline and recovery rates for wetland habitat in the study area? This is particularly important in the southern portion of the Project study area, in the agricultural and urban development areas. The EIS baseline does not provide the information needed for a temporal analysis and understanding of cumulative effects to wetlands. Basic metrics for wetlands, such as changes to % wetland cover over time, or rates of conversion (e.g. rate of change in forested land to cleared land), have not been addressed[54].

2.3 Are thresholds specified against which cumulative change and the significance of effects can be assessed?

Collection of data and information is of little value unless that information is compared to some form of a threshold. Without thresholds (whether scientific or based on benchmarks of what is 'socially acceptable'), it is not possible to evaluate the significance of a cumulative effect[55]. Examining thresholds is thus an important part of the baseline analysis. In any given area it is possible that some VECs may already be at or beyond a threshold of sustainability; any additional impact would be deemed significant. Without setting a threshold, it is not possible to know how much disturbance on the landscape or how much change in VEC condition is considered 'too much'. Two types of thresholds are required for CEA: effects based thresholds that tell us something about the state or sustainability of a VEC; and stressor-based thresholds that tell us something about how much more disturbances or change is acceptable or tolerable. Section 7.5 of the EIS Scoping Document notes that the "adversity of environmental effects will be determined based on predetermined factors and criteria." However, we were able to find few "predetermined factors and criteria" throughout the EIS against which to evaluate the adversity of environmental effects, with the exception of caribou population and habitat assessments.

- **Example 1:** For some components, such as 'mammals and habitat' (specifically caribou and habitat supporting caribou), thresholds against which the significance of a cumulative effect can be assessed are identified in the baseline (Chapter 6), impact evaluation (Chapter8), and accompanying technical reports. For example, the Supplemental Caribou Technical Report identifies thresholds for disturbance to caribou habitat based on Environment Canada guidelines and then examines the current and future levels of disturbance and the Project's disturbance within the specified threshold (see Sec 4.1 of the Supplemental Caribou Technical Report). Procedurally, this is 'good practice' in cumulative effects assessment. Unfortunately, thresholds or similar approaches (e.g. targets, benchmarks, and the degree of change from pre- or previous-disturbance conditions) are not identified for most other VECs.

- **Example 2:** Table 9.3-1 and Table 9.3-2 use the terminology 'no adverse cumulative effects', 'negligible cumulative effects (beyond the assessment discussed in Chapter 8),' and 'potentially non-negligible cumulative effects.' We assume that a 'potentially non-negligible cumulative effects' is a significant adverse cumulative effects? The thresholds that differentiate these effects classifications/ characterizations for each VEC or indicator are not identified.

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[54] See, for example, North Saskatchewan Watershed Alliance NSWA. 2009. *Cumulative Effects Assessment of the North Saskatchewan River Watershed using ALCES.* Submitted by Dr. M.G.Sullivan, ALCES Group. Edmonton, Alberta: The North Saskatchewan Watershed Alliance Society.

[55] Kennett S 2006. From Science-based Thresholds to Regulatory Limits: Implementation Issues for Cumulative Effects Management. Canadian Institute of Resources Law.

- **Example 3:** Concerning the interactions and effects identified in Tables 9.3-1 and Table 9.3-2, it is not at all clear from the EIS baseline and Chapters 8 and 9, or from the supporting technical reports, the thresholds, limits, or targets from the baseline study against which the significance of future cumulative effects is being assessed. This is also true for the caribou and habitat components, given that the analysis of these components in the Supplemental Caribou Technical Report carries forward only 5 years into the future, as recommended by Manitoba Hydro (see Sec 4.1.2). Many of the coincidence effects identified in Table 9.3-1 (based on the information provided about the future and prospective project and activity timelines) occur beyond this 5 year time horizon. Will the threshold for caribou habitat in the study area (65% undisturbed habitat requirement for a range to be 60% self-sustaining – based on Environment Canada's Draft National Recovery Strategy, see pg 51 of the Supplemental Caribou Technical Report) be exceeded with the cumulative addition of three other projects?

- **Example 4:** Section 6.4.2 of the Aquatic Environment Technical Report notes that several generating projects exist in the study area and surrounding areas, and future generating stations (Conawapa and Keeyask) are likely. It is noted that "the main residual effect resulting from the construction and operation of hydroelectric generating stations is the inundation of the lower reaches of tributaries. This results in change in water levels and flow regime and, therefore, fish habitat in a portion of some tributaries." The report goes on to note that "due to the low level of the residual effect from the Bipole III Project, the cumulative effect when combined with generating stations is considered not significant."

  There is insufficient evidence presented to support this conclusion. The threshold in terms of acceptable water levels (i.e., minimally acceptable level for flow) to ensure no significant adverse impact to fish habitat are not specified. Flow reductions (or surges) due to the Project in combination with other future hydroelectric generation projects are not specified or explicitly analyzed as part of the cumulative effects. We recognize that certain data may not be available, but a worse-case scenario can be determined or, at a minimum, the minimally acceptable level for flow identified. The conclusion that "due to the low level of the residual effect from the Bipole III Project, the cumulative effect when combined with generating stations is considered not significant" cannot be drawn without: i) identifying a minimally acceptable level of flow, and ii) modeling the combined effects of the current and future generation projects on flow reductions.

3.0 Prospective Analysis of Cumulative Effects

Prospective analysis is about looking to the future – this is core to cumulative effects assessment. Using trends, patterns or risks of cumulative change to VEC conditions identified during the retrospective analysis, attention is focused on determining the project's potential contribution to effects of the VECs of concern in combination with the effects caused by other projects, activities and disturbances in the region. The analysis is VEC-centered; in other words, the focus of attention is on significance of change in VEC conditions as a result of all sources of stress, and not on the relative magnitude of the project's individual contribution.

3.1 Is the time scale of cumulative effects predictions/analysis sufficient to capture the scope of impacts associated with the project's lifecycle?

In its 2004 Report on Public Hearings for the Wuskwatim Generation and Transmission Projects, the Manitoba Clean Environment Commission (Sec 7.2.2.8.3) criticized Manitoba Hydro for its narrow interpretation of cumulative effects, including its "decision not to extend cumulative-effects assessment beyond a ten-year period." The current Project cumulative effects assessment is even more temporally restrictive, with a 5-year temporal boundary for certain VECs, with any consideration beyond this time frame for other VECs largely descriptive and with limited supporting analysis.

Section 9.2 notes that the Bipole III CEA 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. However, the temporal scale of cumulative effects predictions/analyses for future and prospective projects and effects is variable and overall insufficient to capture the cumulative effects of future and prospective projects and activities that may affect the VEC over the lifecycle of the proposed Project.

- **Example 1:** The effects analysis for caribou and habitat fragmentation are restrictive, adopting only a <u>5-year future</u> for effects analysis to 2016 and only 2014 for certain future disturbances and activities, as recommended by Manitoba Hydro (see Chapter 8, Caribou Technical Report, Habitat Technical Report). Within the 5-year timeline it is not possible to capture the potential cumulative effects associated with other projects and activities identified in Table 9.2-2 and, in particular 9.2-3, that may result in the destruction of critical habitat. Construction of the Keeysak Generation and Transmission projects, for example, is not expected to start until 2013 and will last approximately 8 years (2021); construction of the Conawapa Generating Station Projects (including transmission infrastructure) is not expected to begin until 2015 and is expected to last 8 to 8.5 years. The cumulative effects of these future and prospective projects are thus not captured in the cumulative effects assessment for caribou and habitat. Our point is simply that a conclusion cannot be made about cumulative effects on caribou and habitat 10, 15, 20 or 50 years into the future if the analysis extended only 5 years into the future.

- **Example 2:** Other components (e.g. terrain and soils; groundwater; aquatic environment – see the respective technical reports) adopt a 20-year future. This timeline is more likely to facilitate the analysis of cumulative effects associated with future and prospective projects and activities. However, there is no *analysis* of cumulative effects over the 20-year future. The 20-year temporal boundary serves primarily to scope which future and prospective developments may overlap, temporally, with the Project but there is no corresponding assessment or modeling of cumulative effects over the 20-year horizon. Also, the EIS reports a 50-year Project lifetime.

- **Example 3:** The timeline identified in the EIS over which the Project will contribute to cumulative effects on a regional scale (50 years) is not consistent with the temporal scale of analysis in the EIS or in supporting technical reports, which adopt 5-year and 20-year futures. Section 9.3.2 identifies a 50-year period over which the project will contribute to cumulative effects: "The 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." Such long-term horizons are important in cumulative effects assessment. Recognizing the uncertainty involved in such future assessments is the reason behind good-practice recommendations for the use of scenario-based approaches. Such analyses are absent from the EIS for the 50-year horizon.

3.2 Is there sufficient analysis/evidence to support conclusions about potential cumulative effects?

Section 8.0 'Cumulative Effects Assessment' of the Scoping Document for the EIS states: "The methods, assumptions, analysis and conclusions of the assessment will be documented in the EIS." We were unable to find sufficient document of cumulative effects methods or analysis to support the conclusions. The analysis of cumulative effects is superficial and is referred to in the EIS as a "high level screening assessment" (see sec. 9.3.1 and 9.3.3) – not an approach supported by appropriate methods and analysis as is indicated in the Scoping Document. There is no attempt to undertake an analysis of cumulative effects for future and prospective projects, with the exception of the 5-year futures analysis for caribou and habitat; however, a 5-year horizon is insufficient to capture future cumulative effects of the project.

Chapter 9 of the EIS provides the CEA. In Sec 9.2, reference is made to Chapter 6 for the analysis of past activities, noting that: "The effects of past and current projects and activities form and integral part of, and have been incorporated into, the description of the existing environment." It is also noted that: "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." Chapter 9 thus focuses on the cumulative effects of only those on-going effects from past activities that 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", and on current and future projects and activities.

However, neither Chapter 6 nor Chapter 8 provides a sufficient analysis of the effects of past activities on the environment such that the implications of the project's additional effects, or the effects combined with other future and prospective actions, can be understood. There is a lack of supporting analysis of past effects, specifically spatial and temporal changes, trends, patterns or thresholds, to determine the cumulative effects of the Project. There are some exceptions, specifically cumulative effects to caribou and, more specifically, to habitat supporting caribou. The analysis for caribou and habitat supporting caribou population is based on identified metrics for assessment and spatial and temporal changes that are analyzed under past, present and certain future disturbance conditions. It is possible to identify, but not always delineate, the relative and cumulative contribution of past and certain future projects and activities on the VEC of concern. However, for most sub-components it is difficult to discern how cumulative effects of the Project, when considering the effects of past actions were not actually analyzed.

Chapter 9 is similarly challenged with regard to the analysis of predicted cumulative effects for future and prospective projects and activities, and *how* cumulative effects were determined based on that analysis. Supporting data, models and causal linkages are incomplete. The chain of evidence/ analysis used or referred to in Chapter 9 is not explicit and in some instances inconsistent with the details contained in other chapters of the EIS, and in the supporting technical documents.

- **Example1:** Table 9.2-1 refers to the Dorsey-Forbes 500 kV Transmission Line project, and excludes it from the cumulative effects assessment due to "no overlap of effects with effects of the project." It is noted in Table 9.2-1 that the Dorsey-Forbes 500 kV Transmission Line is addressed in the baseline (Chapter 6) and earlier effects assessment (Chapter 8). However, there is no mention of the Dorsey-Forbes project in Chapter 6. The only reference to the Dorsey-Forbes project in Chapter 8 is with regard to noise levels during construction, and it is not within the context of assessing a potential cumulative effect.

- **Example 2:** The 'Terrestrial Ecosystem and Vegetation Technical Report' (Table 36) identifies cumulative effects to the following VECs: 'plant species and communities of conservation concern,' 'native grassland/prairie areas,' and 'plant species/communities important to Aboriginal people.' Residual environmental effects are identified to each VEC, primarily within the project ROW. Section 7.6.2, 'Analysis of Effects,' provides "information on the potential other actions that may cumulatively effect the VECs identified for the Bipole III Project."

  With regard to hydroelectric, mining, forestry and infrastructure projects, it is noted in sec. 7.6.2 (p. 155) that such projects "usually require environmental or due diligence assessments as part of their permitting or licensing process prior to development. These assessments are conducted to evaluate the potential effects of the development on VECs including similar vegetation VECs identified in this cumulative effects assessment…It is assumed that the information gathered would be utilized to develop appropriate mitigation measures to minimize impacts to VECs resulting in no or minimal residual effects, similar to those determined for the Bipole III Project. As a result of the mitigation measures identified for the Bipole III VEC's, there are minimal resultant cumulative effects from past, existing, and future hydroelectric, mining, forestry and infrastructure projects. These include the species of concern which will be lost at the construction power station and the potential loss of plant communities that are important to Aboriginal people for the transmission lines and northern Project components which has been identified as a residual effect."

There is no analysis of loss of 'plant species and communities of conservation concern,' 'native grassland/prairie areas,' or 'plant species/communities important to Aboriginal people' due to other projects in the region or due to the effects of future and prospective projects. There is no evidence to support the conclusion and there is an assumption that cumulative effects have not, or will not occur because other projects will adopt similar mitigation measures.

- **Example 3:** Chapter 9 indicates that there will be no adverse cumulative effect of the Project on terrestrial ecosystems and vegetation (Table 9.3.1) or on culture and heritage (Table 9.3-2), when considered with the impacts of, among other things, mineral license area exploration and development, forestry operations. This appears inconsistent with the Terrestrial Ecosystems and Vegetation Technical Report, which identifies residual effects from the current Project (Table 26) and the potential for cumulative effects (Table 37). Table 37 summarizes the cumulative effects assessment of other actions (including hydroelectric projects, forestry, mining, infrastructure etc), using numbers of plants or hectares as the indicator, and concludes that there will be loss of plants of conservation concern and loss of plants valued by Aboriginal people. More problematic is that we could not find any analysis of effects to support the conclusions about cumulative effects. The accompanying tables to the Terrestrial Ecosystems and Vegetation Technical Report do identify plant numbers and/ or hectares for vegetation type/ terrestrial components inside the ROW and for certain components in the local study area. However, we could not find any mapped disturbance patters for other projects, specifically future and prospective, and disturbed area to provide evidence in support of cumulative effects analysis to support the conclusions made in Chapter 9 regarding no to negligible cumulative effects.

- **Example 4:** Chapter 9 refers to Chapter 8 for the analysis of cumulative effects to terrain and soils. However, there is little analysis in Chapter 8 with respect to cumulative environmental effects to terrain and soils. For example, Section 8.2.2 reads: "The following is an assessment of the potential environmental effects that may be experienced by the VECs of the soil and terrain environment and mitigation measures to minimize or preclude potential effects to VECs. Potential environmental effects of the Project were identified using a combination of methods, including an environmental interaction matrix, feature mapping, professional opinion and review of Aboriginal Traditional Knowledge (ATK), key perspectives and comments from the Environmental Assessment Consultation Process and literature (Bipole III Terrain and Soils Technical Report)."

How cumulative effects to terrain and soils were assessed using these tools or techniques is not clear; moreover, it is not at clear as to how these tools can be used to predict future cumulative effects in relation to future and prospective projects. There is no attempt to overlay future development or disturbances with features mapped to identify, for example, aggregate effects of disturbances to terrain and soils. The Terrain and Soils Technical Report is largely a description of soil and terrain conditions, and restricted largely to the Project ROW. Cumulative effects are not assessed. There was no prediction or modeling of effects of future and prospective projects. At a minimum, one would expect to see mapped terrain and soil sensitive areas and an overlay of current and future disturbances, with some calculation of risk from to cumulative effects.

- **Example 5:** Table 9.3-1 identified 'no adverse cumulative effects' on the aquatic environment when considering the coinciding impacts of other projects and activities including the Wuskwatim Transmission Project, forestry operations and road development, mineral license area exploration activities, provincial highways and roads, the Keeyask Generation and Transmission Project and the Conawapa Generating Station Projects, among others. 'Negligible effects' are identified for other existing utility structures, the Kettle Generating Station Upgrades and urban residential development. However, there is limited analysis provided to support these conclusions of no or negligible cumulative effects to the aquatic environment due to interactions with, or the combined effects of, other future and prospective projects. There is insufficient evidence in Chapter 6 and Chapter 8. The EIS makes reference to the Aquatic Environment Technical Report, however:

    i) 'No adverse cumulative effects' are identified on the aquatic environment for the Project in coincidence with the Wuskwatim, Keeyask and Conawapa projects (Chapter 9, Table 9.3-1). Neither Chapter 9 nor Chapter 8 provides evidence of cumulative effects analysis of these future projects, interacting individually with the Project <u>and</u> in combination, on the aquatic environment. The Aquatic Environment Technical Report notes: "In addition to changes in riparian vegetation and associated effects, portions of the Wuskwatim Transmission Project parallel the Bipole III Project and are therefore in close proximity on some of the same watercourses. Future transmission projects include: Keeyask collector lines; and Conawapa collector lines. Considering the growth, form, and function of riparian vegetation is this area, the cumulative effect of multiple ROW is expected to be negligible." There is insufficient data and analysis of Project effects and of the potential effects of future and prospective projects and activities to support this conclusion regarding cumulative effects.

    ii) The development of access roads and provincial highway and winter road development are noted in the Aquatic Environment Technical Report to have the potential to effect water quality and fish habitat at stream crossings. But the cumulative effects are considered not significant (Table 9.3-1). Although the number of stream crossings of the Project is identified, and stream crossings of other linear features, there is no prospective cumulative effects analysis of future stream crossings for future and prospective developments and the total, or cumulative effect of these crossings on aquatic habitat disturbance is not known.

iii) Agriculture practices in the study area are reported to have affected and continue to affect water quality and fish habitat due to, in part, the loss of riparian vegetation, damage to stream banks, and erosion and sedimentation of stream through livestock where pastures include watercourses. It is noted that, "In comparison, the Bipole III project will have negligible effects to watercourses. The additive of effect of Bipole on current and future agricultural effects will be negligible." No analysis of the cumulative contribution of the effects of the Project in combination with these other effects is provided to support the conclusion, and the effects of the Bipole project are assessed 'in comparison to' versus 'in addition to' these other effects. This is a misinterpretation of a cumulative effect.

- **Example 6:** Table 36 in the Terrestrial Ecosystem and Vegetation Technical Report provides a CEA VEC summary. For the VEC 'plant species/communities important to Aboriginal people,' the indicator 'area of habitat or plants used for medicinal, food and cultural uses' is identified and conclusions are drawn about cumulative effects. But, page 86 of the report states that: "Although no area calculations were determined for traditional plant harvesting and gathering locations along the ROW, general harvesting and gathering locations were identified in the self-directed studies. Was an area calculation used or not to assess cumulative effects? What is the area, as a % of total area in the ROW?

3.3 Are the tools and techniques used capable of capturing the complexities (e.g. non-linear relationships, critical thresholds) of cumulative effects pathways and uncertainties of future developments?

Section 7.5 of the Bipole III Scoping Document notes that the environmental effects of the proposed Project components and activities on the existing environment will be identified and described as changes to the environment caused by the Project. "Effects will be identified using checklist, matrices, linkage diagrams, map overlays, and other established environmental assessment methods, and will employ GIS (Geographic Information Systems) and other computer-based systems. Direct, indirect and cumulative environmental effects (adverse and beneficial) will be identified and assessed. Effects will be assessed by different methods…and use multiple sources including literature, field work, consultation and interviews, modeling, data analysis, and professional judgement."

However, the tools and techniques one would expect to see in a cumulative effects assessment, particularly for a linear development project, are absent from the EIS. There are many predictive tools and techniques available to support an analytical approach to cumulative effects assessment, ranging from simple regression analysis to more advanced computer-based systems such as ALCES (A Landscape Cumulative Effects Simulator)[56]. ALCES has been applied in numerous cumulative effects assessment (see www.alces.ca), for example:

- Assessing changes in landscape composition and performance of ecological indicators at Syncrude's Mildred Lake Bitumen Mine during the pre-industrial era (prior to 1975), the mine construction phase (1975 top 2025), the mine closure phase (2025 to 2100) and the post-closure era (after 2100). Ecological indicators included landscape composition, forest age class structure and utility function of caribou, black bear, moose and index of native fish.

- Assessing the future impacts of development in the James Bay Lowlands, specifically the impacts of mining, hydro development, and forestry on landscape condition and wildlife habitat.

- Assessing the cumulative effects of development options, and rates of development on caribou in the Athabasca region to simulate cumulative disturbance and management actions needed to maintain or increase boreal caribou numbers over the next 50 years.

There is limited modeling of potential cumulative effects in the EIS, either statistical or spatial, aside from caribou and caribou habitat, and there is little evidence to suggest that GIS and other computer-based systems were used to model and predict, versus describe, potential cumulative effects. The cumulative effects predictions about future and prospective developments in Chapter 9 are qualitative and with limited supporting analytical evidence.

- **Example 1:** Checklists and matrices are tools for communicating information about environmental effects – they are not tools for 'predicting' environmental effects. GIS-based modeling or weighting of overlays with environmental features, such as VECs, scenarios, and computer-based systems for predictive analysis (including statistical analysis and associations – e.g. regressions) are predictive tools; however, such tools have not been sufficiently used in the EIS to support cumulative effects analysis in Chapter 9 for future conditions. There is limited modeling of baseline trends or cumulative effects into the future for the identified future projects and prospective projects and activities. As a result, there is insufficient evidence to support the cumulative effects predictions/assessments and conclusions.

- **Example 2:** Section 9.3.2 of the EIS notes: "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." We agree that such predictions are challenging, but these are not good reasons for not predicting cumulative effects into the future. Scenario-based approaches are widely promoted as one

[56] ALCES is simulation tool for exploring the response of resource systems to disturbances. It is used for exploring and quantifying the relationships between different land-use sectors and natural disturbances and their potential environmental consequences. As a simulation model it is designed to forecast and explore alternative outcomes and conditions. ALCES is a spatially stratified model and allows users to examine the area and length of different land uses or disturbances, such as roads or forest cut blocks, within each landscape unit.

means to address this uncertainty[57] and are particularly well-suited to broad landscape effects, such as fragmentation due to disturbance[58]. The Canadian Council of Ministers of the Environment recommends scenario analysis for cumulative effects assessment[59], and scenario analysis has proven useful in other cumulative effects analyses for linear developments including the Mackenzie Gas Pipeline Project[60,61] and the Great Sand Hills Regional Environmental Assessment[62].

Scenario-based tools are significantly underutilized in the EIS's assessment of cumulative effects. Although the caribou and habitat assessments do adopt landscape metrics, which is a valuable approach to assessing the impacts to wildlife habitat across multiple land uses and industries[63], these metrics are modeled only for a 5-year future (see Supplemental Caribou Technical Report). There is no attempt to model future disturbance and response scenarios for the stated 50-year lifetime of the project. We would consider such a scenario-based approach using various metrics of landscape disturbances to be a 'low hanging fruit' for a cumulative effects assessment for a linear development project, where the dominant cumulative effects concerns on the biophysical environment are associated habitat disturbance and fragmentation.

- **Example 3:** The methods or tools used to predict the cumulative effects (coincidence effects) identified in Chapter 9 (Table 9.3-1 and Table 9.3-2) are not identified. There is reference to Chapter 8, and to the accompanying technical reports, but aside from the caribou and habitat technical reports there is no evidence of models for cumulative effects assessment on the biophysical environment. Chapter 9 refers to the cumulative effects assessments as "high level screening assessment." We are not clear what this means, but given the lack of analysis of cumulative effects for the future and prospective projects and activities, we assume that the method used was largely the expert opinion of the author of the Chapter. A screening assessment is not an analysis of cumulative effects.

- **Example 4:** Chapter 9 defers to Chapter 8 for the analysis of cumulative effects to terrain and soils. However, there is little analysis in Chapter 8 with respect to cumulative environmental effects. For example, Section 8.2.2 reads: "Potential environmental effects of the Project were

57 Duinker P, Greig L 2006 Scenario analysis in environmental impact assessment: Improving explorations of the future. *Environmental Impact Assessment Review* 27: 206–219.

58 Seitz N, Westbrook C, Noble B 2011. Bringing science into river systems cumulative effects assessment practice. *Environmental Impact Assessment Review* 31: 180-186.

59 Canadian Council of Ministers of the Environment 2009. Regional Strategic Environmental Assessment in Canada: Principles and Guidance. PN 1428. Canadian Council of Ministers of the Environment, Winnipeg, MB.

60 Greig L, Duinker P 2007. Scenarios of Future Developments in Cumulative Effects Assessment: Approaches for the Mackenzie Gas Project. Prepared by ESSA Technologies Ltd., Richmond Hill, ON for the Joint Review Panel for the Mackenzie Gas Project;

61 Holroyd P, Grant J, Dyer S 2007. Scenario analysis: a best practice approach to assessing the cumulative impacts of the Mackenzie Gas Project. Pembina Institute, AB.

62 Great Sand Hills Scientific Advisory Committee 2007. Great Sand Hills Regional Environmental Study. Canadian Plains Research Centre, Regina, SK.

63 Givertz E, Thorne J, Berry A, Jaeger J 2008. Integration of landscape fragmentation analysis into regional planning: A statewide multi-scale case study from California, USA. *Landscape and Urban Planning* 86(3–4): 205–218.

identified using a combination of methods, including an environmental interaction matrix, feature mapping, professional opinion and review of Aboriginal Traditional Knowledge (ATK), key perspectives and comments from the Environmental Assessment Consultation Process and literature (Bipole III Terrain and Soils Technical Report).” Aside from professional opinion, these are not predictive methods or tools for evaluating cumulative effects to terrain and soils. Impact matrices are designed to communicate information; feature mapping may be used to characterize risk, but there was no risk assessment conducted; literature or case reviews can be useful, but there is no indication of what cases were reviewed and the transferability of that knowledge to the current case. How current cumulative effects to terrain and soils were assessed using these tools or techniques is not clear; moreover, it is not at all clear as to how these methods were used to predict future cumulative effects due to future and prospective projects.

3.4 Are trends and linkages established between VEC conditions and disturbances in the baseline analysis used to inform predictions about cumulative impacts?

The primary purpose of establishing trends and linkages between VEC conditions and disturbances in the baseline analysis is to project this information forward, quantitatively or qualitatively, to identify and understand the potential cumulative or total effects of the Project and future projects and actions in the Project’s environment on the VECs of concern. With the exception of caribou and caribou habitat (see Supplemental Caribou Technical Report), there is no modeling of baseline trends or relationships between VEC conditions and disturbances in the baseline analysis and, as a result, no trends or relationships to carry forward to aid in cumulative effects predictions.

3.5 Is the cumulative effects analysis centred on the total effects on VECs in the project’s regional environment?

Cumulative effects must be approached from the perspective of the total effects on a VEC[64]. This is not consistent with how cumulative effects are approached in the EIS, even though it is identified as important to cumulative effects assessment in the Cumulative Effects Assessment Practitioner’s Guide, which was used by the proponent to guide their cumulative effects assessment. Chapter 9 of the EIS, Section 9.2, notes: “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.” This is inconsistent with the EIS Scoping Document (Sec 8.0 Cumulative Effects Assessment), which states: “The cumulative effects assessment framework will be defined in the EIS and will be based on CEAA guidance as well as best and current practices including the consideration of regional and strategic environmental assessment approaches.” Regional and strategic environmental assessment practices are VEC-based, and not defined by the spatial and temporal overlap of a project’s effects[65-66].

[64] Hegmann G, Cocklin C, Creasey R, Dupuis S, Kennedy A, Kingsley L, Ross W, Spaling H, Stalker D 1999. Cumulative Effects Assessment Practitioner’s Guide. Minister of Public Works and Government Services Canada.

[65] Seitz N, Westbrook C, Noble B 2011. Bringing science into river systems cumulative effects assessment practice. *Environmental Impact Assessment Review* 31: 180-186.

The EIS does not sufficiently address the total or cumulative effect of all interactions on each VEC. It is appropriate to address the effects of the Project on each VEC or sub-component of the environment separately; however, it is incorrect to address the cumulative effect on each VEC by considering only the interaction of the Project with each individual future or prospective project or activity[67]. In doing so, the EIS fails to consider the cumulative effects of all interactions or additions on each VEC. No evidence is presented to suggest that the 'total effects' were considered.

- **Example 1:** Chapter 8 identifies the impacts of the project, which serves as a basis for the cumulative effects analysis carried forward to Chapter 9; however, the overall approach, with the exception of effects analysis on caribou and caribou habitat, is inherently stressor-based and focused on Project's impacts as opposed to total effects on the VEC. The total effects of the 'other projects and activities' identified in Table 9.3-1, with and without the Project, on each of the Biophysical Environment Sub-Components is not addressed in the EIS. These effects are ultimately the cumulative effects of concern – the result of the totality of interactions and effects, and not only the effects of the Project interacting with each additional, individual project or activity.

- **Example 2:** Table 9.3-1 identifies the potential coincidence effects (Project effects + the effects of 'other projects and activities') on Mammals and Habitat as "potentially non-negligible" for 9 of 14 interactions, and negligible cumulative effects" for an additional 2 of 14 interactions. A cumulative effects assessment must consider the total effects on mammals and birds, considering the total effects of all other projects and activities and not just the individual interactions of other projects and activities with the Project in question. From the perspective of the receiving environment, and thus cumulative effects, it is the total effect that matters. The total effect is not captured in the CEA; rather, emphasis is on identifying and qualifying interactions between the Project and other stressors. What are the cumulative effects on the VEC, from all projects and activities?

- **Example 3:** The high level screening assessment in Table 9.3.2 identifies "negligible cumulative effects" or "potentially non-negligible" cumulative effects on "services" for 11 of 14 identified interactions with other future and prospective projects and activities. However, the cumulative effect of these interactions on "mammals and habitat" (the total or sum of effects associated with all interactions with all other future and prospective projects and activities across) is not assessed or even mentioned.

- **Example 4**: Table 37 in the Terrestrial Ecosystem and Vegetation Technical Report provides a cumulative effects assessment valued environmental component summary. For the VEC 'plant species/communities important to Aboriginal people,' the indicator 'area of habitat or

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[66] Canadian Council of Ministers of the Environment 2009. Regional Strategic Environmental Assessment in Canada: principles and Guidance. PN 1428. Canadian Council of Ministers of the Environment, Winnipeg, MB.

[67] Hegmann G, Cocklin C, Creasey R, Dupuis S, Kennedy A, Kingsley L, Ross W, Spaling H, Stalker D 1999. Cumulative Effects Assessment Practitioner's Guide. Minister of Public Works and Government Services Canada.

plants used for medicinal, food and cultural uses' is identified and conclusions are drawn about cumulative effects. It is noted that effects are primarily restricted to the ROW, northern project components and access roads/trails. However, no other disturbances outside the ROW are considered in terms of the cumulative effects to 'plant species/communities important to Aboriginal people.' The effects analysis in the Terrestrial Ecosystem and Vegetation Technical Report is restricted to inside the ROW; the conditions of these plant species of concern or value in the larger study area are not addressed. Table 9.3-1 in Chapter 9 of the EIS identifies no adverse or negligible cumulative effects to terrestrial ecosystems and vegetation due to interactions with other projects and activities; however, the analysis of effects to 'plant species/communities important to Aboriginal people' is restricted to the Project's ROW. The potential for cumulative effects on the VEC are not addressed.

The EIS approaches cumulative effects on VECs from the Project (i.e. stressor perspective), resulting in a misrepresentation of the potential for cumulative effects. As a result, the cumulative effects of the Project are deemed negligible based simply on the magnitude of the Project's effects as measured against the effects of other projects and activities. This is a misinterpretation of a 'cumulative effects' and dismisses the potential for cumulative effects on VECs because the project's effects are viewed as 'relatively less significant' and therefore non-cumulative[68,69]. The significance of a cumulative effects should not be measured by the magnitude of the Project's incremental contribution; the significance of cumulative effect is measured based on the significance of the total effect of all actions on the VEC – regardless of how small or large the Project's own contribution. A project could add very little additional stress to a VEC, but the cumulative effect could be significant.

- **Example 1:** Section 9.3.2, referring to site-specific residual effects, notes: "Residual adverse effects considered for some biophysical VECs are effectively limited to the immediate rights-of-way and Footprint area studies 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." This is an incorrect interpretation of a cumulative effect. If the VECs of concern are also affected by other developments or disturbances in the region then the effect of the Project, even if contained to the Project's ROW, is a cumulative effect on that VEC.

- **Example 2:** Section 9.3.2.2 reads: "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...Indirect ecological impacts from transmission lines are also expected to be minor compared to those associated with other human caused or natural landscape disturbances." This is an incorrect interpretation of the significance of a cumulative effect. Cumulative effects are the total effects to VECs, regardless of the significance of the

68 Seitz N, Westbrook C, Noble B 2011. Bringing science into river systems cumulative effects assessment practice. *Environmental Impact Assessment Review* 31: 180-186.

69 Duinker P, Greig L 2006. The impotence of cumulative effects assessment in Canada: ailments and ideas for redeployment. *Environmental Management* 37(2): 153–61.

contribution of any single source, including the Project, in comparison to other sources. It is not the magnitude of the effect associated with the Project, in comparison to the magnitude of all of the effects that is important; it is the TOTAL effect.

- **Example 3:** Chapter 9 (Table 9.3-1) identifies 'no adverse cumulative effects' associated with roads on the aquatic environment. The assessment is described in Chapter 8, based in part on information provided in the Aquatic Environment Technical Report. Section 6.4.4 of the Aquatic Environment Technical Report notes that past and future road developments do have the potential to effect water quality and fish habitat in streams that are crossed, but no cumulative effects analysis/prediction is presented in either the technical report or the EIS. The Aquatic Environment Technical Report upon which the assessment is based notes: "there are numerous roads throughout the study area that include stream crossings. However, <u>in contrast to</u> permanent road crossings, the Bipole III transmission line stream crossings have a negligible effect." The EIS assessment masks the potential for cumulative effects by comparing the relative magnitude of the project's contribution against that of other sources. This is an error in cumulative effects assessment.

It is noted in Chapter 9 the EIS (Section 9.3.2) that <u>the Project will contribute to cumulative effects on a regional scale</u>; however, these effects are not adequately addressed. The approach to CEA is restrictive in terms of including and analyzing the effects of other projects in the region – future and prospective. Section 9.3.2 of the EIS states: "Larger landscape scale projects and activities in forestry and mineral exploration and mining will, by the Project operating stage, have <u>a potentially greater influence</u> on bio-physical and socio-economic components in the Project Study Area....It is expected that during the operation phase the residual effects of Bipole III will be fully managed and <u>small in their magnitude</u>, and contribute to cumulative effects on a regional scale." Some future and prospective projects are excluded due to their seemingly small impacts or perceived limited or lack of spatial overlap; in other cases the cumulative effects problem is simply passed off as the responsibility of these future projects with 'a potentially greater influence.' This is problematic and an incorrect view of cumulative effects assessment and management.

We acknowledge that it can be difficult to assess the effects of future developments in other sectors (e.g. mineral lease activity) when those developments are currently prospective, at best. However, it is a flawed cumulative effects analysis not to include other hydroelectric development projects (generating stations and transmissions lines) that are associated with the development of the current Project and/or that will generate similar types of effects. This is a <u>major shortcoming</u> of the cumulative effects assessment presented in the EIS and results in little confidence in the conclusions drawn about future cumulative effects.

- **Example 1:** Table 9.2-2 notes that the cumulative effects assessment does not include the Dorsey to Portage 230 KV Transmission Line project due to "no spatial overlap of effects with Project." However, it is also noted that the line will be 70 kms in length and require additional easements and water crossings. The impact of this project on the same VECs affected by the Project (e.g., including vegetation, soils, aquatic habitat, and wetlands) is completely dismissed without being properly considered in cumulative effects analysis.

- **Example 2:** The Keeyask Transmission project is identified as having a temporal overlap of socio-economic effects, but no biophysical effects are mentioned (Table 9.2-2). The Keeyask project is also not addressed in the analysis of habitat fragmentation technical report to inform the CEA. Yet, The Keeysak project is identified in the Terrestrial Ecosystems and Vegetation as having an effect on 'loss of plants of conservation concern,' and 'loss of plant species valued by Aboriginal people'. The Project is also identified as affecting these VECS, and a cumulative effect is identified. In the EIS, however, the potential for a cumulative effect on 'Terrestrial Ecosystems and Vegetation' (Table 9.3-1) is considered 'negligible' and the potential for a cumulative effect on 'Culture and Heritage' and 'Resource Use' (Table 9.3-2) is considered nil. This seems inconsistent from a cumulative effects perspective, and the conclusions also lack supporting cumulative effects analysis. Proper consideration is not given to total effects on the VECs of concern from all sources of stress in the region.

- **Example 3:** Table 9.2.3 in the EIS notes that "the New International Transmission Line is not included because of 'minimal spatial overlap' and that effects would be incremental. The service date for this project is uncertain; however, this does not mean that no cumulative effects will occur or that the cumulative effects cannot be assessed. That there will be minimal spatial overlap of effects is a misinterpretation of cumulative effects. Cumulative effects are viewed from the perspective the affected VECs, not the Project. In other words, the further development of new transmission lines in southern Manitoba, likely in an agricultural landscape, with affect the same VECs as the Bipole III project – namely agricultural lands and wetlands. There will be cumulative effects. The question that the EIS should address is whether they will be significant.

- **Example 4:** Table 9.2-2 (Chapter 9) of the EIS notes that the CEA does not include the Dorsey to Portage 230 KV Transmission Line project due to "no spatial overlap of effects with Project." However, it is also noted that the line will be 70 kms in length and require additional easements and water crossings. The Dorsey to Portage project will affect the same VECS as the Bipole III project (e.g. vegetation, soils, aquatic habitat, and wetlands), yet the potential for cumulative effects is dismissed.

- **Example 5:** Section 4.0 of the Habitat Technical Report concludes: "When considering large-scale corridor projects, such as the Project, fragmentation is frequently an inevitable consequence. The Project will consist of a 1,384.4 km linear corridor, with the corridor intercepting a total of 479.7 km of forest across eight ecoregions. The potential adverse effects of fragmentation within the project area will vary across affected species in the area, but overall effects are assumed to have potential negative effects on individuals and populations of mammal species at varying degrees." There is no prospective analysis in the EIS or Habitat Technical Report as to whether or how the effects of the Project will interact with the potential effects of the Conawapa Generating Station project. No scenario of development in presented.

- **Example 6:** Current and future agricultural activities are identified in Table 9.2.3 (Chapter 9), but there is no analysis of rates of wetland decline and recovery in the study area in order to identify cumulative effects to wetlands due to the Project and other future and prospective projects and activities. Even a crude metric of % wetland area change over time, and a spatial analysis of disturbances (e.g. intersections) to wetland habitat would provide some analytical insight to the potential for cumulative effects.

- **Example 7:** The prospect of further development of new transmission lines in southern Manitoba is noted in Chapter 9, but not included in the cumulative effects assessment due to "no spatial overlap of effects with the project." The service date for this project is uncertain; however, this does not mean that no cumulative effects will occur or that the cumulative effects cannot be assessed. We disagree with that there will be "no spatial overlap of effects." This is a misinterpretation of cumulative effects. Cumulative effects are viewed from the perspective the affected VECs, not the Project. In other words, the further development of new transmission lines in southern Manitoba, likely in agricultural landscape, with affect the same VECs as the Bipole III project – namely agricultural lands and wetlands. There will be cumulative effects. The question that the EIS should address is whether they will be significant.

We also observed that the EIS 'passes the buck' for responsibility for assessing and managing cumulative effects.

- **Example 1:** With respect to hydroelectric, mining, forestry and infrastructure projects, Section 7.6.2 of the Terrestrial Ecosystem and Vegetation Technical Report notes: "Past, existing and future hydroelectric, mining, forestry and infrastructure projects usually require environmental or due diligence assessments as part of their permitting or licensing process prior to development. These assessments are conducted to evaluate the potential effects of the development on VECs including similar vegetation VECs identified in this cumulative effects assessment. Assessments of other actions usually include the collection of information pertaining to any species/communities of conservation concern...It is assumed that the information gathered would be utilized to develop appropriate mitigation measures to minimize impacts to VECs resulting in no or minimal residual effects, similar to those determined for the Bipole III Project." It is then concluded that "As a result of the mitigation measures identified for the Bipole III VEC's, there are minimal resultant cumulative effects from past, existing, and future hydroelectric, mining, forestry and infrastructure projects." That other projects, past or future, may or may not undergo EIS and implement mitigation measures does not mean that the Project will not result in cumulative effects, neither should it relinquish the proponent from the responsibility of assessing those effects.

If it is deemed acceptable practice by any regulator or review panel that a proponent can identify their project as unlikely to cause cumulative environmental effects based on the argument that 'other' projects in the region, including future projects, will also undergo an EIS and implement mitigation measures, then there is no point in requiring that a CEA be done in the first place. This completely undermines the purpose of CEA.

That these projects and activities are not given more consideration as to the potential cumulative effects risks significantly underestimating the potential cumulative effects of the Project. These deficiencies could be addressed by adopting a more inclusive approach, particularly for future and prospective developments in the same sector, and adopting a scenario-based approach to their development and impacts across the landscape.

4.0 Cumulative Effects Management Measures

The cumulative effects assessment management phase includes determining the significance of the impacts predicted and providing a reasonable justification for that determination. Potential mitigation strategies to address, at a minimum, negative environmental consequences are also proposed.

4.1 Is the significance of a project's cumulative effect measured against a past reference condition and not simply the current, cumulative or disturbed condition?

The determination of significance is one of the most important and challenging aspects of impact assessment. Significance determination in CEA involves finding out "how much further effects can be sustained by a VEC before suffering changes in condition or state that cannot be reversed[70]." To gain proper insight into the significance of any effect, standard practice would involve comparing the nature of the predicted effect on VEC conditions against those in a 'pre-disturbance' state (described in Section 1.5). What this means is that one cannot tell if an effect is significant if one only looks at the incremental change that would be caused to the VEC by the project in question. Rather, it is essential to comprehend 'pre-disturbance conditions' (before a VEC might have been comprised), to appreciate whether the incremental effects of the project are truly significant or not.

There is no evidence in the Bipole III CEA that significance determination is based on a past reference condition of this kind. On the contrary, all previous disturbances on the landscape are collectively and erroneously absorbed into the description of 'baseline conditions' for the project (see Chapter 6): "The past projects and human activities that follow (in Table 9.2-1) are generally described and addressed as part of the baseline (Chapter 6) and earlier effects assessment (Chapter 8)" (Chapter 9, p. 9-7). Thus, the significance of cumulative effects in the Bipole III was not measured against a pre-disturbance reference condition.

4.2 Is the significance of cumulative effects adequately described and justified (e.g. based on regulatory thresholds, environmental policies, expert evaluation, public concerns, etc.) and based on VEC sustainability, defined by a desired or healthy condition or threshold as opposed to the magnitude of the individual project stress on that VEC?

The significance of an effect is usually described according to a number of attributes including: direction; extent (scope); duration; frequency; and magnitude[71]. The significance determination can also be declared with varying levels of confidence. According to the Executive Summary (p. iv and v), a team of specialists concluded that the Project's identified residual effects were not significant from a regulatory perspective, given they were small in magnitude or short in duration (no more than five years), and confined to the Project Footprint or the study area. Proposed mitigation measures for

[70] See p. 56 in: Hegmann G, Cocklin C, Creasey R, Dupuis S, Kennedy A, Kingsley L, Ross W, Spaling H, Stalker D 1999. Cumulative Effects Assessment Practitioner's Guide. Minister of Public Works and Government Services Canada.

[71] Hegmann G, Cocklin C, Creasey R, Dupuis S, Kennedy A, Kingsley L, Ross W, Spaling H, Stalker D 1999. Cumulative Effects Assessment Practitioner's Guide. Minister of Public Works and Government Services Canada.

four VECs of particular concern were revisited (woodland caribou, public safety, transportation, and community services), and taking into account the extensive mitigation measures proposed for these four VECs, as well as proposals for monitoring and adaptive management, the adverse effects of the Project were deemed not significant. The same VECs were then revisited in the analysis of cumulative effects of the Project. The conclusion was, similarly, that taking into account the proposed effects mitigation measures the anticipated cumulative effects of the Project are not significant from a regulatory perspective either.

More specifically, in Chapter 9 of the EIS, the significance of cumulative effects upon "some biophysical VECs" (p. 9-15) is disregarded based on that they are "…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" (p. 9-15). In other words, the determination of significance, as described in Chapter 9, does not appear to be based on established environmental thresholds, environmental policies, expert evaluation, or public concerns and is not based on any detailed evaluation of direction; extent (scope); duration; frequency; and/or magnitude.

A major factor that influences interpretation of significance is "exceedance of an environmental threshold[72]." There is no mention of environmental thresholds in the Bipole III CEA whatsoever. Interestingly, the determination of significance for cumulative effects appears to be based on the magnitude of the Project's stress on VECs as determined via the residual effects analysis performed in Chapter 8. For example, when summarizing site-specific residual effects, the CEA states:

> "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 (plans for monitoring, harvest management strategies, regional planning initiatives) were considered to the extent feasible in Chapter 8 assessment and are not considered to be significant" (Chapter 9, p. 9-17).

As a class, cumulative effects of the Bipole III line on biophysical or socio-economic VECs are deemed insignificant and (dis)missed.

4.3 Are the incremental impacts of the proposed initiative "traded off" against the significance of all other disturbances of activities in the region (i.e. minimized or masked)?

There are numerous examples in Chapter 9 of the EIS where the magnitude of potential negative cumulative effects is masked or minimized, either through faulty logic or by comparison with the relative significance of effects or disturbances caused by other projects.

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72 See p. 43 in: Hegmann G, Cocklin C, Creasey R, Dupuis S, Kennedy A, Kingsley L, Ross W, Spaling H, Stalker D 1999. Cumulative Effects Assessment Practitioner's Guide. Minister of Public Works and Government Services Canada.

- **Example 1:** The EIS states: “It would not make sense from a methodological perspective to assess CEs for VECs when there are no residual adverse effects” (Information Request #3, p. 118). In fact, it does make sense in some instances to have a second look at the significance designation for project effects, as some insignificant effects may become significant when viewed in light of other cumulative changes on the landscape and whether ecological thresholds have already been exceeded.

- **Example 2:** The EIS states, with regard to cumulative effects contributed by “past and existing” projects (see Table 9.2-1): “In general, effects of the above past and existing projects and activities where relevant to the CEA 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” (Chapter 9, p. 9-7). Incorporating the effects of past projects into the baseline masks the significance of trend data which would otherwise exist and should be examined.

- **Example 3:** There is a tendency to rely upon other existing management programs, and future licensing and assessment processes to address the cumulative effects of the Project. “Manitoba Hydro is participating in several future projects considered in the CEA. 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” (Chapter 9, p. 9-7).

- **Example 4:** There is a ‘pretence of innocence’ about the nature, timing, and extent of the proponent’s own prospective future Conawapa Generation project, yet the proponent has built generating facilities before (and so should be intimately familiar with their effects) and records an expected service date of 2024 in the EIS (see Figure 9.3-1). “The above future projects identified in Table 9.2-3 (including the Conawapa Generation project) will, if and when they proceed, be subject to their own review process 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 the effects are not well understood at this time, they are addressed only to a limited extent in this CEA, i.e., to note prospective overlap issues to be addressed in the future when and if these projects are subject to regulatory review” (Chapter 9, p. 9-12).

The practice of displacing responsibility for cumulative effects from one project to the next is unacceptable[73] and almost ensures that cumulative effects will never be adequately addressed in any of the projects, or for the projects cumulatively.

4.4 Are mitigation measures identified that help offset significant cumulative environmental

[73] Duinker P, Greig L 2006 Scenario analysis in environmental impact assessment: Improving explorations of the future. *Environmental Impact Assessment Review* 27: 206–219.

effects, and if so, is consideration is given to multi-stakeholder collaboration to develop joint management measures?

A second major factor that influences significance determination (besides exceedence of thresholds, described in Section 4.2) is effectiveness of mitigation[74]. The primary means by which the Project offsets negative cumulative environmental change is through strategic route selection for the Bipole III transmission HVdc line. Where potential effects could not be avoided altogether (by strategic routing choices), specialists discussed mitigation measures to eliminate or reduce potential adverse effects on VECs forseeably affected by one or more Project components (Executive Summary, p. iv).

Although Chapter 9 reports that significant adverse cumulative effects are not anticipated, the proponent identifies a number of management initiatives and partnerships that will be relied on to absorb and address emergent cumulative biophysical and socio-economic effects of the Project. Examples of mitigation initiatives include:

- **Example 1:** With respect to addressing the Project's biophysical effects on VECs (listed in Chapter 9, p. 9-16 and 9-17), Manitoba Conservation is expected to play a key role in monitoring changes in mammal population numbers and status.

- **Example 2:** "Regional planning for creation of access roads and lowering speed limits in active wildlife areas have demonstrated success in reducing numbers of vehicle/mammal collisions" (Chapter 9, p. 9-17).

- **Example 3:** With respect to mitigation strategies for caribou (Wabowden Range and possibly Bog Range) the EIS states: "…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" (Chapter 9, p. 9-19).

- **Example 4:** With respect to socio-economic effects, the EIS states: "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" (Chapter 9, p. 9-25).

Chapter 11 of the EIS describes a broader effects mitigation management program to offset Project effects, namely Manitoba Hydro's Environmental Protection Program and Environmental Protection Plans, and a comprehensive 'Mitigation Commitment Table' has been submitted by the Project proponent. However, as the CEA did not find any significant adverse cumulative effects of the Project, no further comments are made on cumulative effects mitigation strategies.

[74] Hegmann G, Cocklin C, Creasey R, Dupuis S, Kennedy A, Kingsley L, Ross W, Spaling H, Stalker D 1999. Cumulative Effects Assessment Practitioner's Guide. Minister of Public Works and Government Services Canada.

4.5 Is adaptive management identified for significant cumulative effects contingent upon future and uncertain developments and impact interactions?

In CEA, it would be difficult to claim to be managing cumulative effects unless there is some regular feedback loop that links project effects to VEC responses to changes in mitigative strategies, i.e adaptive management. Adaptive management is an iterative process whereby current conditions are used to determine subsequent management actions[75], and is used particularly when uncertainty about future conditions is high. Despite that the Bipole III CEA did not find any significant adverse cumulative effects of the Project (other than for caribou), adaptive management is still proposed as a means to address incremental cumulative adverse effects emerging from the Project over time, both for biophysical and socio-economic VECs. Several references to the use of adaptive management follow:

- **Example 1:** Proposed mitigation measures for four VECs of particular concern (woodland caribou, public safety, transportation, and community services) identified in the effects assessment (Chapter 8) were revisited (in the CEA). Taking into account the extensive mitigation measures proposed for these four VECs and the proposals for monitoring and adaptive management,…(the adverse effects of the Project were deemed not significant) (Executive Summary, p. iv and v).

- **Example 2:** With regard to caribou (Waboden range, and potentially Bog range), "The nature of effects will be monitored and adaptive management applied as required…" (Chapter 9, p. 9-19).

- **Example 3:** "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 9, p. 9-25).

With respect to the Project's anticipated effects, the proponent generally appears to have adequate adaptive management strategies in place. Note, however, that because the Bipole III CEA did not find significant adverse cumulative effects of the Project, a comprehensive review of adaptive management strategies for the Project is not undertaken herein.

[75] Walters C 1986. Adaptive Management of Renewable Resources. Macmillan, New York.