INFORMATION RESPONSES
LOWER CHURCHILL PROJECT
CEAA REFERENCE NO.07-05-26178

JOINT REVIEW PANEL

Volume 1-A
IR Numbers JRP.1 to JRP.13

July 3, 2009

nalcor energy
LOWER CHURCHILL PROJECT

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Volume 1-A

IR Numbers JRP.1 to JRP.13

Information Request Number: JRP.1

Consultation with Innu Nation

Requesting Organization – Joint Review Panel **Information Request No.: JRP.1**

Subject - Consultation with Innu Nation

References:

EIS Guidelines, Section 4.8 (Consultation with Aboriginal Groups and Communities)

EIS, Volume III, Section 2.8 (Existing Environment – Land and Resource Use)

Minaskuat Inc. 2009a. *Current Land and Resource Use in the Lower Churchill River Area*. Report prepared for the Lower Churchill Hydroelectric Generation Project.

Minaskuat Inc. 2009c. *Lower Churchill River Fish Consumption and Angling Survey.* Report prepared for the Lower Churchill Hydroelectric Generation Project.

Rationale:

The EIS Guidelines require the EIS to "demonstrate the Proponent's understanding of the interests, values, concerns, contemporary and historic activities, Aboriginal traditional knowledge and important issues facing Aboriginal groups, and indicate how these will be considered in planning and carrying out the Project." (p. 40).

Minaskuat Inc. (2009a) mentions that "the Study Team was not granted access to collect primary data on the land and resource use patterns of the Innu" but that the Proponent "has documented its ongoing efforts to engage Innu Nation and obtain current land use data related to the Study Area". It concludes that "there is a temporal gap in the information available on Innu Land and resource use in the Study Area" (p. 8). Sheshatshiu Innu harvestings areas shown in the EIS for example cover the period of 1979 to 1987 (Volume III, p. 2-57, 2-60, 2-61, 2-65 and 2-75).

Minaskuat Inc. (2009c) indicates however that there are ongoing efforts to gather data on Innu land and resource use: "The Innu community of Sheshatshiu was not included in the telephone survey at the request of Innu Nation. Hydro and Innu Nation have discussed other potential means of acquiring Innu fishing information for use in the environmental assessment." (p. 4-1)

The Panel is required to consider the effects of the Project on the current use of lands and resources for traditional purposes by Aboriginal persons.

Requesting Organization – Joint Review Panel **Information Request No.: JRP.1**

Information Request:

In order for the Panel to consider the efforts taken by the Proponent to obtain current data on Innu land and resource use:

a. **What was the scope of the initial request that the Proponent addressed to Innu Nation to obtain access to collect primary data on Innu land and resource use?**

Response:

In June 2006, the Proponent engaged Minaskuat Limited Partnership (Minaskuat, an Innu Business) and its partners as its environmental assessment (EA) consultant. This contractor included an Innu socioeconomic study team comprised of researchers with considerable experience in working with the Labrador Innu. The Proponent, through Minaskuat, then proceeded to plan and implement a range of environmental baseline studies (biophysical and socioeconomic) in support of the EA, including studies related to Innu Land and Resource Use and other socioeconomic issues.

Proposals for the Innu Land and Resource Use and other studies were developed by the Minaskuat study team for the Proponent. This included a proposal to carry out an "Innu Land Use and Occupancy Study Planning and Churchill River Fieldtrips" exercise, which was to have been the first step towards gathering Innu land and resource use information for the EA. The study workscope (from October 2006) included undertaking:

> "...the planning and preparation necessary to undertake the Innu land use and occupancy baseline study to gather data on Innu land use to be used in the environmental assessment of the Project. It also provides for the planning and undertaking of fieldtrips on the Churchill River with Innu Elders...to promote Elder reminiscences about their land use in the Mishta-shipu valley, and to begin recording their testimony about this land use. The trips will prime them for subsequent data collection in the context of formal land use interviews...
>
> Land Use and Occupancy Work Tasks:
>
> - extract data from Innu Nation land use and occupancy datasets related to the Project;
> - evaluate gaps, strengths and weaknesses (e.g. map scale) in the data for the purpose of designing supplementary work;
> - review current methodologies for the conduct of land use and occupancy research (e.g. Tobias Moose 2 map biography methods text);
> - build draft list of Innu land users with experience in the Project area who will be targeted for interviews;
> - identify additional sources of Innu land use and occupancy data of relevance to the study area, and begin acquisition of additional data; and
> - review methods and tools and develop work scope and cost estimate for implementation of Innu Land Use and Occupancy Study...".

This workscope was forwarded to, reviewed by and discussed with Innu Nation through the NL Hydro-Innu Nation Task Force in place from 2006-2008 under Process Agreements between the Parties. In late 2006 work was initiated on this "Innu Land Use and Occupancy Study Planning and Churchill River Fieldtrips" study.

However, in December 2006 most of the Innu socioeconomic study team removed themselves from this and other studies, due to contractual and other issues with Minaskuat - issues which did not involve or pertain directly to the Proponent.

In January 2007, Minaskuat attempted to establish new study teams to complete the planned Innu land and resource use and other socioeconomic studies, for which new proposals were developed and submitted to the Proponent and discussed with Innu Nation through the existing consultation processes (Task Force) described above. Innu Nation did not, however, approve or support these alternative study teams. In planning and implementing environmental studies for the EA, the Proponent has always adhered to a principle that it will only undertake to access and collect primary data on Innu land and resource use with Innu Nation's cooperation and support.

In order to proceed with its land use and other socioeconomic studies for the EA, in early 2007 the Proponent directed its consultants to begin studies focused primarily on non-Innu communities, but to also begin to compile existing and publicly available literature on Innu land and resource use in the Project area.

The Proponent also then undertook to continue to work with Innu Nation to seek to obtain access to collect primary data on Innu land and resource use, and to do so with Innu Nation's cooperation and support. These subsequent efforts are outlined in the following response (b).

Requesting Organization – Joint Review Panel **Information Request No.: JRP.1**

In order for the Panel to consider the efforts taken by the Proponent to obtain current data on Innu land and resource use:

b. What specific steps has the Proponent taken and documented to engage Innu Nation and obtain current Innu land and resource use data related to the Study Area since this initial request?

Response:

Subsequent to its initial efforts and requests (as outlined in the preceding response), the Proponent made and documented significant and repeated attempts to engage Innu Nation to obtain current Innu land and resource use data related to the Study Area for use in the Project's EA. These included various attempts to contract directly with Innu Nation to gather and provide Innu land and resource use information for use in the EA throughout 2007 and in early 2008. Throughout that period, the Proponent indicated its desire to ensure that the Innu were appropriately involved in planning and conducting these studies, and in the eventual review and use of such information.

A general overview of some of the key steps involved in these efforts is provided below.

Subsequent Attempts to Gather Current Innu Land and Resource Use Data by Nalcor Energy: ***A General Chronology***	
February 2007	• As a result of the departure of the initial Innu socioeconomic study team and Innu Nation's rejection of Minaskuat's alternate study teams, and In order to proceed with socioeconomic studies for the EA, the Proponent directs Minaskuat to conduct a number of general socioeconomic studies. These are focused primarily on non-Innu communities, but also involve collecting existing and publicly available information related to the Innu (including land and resource use data). • To also attempt to move forward with Innu-specific studies, the Proponent also agrees to accept a commercial proposal from Innu Nation itself to undertake additional and separate Innu socioeconomic work, including gathering land and resource use information from Innu sources for use in the EA.
March 19, 2007	• An Innu socioeconomic study proposal is received from Innu Nation. This proposal is reviewed by the Proponent, and is the subject of various verbal and written discussions with Innu Nation over the following weeks.
March 30, 2007	• The Proponent provides a detailed written response to Innu Nation, outlining some specific points, suggestions and concerns regarding the March 19, 2007 proposal. These include various questions and issues around study scope, deliverables, schedules, budgets. The purpose of this correspondence is to seek further definition and clarification around these technical and commercial issues, in order to attempt to discuss and resolve them so that this work can be initiated.
April 17, 2007	• As no response to the above correspondence is received, the Proponent writes to the then Innu Nation President, reiterating its views and desire to see these matters resolved and the study work initiated as soon as possible.
May 29, 2007	• Innu Nation provides a written response to the Proponent's March 30, 2007 review comments on its study proposal. This response, unfortunately, does not indicate whether or how the technical and commercial issues raised by the Proponent are to be addressed.

Subsequent Attempts to Gather Current Innu Land and Resource Use Data by Nalcor Energy: *A General Chronology*	
June 14, 2007	• The Proponent provides a detailed written response to Innu Nation's May 29, 2007 letter, further clarifying and reiterating its technical and commercial questions and concerns with the original proposal, and reiterating its desire to proceed with such studies. • That letter also indicates that while the Proponent is still interested in having Innu Nation conduct the work, these issues must first be discussed and addressed. No response to that correspondence is received.
June 15-22, 2007	• On June 15, 2007 the Proponent and Innu Nation decide to focus on concluding a contract for a study to gather and provide existing socioeconomic information that is held by the Innu communities for use in the EA, including data from Innu Nation's existing land use database. • On June 22, 2007 the Proponent provides Innu Nation with a work scope and draft contract for this Innu socioeconomic study. (A contract for this work is eventually signed and the work initiated in late August 2007, please see below).
June 29, 2007	• The Proponent provides Innu Nation with a proposal from Minaskuat for a *Angling and Fish Consumption* survey, for review and comment through the Task Force process. That proposed (and later completed) study involves a telephone survey of residents of Central Labrador communities (including Sheshatshiu) to gather information on fishing activity in, and fish consumption from, the lower Churchill River.
July 6, 2007	• Innu Nation provides its review comments on the proposal for the *Angling and Fish Consumption* survey. In these comments, Innu Nation states that in lieu of a new phone survey, it would be preferable to obtain and use the existing Innu fish consumption and preference data from the recent Collaborative Mercury Research Network (COMERN) study undertaken in Sheshatshiu, or, in the event that these data cannot be accessed, to conduct a door-to-door survey or focus groups in Sheshatshiu. • In response to these comments from Innu Nation, the Proponent instructs Minaskuat to remove Sheshatshiu from the *Angling and Fish Consumption* survey and proceed with the telephone survey in the other Central Labrador communities only.
August 8, 2007	• Innu Nation states its intention to provide the Innu fish consumption and preference data from the recent COMERN to the Proponent for use in the EA under its eventual contract with Nalcor for the compilation of socioeconomic data (That contact was signed later in August 2007, see below).
August 22, 2007	• The Proponent and Innu Nation sign a contract for an *Innu Socioeconomic Study*, focused on the "identification, compilation and review of existing socioeconomic information and data sets related to the Innu of Labrador that are held by and available exclusively to the Innu Nation and the Innu Communities and will include available information pertaining to…Innu land use and subsistence". The study report is due in November 2007. (A draft report for the general *Innu Socioeconomic Study* (pursuant to the contract of August 22, 2007) is received from Innu Nation in August 2008 and a Final Report in January 2009. The report contains some existing information from Innu Nation's land use database. The nature and age of this information is similar to that provided in the published literature).
August 28, 2007	• The Proponent provides a presentation to Innu Nation at a Task Force meeting outlining its on-going EA socioeconomic work. At that time, the Proponent reiterates its desire to proceed with a number of additional Innu socioeconomic studies, including a proposed *Innu Land Use and Harvesting* study.

Subsequent Attempts to Gather Current Innu Land and Resource Use Data by Nalcor Energy: *A General Chronology*	
September 6, 2007	• The Proponent provides a workscope for its proposed *Innu Land Use and Harvesting* study to Innu Nation through the Task Force, the nature and purpose of which would be to: "… gather and document information regarding contemporary Innu land use and harvesting, for use in the environmental assessment (EA) of the proposed Lower Churchill Project. This will include the collection of information on harvesting activities, times and locations (hunting, fishing, trapping, gathering), camp sites and cabins, travel routes, and other sites of socio-cultural importance to the Innu (such as birth and burial sites and areas of spiritual significance)…Innu land use and harvesting information for this study will be collected through a series of key informant interviews with Innu who are known to have contemporary use in the Churchill River Valley and proposed transmission line corridors".
September 24, 2007	• The proposed *Innu Land Use and Harvesting* study is again discussed by the Proponent and Innu Nation at a Task Force meeting. • Innu Nation also advises that the Innu fishing and consumption data collected through the COMERN work is not likely to be made available to the Proponent through the Innu Socioeconomic Study being completed by Innu Nation (pursuant to the contract of August 22, 2007).
September 25, 2007	• In the absence of comments from Innu Nation on the previously provided workscope for its proposed *Innu Land Use and Harvesting* study, the Proponent provides a written response to what it understands to be Innu Nation's questions and any issues, in order to hopefully address these and move forward. • Written comments on the workscope for the proposed *Innu Land Use and Harvesting* study are subsequently received from Innu Nation, indicating that Innu Nation does not support proceeding with the study at this time.
October 24, 2007	• Nalcor Energy and Innu Nation Executive meet, at which time the issue of Innu socioeconomic studies is again generally discussed.
November 13, 2007	• The Proponent writes to Innu Nation Executive, again reiterating its desire to undertake further Innu Nation socioeconomic work for the EA. That letter includes the workscopes for several proposed Innu socioeconomic studies – including the *Innu Land Use and Harvesting* study - and again requests that Innu Nation undertake this work, under contract to the Proponent, to collect and provide this information for use in the EA. • This correspondence and the status of Innu Nation's response to it are discussed on various occasions by the Proponent and Innu Nation through the Task Force in late 2007 and 2008. However, no response from Innu Nation is received.

Requesting Organization – Joint Review Panel **Information Request No.: JRP.1**

In order for the Panel to consider the efforts taken by the Proponent to obtain current data on Innu land and resource use:

c. What other specific potential means of acquiring Innu land and resource use data (including fishing information) are the Proponent and Innu Nation considering pursuing for use in the environmental assessment?

Response:

As outlined in the above responses, the Proponent has made and documented significant efforts to engage Innu Nation to obtain current Innu land and resource use data related to the Study Area for use in the Project's EA. Unfortunately, in the end none of these efforts proved successful, and the Proponent was unable to proceed with such studies with Innu Nation's cooperation and support.

While this was disappointing, the Proponent has respected Innu Nation's views and wishes on this matter, and has not proceeded to collect additional Innu land and resource use data (including fishing information) for use in the EA. Instead, the EIS makes use of existing and available information.

There are no on-going discussions or efforts between the Proponent and Innu Nation towards obtaining additional Innu land and resource use data for use in the Project's EA. The proponent has, and continues, to encourage the Innu to bring any such perspectives and information on Innu land use and potential effects directly to the EA Panel process.

Requesting Organization – Joint Review Panel **Information Request No.: JRP.1**

Information Request:

d. Regarding the temporal gap in the information available on Innu land and resource use, Minaskuat Inc. (2009a) indicates that "it is the Study Team's opinion that there is no reason to believe that there has been an obvious cause of fundamental change in the nature, intensity or distribution of land and resource use" (p. 8). Demonstrate how the Study Team came to the conclusion that there have not been any recent fundamental changes in the nature, intensity or distribution of land and resource use.

Response:

The Study Team's conclusion was based on its familiarity with the evolution of the social and economic environment of the Land and Resource Use Study Area over the period in question and general (i.e., non-Project specific) discussions between the Nalcor team and individual Innu.

Examples of events that the Study Team considered might cause a fundamental change in the nature, intensity or distribution of land and resource use are:

1. The relocation of the Mushuau Innu from Davis Inlet to Natuashish, one express purpose of which was to facilitate access to land and resources on the mainland;
2. The execution of a treaty containing, like several recent treaties, financial and other provisions designed to foster or subsidize hunting, fishing, trapping and related activities.

The Study Team, after careful consideration of the types of events that have occurred in the last 20 years similar to the examples noted above, concluded that there were no events that might have caused a fundamental change in the nature, intensity or distribution of land and resource use in the Study Area by Innu.

Requesting Organization – Joint Review Panel **Information Request No.: JRP.1**

Information Request:

e. Minaskuat Inc. (2009a) also indicates that "without the benefit of Innu participation, the Study Team could not adequately address issues related to the spiritual and historic importance of the Study Area to Innu" (p. 8). Explain how this data gap has been addressed in the assessment of the Project's anticipated environmental effects on cultural heritage resources and cultural heritage sites.

Response:

The lack of Innu participation in this aspect of the environmental assessment, as it relates to the Project's anticipated environmental effects on cultural heritage resources and cultural heritage sites, has been addressed through

1. extensive background literature reviews and field surveys
2. reference to the Innu Traditional Knowledge (ITK) Report
3. provisions of the Impact Benefits Agreement (IBA) currently being negotiated between Nalcor and Innu Nation
4. commitment to conduct site-specific historic resources assessment and clearance prior to activities that may result in ground disturbance

Literature Reviews and Field Surveys

Data considered in the environmental effects analysis for Cultural Heritage Resources include:

- archaeological surveys and assessments in the Assessment Area since 1974;
- historic and contemporary Innu land and resource use in the Assessment Area, secured under license from Innu Nation between 1998 and 2001;
- a literature review of published sources and unpublished reports and records on file with the PAO;
- aerial photograph and map analyses; and
- archaeological potential mapping and field investigation in 1998, 1999, 2000 and 2006.

Overall, archaeological field surveys, conducted with Innu Archaeological Field Technicians in 1998, 1999, 2000, and 2006, led to the investigation of over 984 locations, with approximately 32,450 test pits excavated. Testing locations were pre-selected, based on aerial photograph analysis and land use data. The Project footprint (proposed Gull Island Generation Facility and reservoir; Muskrat Falls Generation Facility and reservoir; interconnecting transmission line from Muskrat Falls to Gull Island and from Gull Island to Churchill Falls) was extensively surveyed.

ITK Report

Among other things, the ITK Report included Innu knowledge-based descriptions of key historical and cultural features of the Project area. The ITK report was consulted for information pertaining to cultural heritage resources and sites. Within the Cultural Heritage Resources Assessment Area, the ITK Report references two sites of cultural and spiritual importance to the Innu within the lower Churchill River valley (Section 11 of the ITK Report: Ideology: Innu beliefs and Mishta-shipu). . A rock knoll on the north side of Muskrat Falls (Manitu-utshu*)* is believed to be the dwelling place of the giant otter or seal-like being known as Uenitshikumishiteu in Innu

mythology. The second site (Ushkan-shipiss), on the south side of the Churchill River near Upper Brook, is where the last shaking tent ceremony in Labrador and Quebec took place in the fall of 1969 (Section 2.9.4 of Volume III).

Where sites of particular importance are identified, Nalcor Energy will make every effort to contribute to the protection and conservation of these sites (Section 6.5.5.1 of Volume III). Interactions with the cultural and spiritual site at Muskrat Falls (Manitu-utshu*)* have been reduced through a Project redesign and development of an alternate layout that considered cultural and spiritual importance of the site, as well as technical and economic factors. In 2006, Hydro sponsored a field trip by a group of Sheshatshiu residents to the site of the last shaking tent ceremony at Upper Brook (Ushkan-shipiss). Innu testimony was recorded with respect to the shaking tent event and its social and cultural context. The audio-visual material from the site visit has been archived with Innu Nation. These materials will serve as historical and religious resource material for future generations of Innu (Section 6.6 of Volume III)

IBA

Through the IBA currently being negotiated by Nalcor and Innu Nation, there is a provision regarding measures to identify Innu cultural and heritage sites, in consultation with Innu Nation.

Site-Specific Historic Resources Assessment Surveys and Clearance

Any work associated with the Project which will result in ground disturbance, such as operation of heavy equipment, blasting, trenching, cutting and clearing will be subject to historic resources assessment and clearing prior to beginning the activity.

In addition to the measures listed above, effects management measures have been proposed (Section 6.5.5 of Volume 3) in accordance with provincial government guidelines for historic resources research (Newfoundland and Labrador Historic Resources Act 1985). The measures include further documentation and field recording of visible surface remains and structures, and systematic data recovery through testing and detailed excavation and recording where appropriate. A Historic and Archaeological Resources Contingency and Response Plan for Cultural Heritage Resources will be developed and implemented in the event of the discovery of a previously unidentified site**.** All Project personnel will receive orientation training regarding the historic resources potential of the area, the responsibility to report unusual findings, and procedures to implement in the event historic resources are discovered during Project construction.

References:

IEDE/Jacques Whitford (IED Enterprises/Jacques Whitford). 2000. Churchill River Power Project 1998 Environmental Studies-Historic Resources Overview Assessment, Labrador Component. (LHP 98-17). Final Report submitted to Labrador Hydro Project, St. John's, NL.

Jacques Whitford. 2000. Sea Level History and Geomorphology of the Churchill River and Strait of Belle Isle (LHP 98-23). Jacques Whitford report prepared for Newfoundland and Labrador Hydro, St. John's, NL.

Jacques Whitford/IELP (Innu Environmental Limited Partnership). 2001a. Labrador Hydro Project 1999 Environmental Studies-Historic Resources (Labrador Study) (LHP 99-17). Report submitted to Newfoundland and Labrador Hydro, St. John's, NL.

Jacques Whitford/IELP (Innu Environmental Limited Partnership). 2001b. Labrador Hydro Project 2000 Studies-Historic Resources Potential Mapping (LHP 00-17). Report submitted to Newfoundland and Labrador Hydro, St. John's, NL.

Jacques Whitford/IELP (Innu Environmental Limited Partnership). 2001c. Labrador Hydro Project 2000 Studies-Historic Resources Field Program (Volume 1) (LHP 00-17). Report submitted to Newfoundland and Labrador Hydro, St. John's, NL.

Jacques Whitford/IELP (Innu Environmental Limited Partnership). 2001d. Labrador Hydro Project Churchill River Power Project Historic Resources Overview Assessment 1998-2000 Volume 1: Interpretive Summary and Recommendations (LHP 00-17C). Report submitted to Newfoundland and Labrador Hydro, St. John's, NL.

Minaskuat Inc. 2008. 2006 Historic Resources Overview and Impact Assessment of Muskrat Falls Generating Facility and Reservoir and Muskrat Falls to Gull Island Transmission Line Corridor. Report prepared for the Lower Churchill Hydroelectric Generation Project.

Information Request Number: JRP.2

Consultation with Aboriginal Groups Other than Innu Nation

Requesting Organization – Joint Review Panel **Information Request No.: JRP.2**

Subject - Consultation with Aboriginal groups other than Innu Nation

References:

EIS Guidelines, Section 4.8 (Consultation with Aboriginal Groups and Communities).

EIS, Volume IA, Section 8.0 (Aboriginal Consultation) & Volume IB, Appendix IB-I (Aboriginal and Public Consultation Summaries).

Rationale:

The EIS Guidelines require the EIS to "demonstrate the Proponent's understanding of the interests, values, concerns, contemporary and historic activities, Aboriginal traditional knowledge and important issues facing Aboriginal groups, and indicate how these will be considered in planning and carrying out the Project." (p. 40) As per the EIS Guidelines, the Aboriginal groups and communities to be considered include, in Newfoundland and Labrador, the Innu Nation, the Labrador Métis Nation and the Nunatsiavut Government and, in Quebec, the Innu communities of Uashat Mak Mani-Utenam, Ekuanitshit, Nutaskuan, Unamen Shipu, Pakua Shipi and Matimekush-Lake John.

For Aboriginal groups other than the Innu Nation, the EIS mentions that Project personnel have held various meetings with individual groups for the purpose of exchanging information about the Project, the environmental assessment and possible interest. Aboriginal groups were also invited "to provide any information that they felt would be relevant to consider for Project planning and the environmental assessment" (Volume IA, p. 8-8). However, the EIS Issues Concordance table for Aboriginal Consultation (Volume IB, Appendix IB-I) does not distinguish between issues raised by each of the Aboriginal groups that the Proponent was required to consider.

Requesting Organization – Joint Review Panel **Information Request No.: JRP.2**

Information Request:

In order for the Panel to assess the efforts taken by the Proponent to fulfill the information requirements of the EIS Guidelines regarding consultation with Aboriginal groups other than Innu Nation:

a. What specific steps has the Proponent taken to gather information and elicit participation from Aboriginal groups other than Innu Nation for the purpose of fulfilling the information requirements of the EIS Guidelines, including Aboriginal Knowledge? Provide a separate answer for each group.

Response:

The names and offices of individuals participating in the Proponent's consultation with Aboriginal Groups other than Innu Nation are set out in Table JRP.2.a-1.

Quebec Innu

The specific steps taken by Nalcor Energy to gather information and elicit participation from the Quebec Innu for the purpose of fulfilling the information requirements of the EIS Guidelines are set out in Table JRP.2.a-2.

Nalcor Energy has been engaged in ongoing consultation efforts with respect to the Quebec Innu communities of Uashat Mak Mani-Utenam, Ekuanitshit, Nutaskuan, Unamen Shipu, Pakua Shipi and Matimekush-Lake John since the release of the EIS guidelines. On May 20, 2008, the Chief of each community was provided with the following information:

- Lower Churchill Hydroelectric Generation Project Environmental Assessment Registration document (in French)
- Map book illustrating the anticipated reservoir areas and predicted extent of flooding

In the accompanying correspondence, Nalcor proposed to meet with each community to provide additional information in relation to the Project and to discuss community-specific issues and concerns. Throughout the summer and fall of 2008 Nalcor made repeated efforts by phone, e-mail and written correspondence, to arrange meetings with each community. The determination of meeting dates acceptable to both Nalcor Energy and the particular Quebec Innu community was complicated by a number of external factors including weather, conflict with Band Council elections, summer vacation and the ongoing negotiations between Hydro Quebec and the various communities in respect of the Romaine Hydroelectric Complex Project. However, despite these difficulties, Nalcor representatives met with the Chief, members of Band Council and legal counsel to each Quebec Innu community on the following dates:

- Unamen Shipu and Pakua Shipi -- July 24, 2008
- Nutaskuan-- October 22, 2008
- Uashat Mak Mani-Utenam and Matimekush-Lake John -- January 12, 2009
- Ekuanitshit -- June 1, 2009

Each meeting involved a Power Point presentation on the Project (delivered in French) following by a question and answer session (also in French) with an invitation for further meetings as required by each community. Hard copies of the presentation were left with each community.

On March 3, 2009, each of the six Quebec Innu communities was provided with a copy (in French) of the EIS Executive Summary and provided additional information with respect to the EIS.

In order to regularize consultation, facilitate the participation of each Quebec Innu community and ensure the collection of accurate and comprehensive data relating to Project impacts upon current land and resource usage, Nalcor Energy developed a draft community consultation agreement which was sent to each community (in both English and French) for review on a confidential basis on May 13, 2009. Nalcor Energy has invited each community to review the terms and conditions of the draft consultation agreement and has indicated its willingness to negotiate such revisions and modifications as may be necessary to accommodate the particular circumstances of each community.

The agreement is currently under review by each community and Nalcor Energy met with the Chief and Band Council of Ekuanitshit on June 1, 2009 to discuss the purpose and contents of the proposed agreement.

For more information on the nature and scope of the draft community consultation agreement, please refer to the response provided for in IR# JRP.2.c.

References:

EIS Guidelines, Section 4.8 (Consultation with Aboriginal Groups and Communities)

EIS, Volume IA, Section 8.0 (Aboriginal Consultation) & Volume IB, Appendix IB-I (Aboriginal and Public Consultation Summaries)

Table 1 List of Representatives

Affiliation	Representative	Title
Conseil des Innu d'Ekuanitshit (Mingan)	Jean-Charles Piétacho	Chief Innu Conseil des Innu d'Ekuanitshit
	Liette Boudreau	Assistant to Chief Piétacho
	Vice Chief Vincent Napish	Vice Chief Conseil des Innu d'Ekuanitshit
	David Schulze	Legal Counsel
Conseil des Montagnais de Natashquan (Natashquan)	Chief François Bellefleur	Chief Conseil des Montagnais de Natashquan
	Clement Tremblay	Consultant to Conseil des Montagnais de Natashquan, Conseil de Bande des Montagnais d'Unamen Shipu and Conseil des Innus de Pakua Shipi
	Jean Malec	Chief of Consultation Office
	Daniel Lalo	Councillor
	Roberto Wapistan	Councillor
	Nicolas Wapistan	Councillor
Conseil de bande des Montagnais d'Unamen Shipu (La Romaine)	Chief Guy Bellefleur	Chief Conseil de bande des Montagnais d'Unamen Shipu
	Ken Rock	Legal Counsel
	Chief Christiane Lalo	Chief Conseil des Innus de Pakua Shipi
	Lionel Alvue	Consultant to Conseil de Bande des Montagnais d'Unamen Shipu
	Joseph Mullen	Councillor
	Alain Bellefleur	Councillor
	Raymond Bellefleur	Councillor
	Emilien Bellefleur	Councillor
	Alain Sachel	Consultation
Conseil des Innus de Pakua Shipi (St. Augustin)	Chief Christiane Lalo	Chief Conseil des Innus de Pakua Shipi
	Chief Guy Bellefleur	Chief Conseil de bande des Montagnais d'Unamen Shipu
	Ken Rock	Legal Counsel to Unamen Shipu and Pakua Shipi
	Denis Mestenapaeo	Councillor
	Alfred Tenegan	Councillor
	Maurice Bellefleur	Councillor
Conseil Innu Takuaikan Uashat mak Mani-Utenam (Sept Iles)	Chief Georges-Ernest Grégoire	Chief Conseil Innu Takuaikan Uashat mak Mani-Utenam
	Lyne Morissette	Assistant to Chief Grégoire
	James O'Reilly	Legal Counsel for Uashat
	Patricia Ochman	Legal Counsel for Uashat

Table 1 List of Representatives cont.

Affiliation	Representative	Title
Nation Innu Matimekush-Lac John (Schefferville)	Chief Real McKenzie	Chief Nation Innu Matimekush-Lac John
Naskapi Nation of Kawawachikamach	Chief Philip Einish	Chief Naskapi Nation of Kawawachikamach
	Maria Vincelli	Senior Research Associate, Atmacinta Inc.
Labrador Metis Nation	President Chris Montague	President Labrador Metis Nation
	Bert Pomeroy	Communications
	Tammy Lambourne	Research and Natural Resources Manager
	Jamie Snook	General Manager
	John Glew	
	Rick Bennett	
	Lisa Dempster	Senior Human Resource Officer
	Roland Kemuksigak	Natural Resources Coordinator
Nunatsiavut Government	President Jim Lyall	President Nunatsiavut Government
	President Tony Anderson	President Nunatsiavut Government (Acting)
	Doug Blake	DM, Lands and Resources
	Tim McNeil	DM, Education and Economic Development
	Marina Biasutti-Brown	Director of Environment
	Daniel Michelin	AngajukKak Rigolet
	Darryl Shiwak	Minister of Education and Economic Development
	Theresa Hollett	Impact, Benefit Agreement Coordinator
	Doris Hopkins	Councillor
	Melva Williams	Councillor
	Max Pottle	Councillor

Table 1 List of Representatives cont.

Affiliation	Representative	Title
Nalcor Energy (Prior to December 11th, 2008 Nalcor will be referred to as Newfoundland and Labrador Hydro)	Ed Martin	President & CEO, Nalcor Energy
	Gilbert Bennett	Vice President, Nalcor Energy - Lower Churchill Project
	Paul Harrington	Project Manager, Nalcor Energy - Lower Churchill Project
	Todd Burlingame	Manager, Environment and Aboriginal Affairs
	Mary Hatherly	Aboriginal Agreements Lead
	Maria Giovaninni	EIS Editing and Production Lead
	Leslie Grattan	Consultation Lead
	Jeanette Drover	Consultation Coordinator
	Mike Wilkshire	French/English Interpreter
	Madeline Holden	Electrical Policy Analyst
	Leona Barrington	Senior Communications Specialist
	Larry LeDrew	Environmental Assessment Lead (Generation)
	Steve Bonnell	Environmental Assessment Lead (Transmission)
	Marion Organ	Environmental Engineer
	Sarah Sullivan	Communications Assistant
	Ruby Carter	Aboriginal Planning Lead
	Maria Moran	Benefits Lead
	Susan Hollett	Facilitator
	David Kiell	Manager, Environmental Assessment
Government of Newfoundland and Labrador	Premier Danny Williams	Premier of Newfoundland and Labrador
	Minister Charlene Johnson	Newfoundland and Labrador Minister of Environment and Conservation
	Minister Clyde Jackman	Newfoundland and Labrador Minister of Environment and Conservation
	Paul Carter	Environmental Specialist, Department of Environment and Conservation
Canadian Environmental Assessment Agency	Dominic Cliché	Panel Manager, Canadian Environmental Assessment Agency
	Maryse Pineau	Panel Manager - Lower Churchill Project

Table 2 Specific Steps to Gather Information and Elicit Participation with Quebec Innu Conseil des Innu d'Ekuanitshit

Aboriginal Group	Who	Date	Action Taken
Conseil des Innu d'Ekuanitshit (Mingan)	Chief Pietacho	Jan 15, 2008	Letter to Minister Charlene Johnson regarding an extension to comment on the Lower Churchill Project Environmental Impact Statement draft guidelines and land negotiations.
	Gilbert Bennett	May 20, 2008	Letter to Chief Pietacho sending Project information package including: • Two copies of the Lower Churchill Project Environmental Assessment Registration document; • Two copies of the reservoir map book; • Two copies of the proposed site layouts at Gull Island and Muskrat Falls; and • Aquatic Studies, Historic Resources, Reservoir Formation, Mercury in Reservoirs, Green House Gas Emissions, and Construction Workforce Fact Sheets.
	Maria Giovaninni	June 05, 2008	Telephone call to Liette Boudreau regarding the possibility of a meeting.
	Maria Giovaninni	June 11, 2008	Telephone call to Liette Boudreau regarding the possibility of a meeting. Chief Pietacho to return call to Maria Giovaninni June 13th.
	Maria Giovaninni	June 16, 2008	Telephone call to Liette Boudreau to determine the prospects of a meeting. Liette Boudreau will call back within the next day or so with suitable dates.
	Chief Pietacho	June 25, 2009	Letter to Gilbert Bennett indicating a strong interest to meet but delaying the meeting until after consultation is concluded for La Romaine.
	Maria Giovaninni	June 30, 2008	Telephone call to Liette Boudreau regarding a proposed meeting. Liette Boudreau will get back to Maria Giovaninni in a few days regarding possible dates.
	Maria Giovaninni	July 08, 2008	Telephone call to Liette Boudreau, Maria Giovaninni left message for Liette Boudreau or Chief Pietacho to return call.
	Liette Boudreau	July 09, 2008	Telephone call to Maria Giovaninni; left message.
	Maria Giovaninni	July 09, 2008	Telephone call to Liette Boudreau; left message.
	Maria Giovaninni	July 11, 2008	Telephone call to Liette Boudreau regarding proposed July meeting. Liette Boudreau to confirm July meeting with Chief Pietacho and return call to Maria Giovaninni.
	Maria Giovaninni	July 15, 2008	Telephone call to Liette Boudreau. Liette Boudreau advised that the proposed July meeting is not suitable. Liette Boudreau to inquire into suitability of Aug 05th meeting.
	Liette Boudreau	July 22, 2008	Telephone call to Maria Giovaninni. Liette Boudreau will call Maria Giovaninni back July 30th to confirm the proposed Aug 05th meeting date.
	Maria Giovaninni	Aug 13, 2008	Telephone call to Liette Boudreau. Liette Boudreau on holidays, left message.
	Maria Giovaninni	Aug 27, 2008	Telephone call to Liette Boudreau; left message.

Table 2 Specific Steps to Gather Information and Elicit Participation with Quebec Innu Conseil des Innu d'Ekuanitshit cont.

Aboriginal Group	Who	Date	Action Taken
Conseil des Innu d'Ekuanitshit (Mingan) cont.	Liette Boudreau	Sept 02, 2008	Telephone call to Maria Giovaninni. Liette Boudreau will call back Sep 11th to confirm meeting.
	Maria Giovaninni	Sept 15, 2008	Telephone call to Liette Boudreau; left message.
	Mike Wilkshire	Dec 12, 2008	Telephone call to Liette Boudreau; left message regarding possible January meeting.
	Mike Wilkshire	Dec 15, 2008	Telephone call to Liette Boudreau regarding possible January meeting.
	Todd Burlingame	Dec 30, 2008	Letter to Chief Pietacho proposing meeting date of Jan 13th, 2009.
	Todd Burlingame	Mar 03, 2009	Letter to Chief Pietacho sending the Lower Churchill Project Environmental Impact Statement Executive Summary.
	Gilbert Bennett	May 13, 2009	Letter to Chief Pietacho requesting meeting also including draft consultation agreement.
	David Schulze	May 25, 2009	Letter to Gilbert Bennett confirming receipt of draft consultation agreement and confirming meeting for June 01st in Mingan.
		June 01, 2009	Meeting in Mingan, Quebec attended by Paul Harrington, Todd Burlingame, Mary Hatherly, Jeanette Drover, Mike Wilkshire, Chief Jean-Charles Pietacho, Vice Chief Vincent Napish and Councillors.

Table 3 Conseil des Montagnais de Natashquan

Aboriginal Group	Who	Date	Action Taken
Conseil des Montagnais de Natashquan (Natashquan)	Gilbert Bennett	May 20, 2008	Letter to Chief Francois Bellefleur sending Project information package including: • Two copies of the Lower Churchill Project Environmental Assessment Registration document; • Two copies of the reservoir map book; • Two copies of the proposed site layouts at Gull Island and Muskrat Falls; and • Aquatic Studies, Historic Resources, Reservoir Formation, Mercury in Reservoirs, Green House Gas Emissions, and Construction Workforce Fact Sheets.
	Todd Burlingame/ Maria Giovaninni	June 11, 2008	Telephone call to Clement Tremblay requesting meeting. Clement to confirm the possibility with Chief Bellefleur and return call to in a couple of days.
	Maria Giovaninni	June 16, 2008	Telephone call to Clement Tremblay. Clement will return call in a few days to provide details.
	Clement Tremblay	June 16, 2008	Telephone call to Maria Giovaninni advising of the difficulty of a meeting during the summer months.
	Clement Tremblay	June 30, 2008	Telephone call to Maria Giovaninni; left message.
		July 24, 2008	Meeting in Quebec City attended by Paul Harrington, Todd Burlingame, Clement Tremblay and Jean Malec.
	Maria Giovaninni	Aug 26, 2008	Telephone call to Clement Tremblay to arrange September meeting.
	Maria Giovaninni	Aug 27, 2008	Telephone call to Clement Tremblay to arrange September meeting.
	Maria Giovaninni	Aug 28, 2008	Telephone call to Clement Tremblay to arrange September meeting.
	Clement Tremblay	Sep 09, 2008	Telephone call to Maria Giovaninni. Clement trying to arrange a meeting with representatives of Newfoundland and Labrador Hydro, Unamen Shipu, Pakua Shipi and Natashquan.
	Maria Giovaninni	Sep 22, 2008	Telephone call to Clement Tremblay. Clement confirmed meeting date of Oct 22nd, 2008.
		Oct 22, 2008	Meeting in Natashquan, Quebec attended by Gilbert Bennett, Todd Burlingame, Leslie Grattan, Mike Wilkshire, Clement Tremblay, Daniel Lalo, Roberto Wapistan, Nicolas Wapistan and eleven community members.
	Todd Burlingame	Oct 27, 2008	Letter to Chief Francois Bellefleur sending the presentation from the Oct 22nd meeting.
	Todd Burlingame	Mar 03, 2009	Letter to Chief Bellefleur sending the Lower Churchill Project Environmental Impact Statement Executive Summary.
	Gilbert Bennett	May 13, 2009	Letter to Chief Bellefleur requesting meeting also including draft consultation agreement.

Table 4 Conseil de bande des Montagnais d'Unamen Shipu

Aboriginal Group	Who	Date	Action Taken
Conseil de bande des Montagnais d'Unamen Shipu (La Romaine)	Gilbert Bennett	May 20, 2008	Letter to Chief Bellefleur sending Project information package including: • Two copies of the Lower Churchill Project Environmental Assessment Registration document; • Two copies of the reservoir map book; • Two copies of the proposed site layouts at Gull Island and Muskrat Falls; and • Aquatic Studies, Historic Resources, Reservoir Formation, Mercury in Reservoirs, Green House Gas Emissions, and Construction Workforce Fact Sheets.
	Maria Giovaninni	June 11, 2008	Telephone call to Chief Bellefleur requesting meeting.
	Maria Giovaninni	June 16, 2008	Telephone call to Chief Bellefleur. Chief Bellefleur proposed meeting dates of July 8th or 15th.
	Maria Giovaninni	July 08, 2008	Telephone call to Chief Lalo and Chief Bellefleur; left message.
		July 24, 2008	Meeting in Quebec City attended by Gilbert Bennett, Paul Harrington, Todd Burlingame, Maria Giovannini, Guy Bellefleur, Alain Sachel, Ken Rock, Christiane Lalo, Denis Mestenapeo, Emilien Bellefleur, Joseph Mullen
	Chief Bellefleur/ Chief Lalo	Sep 04, 2008	Letter to Ed Martin requesting meeting.
	Chief Bellefleur/ Chief Lalo	Sep 04, 2008	Letter to Premier Williams requesting his participation in a meeting with Chiefs and Newfoundland and Labrador Hydro.
	Maria Giovaninni	Sep 15, 2008	Telephone call to Ken Rock. Ken Rock indicated a strong interest in meeting with Newfoundland and Labrador Hydro but neither group is available at the present.
	Maria Giovaninni	Sep 18, 2008	Telephone call to Ken Rock proposing Oct 06th meeting.
	Leslie Grattan	Oct 14, 2008	Email to Ken Rock proposing meeting in Natashquan on Oct 22nd.
	Ken Rock	Oct 14, 2008	Email to Leslie Grattan proposing Newfoundland and Labrador Hydro hold meetings in Natashquan, Unamen Shipu and Pakua Shipi separately.
	Leslie Grattan	Nov 04, 2008	Email to Ken Rock proposing presentation to Council representatives in Happy Valley-Goose Bay regarding Lower Churchill Project training and employment.
	Leslie Grattan	Dec 10, 2008	Email to Ken Rock to reschedule (due to weather) Unamen Shipu and Pakua Shipi community meetings to January 2009.
	Ken Rock	Dec 11, 2008	Email to Leslie Grattan with suitable meeting dates.
	Mike Wilkshire	Dec 31, 2008	Telephone call to Lionel Alvue with offer of January meeting.

Table 4 Conseil de bande des Montagnais d'Unamen Shipu cont.

Aboriginal Group	Who	Date	Action Taken
Conseil de bande des Montagnais d'Unamen Shipu (La Romaine) cont.	Mike Wilkshire	Jan 05, 2009	Email to Lionel Alvue with offer of January meeting.
		Jan 16, 2009	Meeting in La Romaine, Quebec attended by Paul Harrington, Todd Burlingame, Mike Wilkshire, Leslie Grattan, Chief Guy Bellefleur, Joseph Mullen, Alain Bellefleur, Raymond Bellefleur and Emilien Bellefleur.
	Todd Burlingame	Mar 03, 2009	Letter to Chief Bellefleur sending the Lower Churchill Project Environmental Impact Statement Executive Summary.
	Gilbert Bennett	May 13, 2009	Letter to Chief Bellefleur requesting meeting also including draft consultation agreement.

Table 5 Conseil des Innus de Pakua Shipi

Aboriginal Group	Who	Date	Action Taken
Conseil des Innus de Pakua Shipi (St. Augustin)	Gilbert Bennett	May 20, 2008	Letter to Chief Christiane Lalo sending Project information package including: • Two copies of the Lower Churchill Project Environmental Assessment Registration document; • Two copies of the reservoir map book; • Two copies of the proposed site layouts at Gull Island and Muskrat Falls; and • Aquatic Studies, Historic Resources, Reservoir Formation, Mercury in Reservoirs, Green House Gas Emissions, and Construction Workforce Fact Sheets.
	Maria Giovaninni	June 05, 2008	Telephone call to Chief Lalo; left message.
	Maria Giovaninni	June 11, 2008	Telephone call to Chief Lalo; left message.
	Maria Giovaninni	June 16, 2008	Telephone call to Chief Lalo; left message.
	Chief Lalo	June 17, 2008	Telephone call to Maria Giovaninni. Chief Lalo will confirm proposed meeting date with Chief Bellefleur and return phone call.
	Maria Giovaninni	June 27, 2008	Telephone call to Chief Lalo; left message to confirm July 24th meeting date.
	Maria Giovaninni	June 30, 2008	Telephone call to Chief Lalo; left message.
	Chief Lalo	July 02, 2008	Telephone call to Maria Giovaninni; left message.
	Maria Giovaninni	July 04, 2008	Telephone call to Chief Lalo; left message.
	Maria Giovaninni	July 08, 2008	Telephone call to Chief Lalo; left message.
	Maria Giovaninni	July 09, 2008	Telephone call to Chief Lalo; left message.
	Chief Lalo	July 10, 2008	Telephone call to Maria Giovaninni; left message.
	Maria Giovaninni	July 11, 2008	Telephone call to Chief Lalo. Chief Lalo advised that the meeting has been arranged in Quebec City for July 24th.
	Maria Giovaninni	July 15, 2008	Telephone call to Ken Rock to confirm time and location of July 24th meeting.
		July 24, 2008	Meeting in Quebec City attended by Gilbert Bennett, Paul Harrington, Todd Burlingame, Maria Giovannini, Guy Bellefleur, Alain Sachel, Ken Rock, Christiane Lalo, Denis Mestenapeo, Emilien Bellefleur, Joseph Mullen
	Chief Bellefleur/ Chief Lalo	Sep 04, 2008	Letter to Ed Martin requesting meeting.
	Chief Bellefleur/ Chief Lalo	Sep 04, 2008	Letter to Premier Williams requesting his participation in a meeting with Chiefs and Newfoundland and Labrador Hydro.
		Jan 15, 2009	Meeting in St Augustin, Quebec as per exchange between Leslie Grattan and Ken Rock attended by Paul Harrington, Todd Burlingame, Leslie Grattan, Mike Wilkshire, Chief Christiane Lalo, Ken Rock, Denis Mestenapaeo, Alfred Tenegan and Maurice Bellefleur.
	Todd Burlingame	Mar 03, 2009	Letter to Chief Lalo sending the Lower Churchill Project Environmental Impact Statement Executive Summary.
	Gilbert Bennett	May 13, 2009	Letter to Chief Lalo requesting meeting also including draft consultation agreement.

Table 6 Conseil Innu Takuaikan Uashat mak Mani-Utenam

Aboriginal Group	Who	Date	Action Taken
Conseil Innu Takuaikan Uashat mak Mani-Utenam (Sept Iles)	Gilbert Bennett	May 20, 2008	Letter to Chief Gregoire sending Project information package including: • Two copies of the Lower Churchill Project Environmental Assessment Registration document; • Two copies of the reservoir map book; • Two copies of the proposed site layouts at Gull Island and Muskrat Falls; and • Aquatic Studies, Historic Resources, Reservoir Formation, Mercury in Reservoirs, Green House Gas Emissions, and Construction Workforce Fact Sheets.
	Maria Giovaninni	June 05, 2008	Telephone call to Lyne Morissette to propose a meeting.
	Maria Giovaninni	June 11, 2008	Telephone call to Lyne Morissette to propose a meeting.
	Maria Giovaninni	June 16, 2008	Telephone call to Lyne Morissette. Lyne Morissette suggested July 9th or July 15th.
	Maria Giovaninni	June 30, 2008	Telephone call to Lyne Morissette; left message.
	Lyne Morissette	July 03, 2008	Telephone call to Madeline Holden; left message.
	Lyne Morissette	July 07, 2008	Telephone call to Madeline Holden; left message to confirm dates.
	Maria Giovaninni	July 07, 2008	Telephone call to Lyne Morissette; left message.
	Maria Giovaninni	July 07, 2008	Telephone call to Lyne Morissette. Lyne Morissette advised that July 15th is not suitable and suggested July 22nd or 23rd.
	Maria Giovaninni	July 08, 2008	Telephone call to Lyne Morissette; left message to confirm arrangements.
	Maria Giovaninni	July 08, 2008	Telephone call to Lyne Morissette. Lyne Morissette advised that July 23rd is more suitable for a meeting.
	Maria Giovaninni	July 09, 2008	Telephone call to Lyne Morissette. Lyne Morissette advised that July 23rd will not work but July 29th or 30th might. Meeting did not occur at the request of Conseil Innu Takuaikan Uashat mak Mani-Utenam.
	Maria Giovaninni	Sept 15, 2008	Telephone call to Lyne Morissette; left message.
	Mike Wilkshire	Dec 12, 2008	Telephone call to Lyne Morissette; left message.
	Mike Wilkshire	Dec 15, 2008	Telephone call to Lyne Morissette; no answer.
	Todd Burlingame	Dec 30, 2008	Letter to Chief Gregoire proposing meeting date of Jan 12th.
	Lyne Morissette	Jan 06, 2009	Letter to Todd Burlingame welcoming Jan 12th meeting.
	Todd Burlingame	Jan 08, 2009	Letter to Lyne Morissette regarding Jan 12th meeting.
	Lyne Morissette	Jan 09, 2009	Letter to Todd Burlingame confirming the Jan 12th meeting.
		Jan 12, 2009	Meeting in Sept Iles, Quebec attended by Todd Burlingame, Mike Wilkshire, Leslie Grattan, Deputy Chief and Council Members for Uashat mak Mani-Utenam, Uashat Technical Committee, Families from Matimekosh-Lac Jean, James O'Reilly, and Patricia Ochman.
	Todd Burlingame	Mar 03, 2009	Letter to Chief Gregoire sending the Lower Churchill Project Environmental Impact Statement Executive Summary.
	Gilbert Bennett	May 13, 2009	Letter to Chief Gregoire requesting meeting also including draft consultation agreement.

Table 7 Nation Innu Matimekush-Lac John

Aboriginal Group	Who	Date	Action Taken
Nation Innu Matimekush-Lac John (Schefferville)	Gilbert Bennett	May 20, 2008	Letter to Chief Real McKenzie sending Project information package including: • Two copies of the Lower Churchill Project Environmental Assessment Registration document; • Two copies of the reservoir map book; • Two copies of the proposed site layouts at Gull Island and Muskrat Falls; and • Aquatic Studies, Historic Resources, Reservoir Formation, Mercury in Reservoirs, Green House Gas Emissions, and Construction Workforce Fact Sheets.
	Maria Giovaninni	June 05, 2008	Telephone call to Chief McKenzie; left message.
	Todd Burlingame	June 10, 2008	Telephone call to Chief McKenzie; left message.
	Maria Giovaninni	June 11, 2008	Telephone call to Chief McKenzie; left message.
		Jan 12, 2009	Meeting in Sept Iles, Quebec attended by Todd Burlingame, Mike Wilkshire, Leslie Grattan, Deputy Chief and Council Members for Uashat mak Mani-Utenam, Uashat Technical Committee, Families from Matimekosh-Lac Jean, James O'Reilly and Patricia Ochman. The participation of Nation Innu Matimekush-Lac John was invited and arranged by the Conseil Innu Takuaikan Uashat mak Mani-Utenam.
	Todd Burlingame	Mar 03, 2009	Letter to Chief McKenzie sending the Lower Churchill Project Environmental Impact Statement Executive Summary.
	Gilbert Bennett	May 13, 2009	Letter to Chief McKenzie requesting meeting also including draft consultation agreement.

Naskapi Nation of Kawawachikamach

The specific steps taken by Nalcor Energy to gather information and elicit participation from the Naskapi Nation of Kawawachikamach for the purpose of fulfilling the information requirements of the EIS Guidelines are set out in Table JRP.2.a-3.

The land claims area of the Naskapi Nation of Kawawachikamach extends into Labrador. Although this group was not specifically identified in the EIS Guidelines, on October 27, 2008 Mr. Dominic Cliche of the Canadian Environmental Assessment Agency provided Nalcor Energy with a copy of correspondence dated October 10, 2008, from Chief Philip Einish of the Naskapi Nation of Kawawachikamach to the Agency requesting consultation with the proponent. In response on November 19, 2008, Nalcor Energy provided Chief Einish with an information package containing a copy of the Lower Churchill Hydroelectric Generation Project Environmental Assessment Registration document (in French) and a Map book illustrating the anticipated reservoir areas and predicted extent of flooding and invited comments from the Naskapi Nation with respect to potential impacts of the project upon land and resource usage. This material was resent in May, 2009.

References:

EIS Guidelines, Section 4.8 (Consultation with Aboriginal Groups and Communities)

EIS, Volume IA, Section 8.0 (Aboriginal Consultation) & Volume IB, Appendix IB-I (Aboriginal and Public Consultation Summaries)

Table 8 Specific Steps to Gather Information and Elicit Participation with the Naskapi Nation of Kawawachikamach

Aboriginal Group	Who	Date	Action Taken
Naskapi Nation of Kawawachikamach	Chief Einish	Oct 10, 2008	Letter to Maryse Pineau and Paul Carter wishing to be adequately consulted during the Environmental Assessment process.
	Dominic Cliché Canadian Environmental Assessment Agency	Oct 27, 2008	Letter to Chief Einish regarding his request for consultation with the proponent.
	Todd Burlingame	Nov 19, 2008	Letter to Chief Einish sending information package including: • Two copies of the Lower Churchill Project Environmental Assessment Registration document; • Two copies of the reservoir map book; • Two copies of the proposed site layouts at Gull Island and Muskrat Falls; and • Five copies of the Lower Churchill Project "Your questions Answered" information brochure.
	Maria Vincelli	May 11, 2009	Email to Todd Burlingame requesting he resend the Project information package.
	Todd Burlingame	May 11, 2009	Email to Maria Vincelli indicating that information will be sent out as soon as possible.
	Todd Burlingame	May 14, 2009	Letter to Maria Vincelli resending Project information package including: • Two copies of the Lower Churchill Project Environmental Assessment Registration document; • Two copies of the reservoir map book; • Two copies of the proposed site layouts at Gull Island and Muskrat Falls; and • Five copies of the Lower Churchill Project "Your questions Answered" information brochure.

Labrador Metis Nation

The specific steps taken by Nalcor Energy to gather information and elicit participation from the Labrador Metis Nation for the purpose of fulfilling the information requirements of the EIS Guidelines are set out in Table JRP.2.a-4.

Discussions between Nalcor Energy and the executive of the Labrador Metis Nation commenced in the spring of 2007 and a series of meetings were held throughout 2008 to provide the Labrador Metis Nation with information about the project, the environmental assessment and the impact of the project upon the interests of members of the Labrador Metis Nation.

Nalcor Energy has provided the Labrador Metis Nation with a variety of information respecting the Project including

- Lower Churchill Hydroelectric Generation Project Environmental Assessment Registration document (in French)
- Map book illustrating the anticipated reservoir areas and predicted extent of flooding
- Site layout maps for Gull Island and Muskrat Falls
- Project Information packages
- Documentation concerning Historic Resources Overview and Impact Assessment of Muskrat Falls Generating Facility and Reservoir and Muskrat Falls to Gull Island Transmission Line Corridor.

Members of the Metis Nation have been invited to a number of workshops held by Nalcor to discuss aspects of the Project's anticipated impacts, including Fish Habitat Compensation, Energy Alternatives and Methylmercury. In addition, the Labrador Metis Nation has been consulted with respect to employment and training possibilities associated with the Project.

In order to regularize consultation, facilitate the participation of Labrador Metis Nation and ensure the collection of accurate and comprehensive data relating to Project impacts upon current land and resource usage by the Labrador Metis, Nalcor Energy developed a draft community consultation agreement which was sent to Mr. Chris Montague, President, Labrador Metis Nation for review on a confidential basis on April 23, 2009. Nalcor Energy has invited Labrador Metis Nation and its legal counsel to review the terms and conditions of the draft consultation agreement and has indicated its willingness to negotiate such revisions and modifications as may be necessary to accommodate the particular circumstances of the Labrador Metis Nation.

The agreement is currently under review by Labrador Metis Nation.

For more information on the nature and scope of the draft community consultation agreement, please refer to the response provided for in IR# JRP.2.c.

References:

EIS Guidelines, Section 4.8 (Consultation with Aboriginal Groups and Communities)

EIS, Volume IA, Section 8.0 (Aboriginal Consultation) & Volume IB, Appendix IB-I (Aboriginal and Public Consultation Summaries)

Table 9 Specific Steps to Gather Information and Elicit Participation with the Labrador Metis Nation

Aboriginal Group	Who	Date	Action Taken
Labrador Metis Nation	President Montague	Jan 15, 2007	Letter to Minister Clyde Jackman urging the Crown to consult with the Labrador Metis Nation.
	David Kiell	April 09, 2007	Letter to President Montague inviting him to Lower Churchill Project Open Houses to be held in Churchill Falls, Happy Valley-Goose Bay and North West River/Sheshatshiu on April 15th, 16th and 17th 2007 respectively.
		April 17, 2007	Meeting in Happy Valley-Goose Bay attended by Gilbert Bennett, Leona Barrington, Steve Bonnell, Bert Pomeroy and Tammy Lambourne.
	Gilbert Bennett	Feb 12, 2008	Letter to President Montague proposing Feb 25th meeting.
		Feb 26, 2008	Meeting in Happy Valley-Goose Bay attended by Gilbert Bennett, Leona Barrington, Steve Bonnell, Chris Montague, Jamie Snook, Tammy Lambourne, Rick Bennett, John Glew.
	Gilbert Bennett	Feb 26, 2008	Letter to President Montague requesting meeting and providing Project information package including: • Seven Lower Churchill Project Environmental Registration documents; • Two copies of the Project's reservoir map book; • Two copies of the proposed site layouts at Gull Island and Muskrat Falls; and • Aquatic Studies, Environmental Assessment Process, Historic Resource Studies, Mercury, Socioeconomic Assessment, Reservoir Formation, Terrestrial Studies.
	Steve Bonnell	Feb 27, 2008	Email to Tammy Lambourne as follow up to Feb 26th meeting and requesting meeting Mar 11th.
	Larry LeDrew	Mar 03, 2008	Letter to President Montague inviting him to Lower Churchill Project Open Houses to be held in Labrador City, Happy Valley-Goose Bay, North West on Mar 10th, 11th and 13th 2008 respectively.
	Steve Bonnell	Mar 06, 2008	Email to Tammy Lambourne to confirm receipt of Feb 27th email.
	Tammy Lambourne	Mar 06, 2008	Email to Steve Bonnell confirming receipt of Feb 27th email and proposing Mar 11th meeting focus on negotiating an environmental agreement between Newfoundland and Labrador Hydro and the Labrador Metis Nation.
	Steve Bonnell	Mar 07, 2008	Email to Tammy Lambourne confirming Tuesday, Mar 11th meeting also advising that the nature of the meeting will have to be of a general nature.
	Tammy Lambourne	Mar 10, 2008	Email to Steve Bonnell declining Mar 11th meeting.

Table 9 Specific Steps to Gather Information and Elicit Participation with the Labrador Metis Nation cont.

Aboriginal Group	Who	Date	Action Taken
Labrador Metis Nation cont.	Steve Bonnell	Mar 12, 2008	Letter to Tammy Lambourne sending Project information package including: • Two copies of the Lower Churchill Project Environmental Assessment Registration document; • Two copies of the reservoir map book; • Two copies of the proposed site layouts at Gull Island and Muskrat Falls; and • Aquatic Studies, Historic Resources, Reservoir Formation, Mercury in Reservoirs, Green House Gas Emissions, and Construction Workforce Fact Sheets.
	Steve Bonnell	Mar 14, 2008	Email to Tammy Lambourne indicating that Newfoundland and Labrador Hydro was not ready at that point to enter into discussions regarding an environmental agreement. Also, welcoming meetings at any time.
	President Montague	Mar 18, 2008	Letter to Steve Bonnell regarding Project information package they received from Nalcor Energy.
	Gilbert Bennett	Apr 09, 2008	Letter to President Montague requesting meeting to move forward with discussions.
	Todd Burlingame	May 09, 2008	Letter to Tammy Lambourne inviting her to the Lower Churchill Project Methylmercury Technical Workshop in Happy Valley-Goose Bay.
	President Montague	May 30, 2008	Letter to Todd Burlingame requesting postponement of the Energy Alternatives Technical Workshop.
	President Montague	July 15, 2008	Letter to Gilbert Bennett welcoming consultation.
	Maria Moran	Aug 05, 2008	Email to Jamie Snook providing notes and proposed consultation plan.
	Todd Burlingame	Aug 25, 2008	Letter to President Montague inviting him to a Lower Churchill Project Open House in Rigolet on Sept 15th, 2008.
	Todd Burlingame	Aug 26, 2008	Letter to President Montague including Historic Resources Overview and Impact Assessment of Muskrat Falls Generating Facility and Reservoir, and Muskrat Falls to Gull Island Transmission Line Corridor.
	President Montague	Sep 29, 2008	Labrador Metis Nation submitted a draft Consultation and Accommodation Discussion Paper to Newfoundland and Labrador Hydro.
	Leslie Grattan	Nov 06, 2008	Telephone call to Jamie Snook; left message regarding Lower Churchill Project training and employment meeting Nov 13th, 2008.
	Leslie Grattan	Nov 06, 2008	Email to Jamie Snook regarding telephone message and invitation to the Nov 13th Lower Churchill Project training and employment meeting in Happy Valley-Goose Bay.
	Jamie Snook	Nov 06, 2008	Email to Leslie Grattan declining participation in Nov 13th Lower Churchill Project training and employment meeting.

Table 9 Specific Steps to Gather Information and Elicit Participation with the Labrador Metis Nation cont.

Aboriginal Group	Who	Date	Action Taken
Labrador Metis Nation cont.	Gilbert Bennett	Nov 10, 2008	Letter to President Montague regarding the draft consultation and accommodation discussion paper with an offer to meet.
	Leslie Grattan	Nov 12, 2008	Telephone call to Jamie Snook regarding progress on a way forward and the Labrador Metis Nation's participation in the Nov 13th Lower Churchill Project training and employment meeting in Happy Valley-Goose Bay.
	Leslie Grattan	Nov 12, 2008	Email to Jamie Snook regarding progress on a way forward and their participation in the Nov 13th Lower Churchill Project training and employment meeting in Happy Valley-Goose Bay.
	Jamie Snook	Nov 12, 2008	Email to Leslie Grattan inquiring if she had a copy of the letter in response to the Labrador Metis Nation's draft consultation and accommodation discussion paper.
	Leslie Grattan	Nov 12, 2009	Email to Jamie Snook indicating she would fax the letter in response to the Labrador Metis Nation's draft consultation and accommodation discussion paper.
	Jamie Snook	Nov 13, 2009	Email to Leslie Grattan confirming receipt of the letter also declining a meeting at this time.
	Leslie Grattan	Nov 17, 2008	Email to Jamie Snook updating him to the turnout of the Nov 13th Lower Churchill Project training and employment meeting in Happy Valley-Goose Bay.
	Leslie Grattan	Nov 25, 2008	Email to Jamie Snook inviting him to attend the Dec 09th Lower Churchill Project training and employment meeting in Happy Valley-Goose Bay. Also inviting him to meet separately regarding information provided at the Nov 13th meeting.
	Todd Burlingame	Dec 30, 2008	Letter to President Montague with an offer to meet and providing information on Project related employment estimates and possible associated training strategies.
	Jeanette Drover	Jan 29, 2009	Email to Jamie Snook inviting him to the Feb 13th Lower Churchill Project training and employment meeting in Happy Valley-Goose Bay.
	Lisa Dempster	Feb 02, 2009	Email to Jeanette Drover inquiring into the details of the Feb 13th Lower Churchill Project training and employment meeting in Happy Valley-Goose Bay.
	Leslie Grattan	Feb 03, 2009	Email to Lisa Dempster regarding the Labrador Metis Nation's participation in the Feb 13th training and employment meeting in Happy Valley-Goose Bay.
	Jeanette Drover	Feb 10, 2009	Email to Lisa Dempster sending the agenda to the Feb 13th Lower Churchill Project training and employment meeting in Happy Valley-Goose Bay.
	Lisa Dempster	Feb 11, 2009	Email to Jeanette Drover welcoming participation in the Feb 13th Lower Churchill Project training and employment meeting in Happy Valley-Goose Bay. A representative from the Labrador Metis Nation was not able to attend.
	Gilbert Bennett	Mar 18, 2009	Letter to President Montague offering congratulations on re-election and proposing meeting.
	Jeanette Drover	Mar 31, 2009	Telephone call to Roland Kemuksigak inviting him to the Lower Churchill Project Fish Habitat Compensation Workshop in Happy Valley-Goose Bay on Apr 07th.

Table 9 Specific Steps to Gather Information and Elicit Participation with the Labrador Metis Nation cont.

Aboriginal Group	Who	Date	Action Taken
Labrador Metis Nation cont.	Jeanette Drover	Mar 31, 2009	Email to Roland Kemuksigak inviting him to the Lower Churchill Project Fish Habitat Compensation Workshop in Happy Valley-Goose Bay on Apr 07th.
	Jeanette Drover	Apr 06, 2009	Email to Roland Kemuksigak sending the agenda for the Lower Churchill Project Fish Habitat Compensation Workshop in Happy Valley-Goose Bay on Apr 07th.
		Apr 07, 2009	Lower Churchill Project Fish Habitat Compensation Workshop in Happy Valley-Goose Bay attended by Ken Weagle, Jim McCarthy, Dave Brown, Bob White, Jeanette Drover and Roland Kemuksigak.
		Apr 07, 2009	Lower Churchill Project Fish Habitat Compensation Workshop in Happy Valley-Goose Bay attended by Ken Weagle, Jim McCarthy, Dave Brown, Bob White, Jeanette Drover and President Montague.
	Gilbert Bennett	Apr 23, 2009	Letter to President Montague requesting meeting also including draft consultation agreement.
	Mary Hatherly Todd Burlingame	Apr 23, 2009	Meeting with President Montague to discuss the draft consultation agreement.
		June 10, 2009	President Montague submitted a revised draft consultation agreement to Nalcor Energy.

Nunatsiavut Government

The specific steps taken by Nalcor Energy to gather information and elicit participation from the Nunatsiavut Government for the purpose of fulfilling the information requirements of the EIS Guidelines are set out in Table JRP.2.a-5.

Meetings were held between representatives of Nalcor Energy and the Nunatsiavut Government throughout 2008. In addition, representatives of the Nunatsiavut Government have been invited to Project open houses and technical workshops and copies of various presentations as well as studies have been provided to the Nunatsiavut Government.

The Labrador Inuit are the beneficiaries of a concluded comprehensive land claims agreement which clearly defines the nature and extent of consultative obligations during the environmental assessment process and the physical footprint of the Project does not extend into Labrador Inuit Lands or the Labrador Inuit Settlement Area. Consequently, Nalcor Energy has not offered to enter into a consultation agreement with the Nunatsiavut Government similar to that proposed to the Quebec Innu and the Labrador Metis Nation. Instead, consistent with the treaty and with the limited interest of the Labrador Inuit in the land and resources of the Project footprint, Nalcor Energy has elicited information respecting the impact of the Project upon Labrador Inuit directly from the Nunatsiavut Government through the provision of project-related information on an ongoing basis. In addition, representatives of the Nunatsiavut Government have been invited to and have attended meetings with Nalcor representatives and have participated in technical workshops on specific aspects of the Project.

References:

EIS Guidelines, Section 4.8 (Consultation with Aboriginal Groups and Communities)

EIS, Volume IA, Section 8.0 (Aboriginal Consultation) & Volume IB, Appendix IB-I (Aboriginal and Public Consultation Summaries)

Table 10 Specific Steps to Gather Information and Elicit Participation with the Nunatsiavut Government

Aboriginal Group	Who	Date	Action Taken
Nunatsiavut Government	Gilbert Bennett	Mar 04, 2008	Letter to Tony Anderson with offer of meeting.
		Apr 11, 2008	Meeting in Happy Valley-Goose Bay attended by Gilbert Bennett, Todd Burlingame, Ruby Carter, Doug Blake, Tim McNeil and Marina Biasutti-Brown.
		May 09, 2008	Letter to Marina Biasutti-Brown inviting her to attend the May 20th Lower Churchill Project Methylmercury Technical Workshop in Happy Valley-Goose Bay.
		May 14, 2008	Meeting in St. John's attended by Gilbert Bennett, Todd Burlingame, Ruby Carter, President of the Nunatsiavut Government (Acting) Tony Anderson, Nunatsiavut Government Ministers and Deputy Ministers.
		May 14, 2008	Meeting in St. John's attended by Larry LeDrew, Steve Bonnell, Marion Organ, Ruby Carter, Todd Burlingame, Mary Hatherly and Marina Biasutti-Brown.
		May 20, 2008	Lower Churchill Project Methylmercury Technical Workshop in Happy Valley-Goose Bay attended by Todd Burlingame, Larry LeDrew, Leslie Grattan, Leona Barrington, Susan Hollett and Marina Biasutti-Brown.
	Todd Burlingame	May 27, 2008	Letter to Marina Biasutti-Brown inviting her to attend the Lower Churchill Project Energy Alternatives Technical Workshop in Happy Valley-Goose Bay.
	Ruby Carter	Jun 11, 2008	Letter to Marina Biasutti-Brown sending a Project information package including: • Larry LeDrew's May 14th presentation containing an overview of the project, access across the dam, baseline data respecting mercury consumption and impact on ice; • Steve Bonnell's May 14th presentation on socio-economic studies; and • Reservoir mapping for Gull Island and Muskrat Falls.
	Paul Harrington for Gilbert Bennett	Jun 16, 2008	Letter to President Lyall sending requested information and offer of meeting.
	Leslie Grattan	Aug 13, 2008	Email to Marina Biasutti-Brown proposing meeting in Rigolet in September.
	Todd Burlingame	Aug 25, 2008	Letter to Daniel Michelin inviting him to the Lower Churchill Project Open House in Rigolet Sept 15th.
	Todd Burlingame	Aug 25, 2008	Letter to Darryl Shiwak inviting him to the Lower Churchill Project Open House in Rigolet Sept 15th.
		Sep 16, 2008	Meeting in Rigolet attended by Gilbert Bennett, Marion Organ, Leona Barrington, Sarah Sullivan, Leslie Grattan, Daniel Michelin, Darryl Shiwak, Doris Hopkins, Melva Williams and Max Pottle.
	Marion Organ	Oct 06, 2008	Letter to Daniel Michelin sending Sept 16th meeting notes.
	Marion Organ	Oct 06, 2008	Letter to Darryl Shiwak sending Sept 16th meeting notes.
	Leslie Grattan	Nov 07, 2008	Email to Theresa Hollett and Marina Biasutti-Brown with offer of meeting in Happy Valley-Goose Bay on Nov 13th, 2008.
		Nov 13, 2008	Lower Churchill Project training and employment meeting in Happy Valley-Goose Bay attended by Maria Moran, Jeanette Drover and Tim McNeil.
	Marion Organ	Jan 29, 2009	Letter to Daniel Michelin sending a copy of the report *Aquatic Environment in the Goose Bay Estuary* by AMEC and BAE Newplan 2001, the report I*ce Dynamics of the Lower Churchill River* by Hatch 2007 and the report *Seal Abundance and Distribution* by Sikumiut.

Requesting Organization – Joint Review Panel **Information Request No.: JRP.2**

Information Request:

b. For the purpose of fulfilling the information requirements of the EIS Guidelines, including Aboriginal Knowledge, for Aboriginal groups other than Innu Nation and to assess the effects of the Project on current use of lands and resources for traditional purposes, has the Proponent consulted any publicly available literature or data sources? If so, provide references to the Panel.

Response:

Labrador Inuit: The Study Team consulted two publicly available studies respecting the Labrador Inuit's current use of lands and resources in the Land and Resource Use Assessment Area:

- "Our Footprints are Everywhere" (Brice-Bennett 1977), a document containing information on Inuit land and resource use in Labrador prepared in support of the Labrador Inuit Land Claim
- "Seeing the Land is Seeing Ourselves" (Williamson 1996), an issues scoping report which includes issues related to ownership of land and resources, prepared by the Labrador Inuit Association prior to development of the Voisey's Bay Mine.

Quebec Innu: An inventory of publicly available literature pertaining to the communities of Uashat Mak Mani-Utenam, Ekuanitshit, Nutaskuan, Unamen Shipu, Pakua Shipi and Matimekush-Lake John was compiled to catalogue sources containing information on land and resource use by these groups in the Land and Resource Use Assessment Area (PF Wilkinson and Associates, May, 2008). This report, entitled "Summary Report on Quebec Innu Phase 1", is attached.

Labrador Métis Nation: Métis people were considered as land and resource users in the Assessment Area. Land and resource use information was collected through informant interviews, which did not distinguish between Metis and other users. The results of the informant interviews are presented in the Current Land and Resource Use in the Lower Churchill River Valley Component Study.

References:

Brice-Bennett, C. (ed.). 1977. *Our Footprints are Everywhere*. Prepared for Labrador Inuit Association. Dollco Printing Ltd., Canada.

Paul F Wilkinson and Associates Inc. 2008. Draft Summary Report on Quebec Innu. Phase 1

Williamson, T. 1996. *Seeing the Land is Seeing Ourselves*. Issues Scoping Project prepared for the Labrador Inuit Association.

Requesting Organization – Joint Review Panel **Information Request No.: JRP.2**

Information Request:

c. For each Aboriginal group other than Innu Nation, what is the Proponent's assessment of the Project's anticipated effects on current use of lands and resources for traditional purposes? Provide a separate answer for each group.

Response:

Please refer to the responses provided for in IR – JRP.2.a. and IR – JRP.16 **.**

The effects of the Project upon land and resources have been assessed in EIS Volumes IIB and III. This assessment focussed upon the impacts of the Project upon the terrestrial environment and key species indicators in the Land and Resource Use Assessment Area as depicted in Figure 2-13 (EIS Volume III, Chapter 2). It was concluded that the permanent impact on land adjacent to the reservoir would be minimal, although there would be temporary disruption during the construction phase of the project, and that while the Project would result in changes to the distribution of some species, causing adjustment in harvesting patterns, there would be no permanent displacement of species in the watershed area. This assessment however did not specifically analyze impacts from the perspective of Aboriginal groups, other than Innu, with respect to each group's current use of lands and resources. A final assessment of the Project's anticipated effects on the current use of lands and resources for traditional purposes by the enumerated Quebec Innu communities and the Labrador Metis Nation has not been completed but is in progress.

In order to systematically assess the impacts of the Project upon an Aboriginal Group's current use of land and resources for traditional purposes, the Quebec Innu, Labrador Metis Nation and Nunatsiavut Government have been provided with a copy of the following information:

- Lower Churchill Hydroelectric Generation Project Environmental Assessment Registration document
- Map book illustrating the anticipated reservoir areas and predicted extent of flooding

Additional Project-related information has been provided to the various Aboriginal groups on an ongoing basis through provision of documentation or through meetings and technical workshops. Each group has been asked to provide information to Nalcor Energy respecting its particular interests and concerns.

Nalcor Energy has developed a template for a draft community consultation agreement which has been offered to each of the enumerated Quebec Innu Communities and the Labrador Metis Nation on a confidential and 'without prejudice' basis.

The substance of the draft community consultation agreement is in general conformity with the policy and factors described in the Canadian Environmental Assessment Act Agency's "Considering Aboriginal traditional knowledge in environmental assessments conducted under the *Canadian Environmental Assessment Act -- Interim Principles*". The draft agreement establishes a collaborative and cooperative framework, supported by funding, for the exchange of Project-related information between Nalcor Energy and the particular Aboriginal Group in order to identify potential environmental impacts of the Project upon current land and resource usage, identify and strengthen mitigation measures and develop an understanding of aboriginal traditional knowledge represent the concerns and interests of the community.

Quebec Innu:

The lands claim areas of the Quebec Innu Bands of Uashat Mak Mani-Utenam, Ekuanitshit, Nutaskuan, Unamen Shipu, Pakua Shipi and Matimekush-Lake John extend into Labrador but have not been accepted for negotiation by the Government of Newfoundland and Labrador. However, Nalcor Energy is aware that the named Quebec Innu communities engage in some level of harvesting in the Land and Resource Use Assessment Area, although the level of harvesting activities appears to be strongest in the western portion of this area.

By correspondence dated May 13, 2009, Nalcor Energy provided the Chief of each of the named six Quebec Innu Communities with a copy of the proposed draft community consultation agreement and offered to meet to discuss the contents of the agreement and to negotiate community-specific terms and conditions. A copy of this correspondence is attached. A meeting with the Chief and members of Band Council of Ekuanitshit, together with legal counsel to the Band, to present information related to the Project and to discuss the draft community consultation agreement was held on June 1, 2009. To date, no response has been received from the remaining Quebec Innu Communities.

Labrador Metis Nation:

By correspondence dated April 23, 2009, a copy of the draft community consultation agreement was sent to Mr. Chris Montague, President, Labrador Metis Nation. A copy of this correspondence is attached.

A preliminary meeting between Mr. Todd Burlingame, Manager, Environmental Assessment and Aboriginal Affairs and Ms. Mary Hatherly, Lead, Aboriginal Agreements and President Montague to discuss the terms of the agreement was held on April 23, 2009 and the terms of the agreement are currently under review by Labrador Metis Nation.

Nunatsiavut Government:

The Land and Resource Use Assessment Area does not extend into Labrador Inuit Lands or the Labrador Inuit Settlement Area. A portion of the Land and Resource Use Assessment Area does include the lands identified in Schedule 12-E of the **Labrador Inuit Land Claims Agreement**, in which Inuit ordinarily resident outside the Labrador Inuit Settlement Area may harvest in accordance with the terms of a special licensing regime. No impact upon the use of lands and resources for traditional purposes by the Labrador Inuit in any part of the Land and Resource Use Assessment Area, including the lands depicted in Schedule 12-E of the Land Claims Agreement, has been identified by the Proponent.

References:

EIS Guidelines, Section 4.8 (Consultation with Aboriginal Groups and Communities)

EIS, Volume IA, Section 8.0 (Aboriginal Consultation) & Volume IB, Appendix IB-I (Aboriginal and Public Consultation Summaries)

EIS, Volume IIB (Biophysical Assessment)

EIS, Volume III, Chapter 2 (Existing Environment) & Chapter 5 (Environmental Effects Assessment – Land and Resource Use)

ATTACHMENT A

Summary Report on Québec Innu Phase 1

INFORMATION RESPONSES
LOWER CHURCHILL PROJECT
CEAA REFERENCE NO.07-05-26178

JOINT REVIEW PANEL

JRP.2
Consultation with Aboriginal Groups Other than Innu Nation

June 29, 2009

nalcor energy
LOWER CHURCHILL PROJECT

Lower Churchill Hydroelectric Generation Project

Summary Report on Québec Innu

Phase 1

Submitted to
Minaskuat Limited Partnership

By
Paul F. Wilkinson & Associates Inc.

May, 2008

TABLE OF CONTENTS

LIST OF ACRONYMS

AMPM	Assemblée Mamu Pakatatau Mamit
Ashuanipi	Ashuanipi Corporation
CAM	Conseil des Atikamekw et des Montagnais
EIS	Environmental Impact Statement
GNL	Government of Newfoundland and Labrador
MMN	Conseil Tribal Mamuitun mak Nutakuan

1. INTRODUCTION

Newfoundland and Labrador Hydro is preparing the EIS for its proposed Lower Churchill Hydroelectric Generation Project, including the associated transmission lines (the "Project"). Figure 1 shows the project area.

Through Minaskuat Limited Partnership, Paul F. Wilkinson & Associates Inc. was mandated to conduct a preliminary study on the relationship of the Québec Innu to the project area.

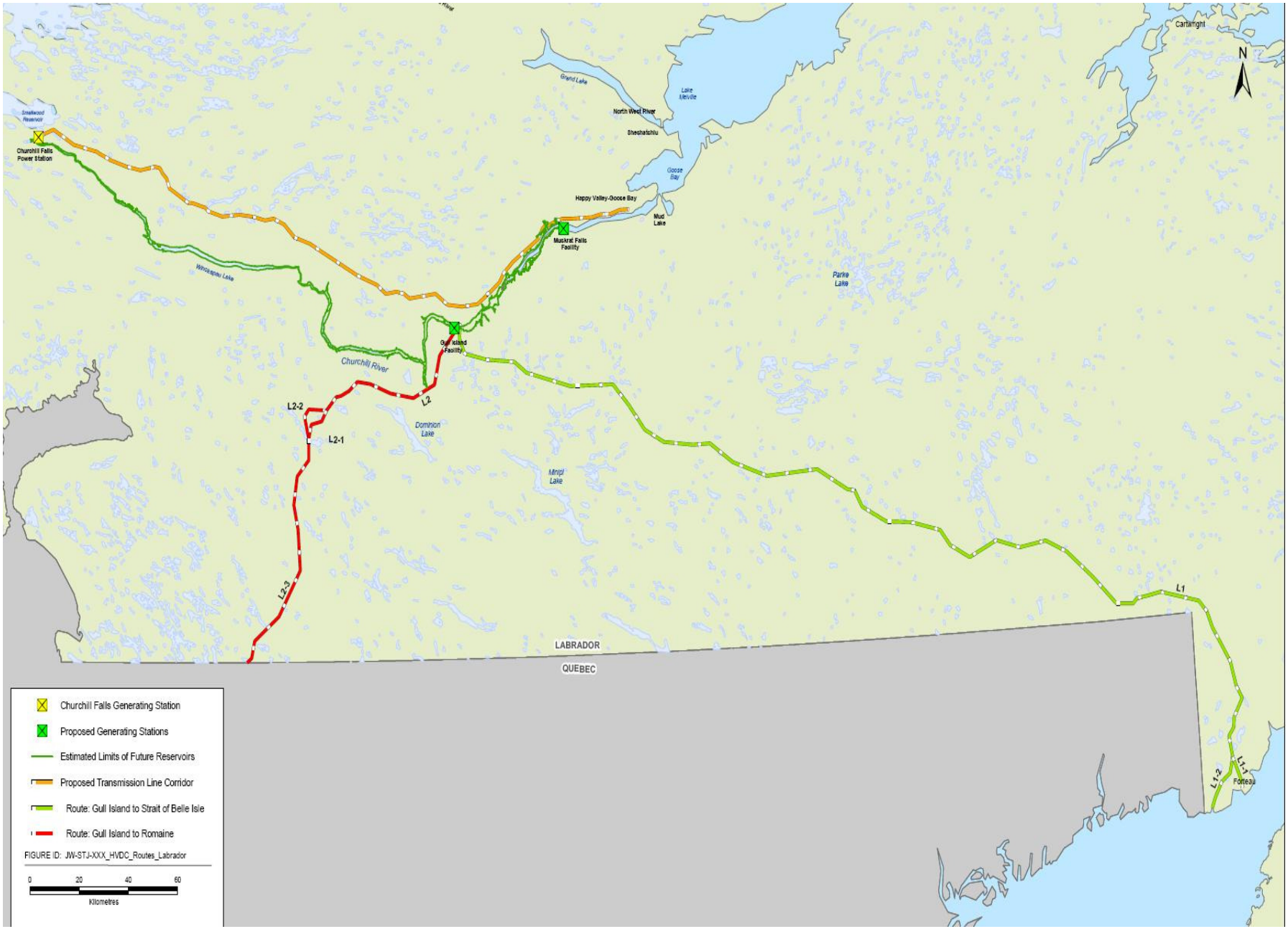
The present report presents the findings of Phase 1 of that mandate, which consists in preparing:

- a brief summary of the the status of the land claims of the Québec Innu in the project area;
- a summary of the available information on contemporary land- and resource-use activities, including such information as: times, locations and types (e.g., hunting, fishing, trapping, gathering) of harvesting activities, species harvested, camp and/or cabin sites, travel routes and any other activities and socio-cultural sites known to be of importance to the Québec Innu (e.g., birth and burial sites, areas of spiritual significance);
- a summary of the available socio-economic data on Québec Innu communities involved in contemporary land- and resource-use activities in the project area.

As per the Client's request, the report was prepared without contacting any Aboriginal or non-Aboriginal organizations: it contains only publicly available information.

Figure 2 (Appendix A) shows the location of the nine Québec Innu communities and of the Naskapi Nation of Kawawachikamach.

Figure 1: Lower Churchill Hydroelectric Generation Project : Project Area



Source: Jacques Whitford and Hydro–The Power of Commitment. Draft of 11 April 2008.

2. STATUS OF THE QUÉBEC INNU LAND CLAIM IN LABRADOR - SUMMARY

2.1 Historical Background

The Conseil Attikamek-Montagnais - known today as Conseil des Atikamekw et des Montagnais - was founded in 1975 to represent the interests of the Québec Innu and Atikamekw in the negotiation of their comprehensive land claims (Ashuanipi 2006; INAC 2007).

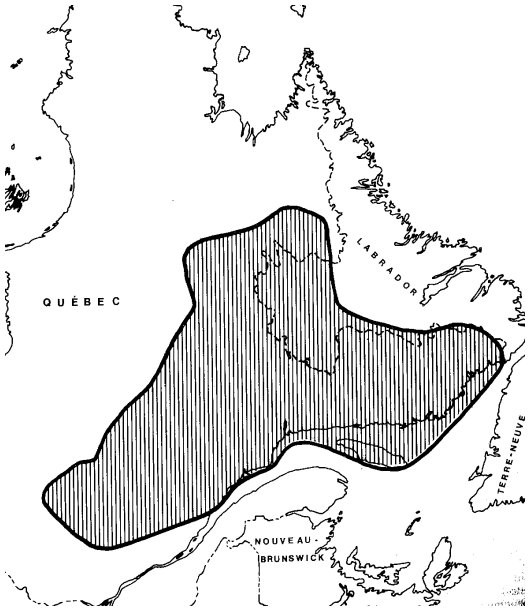
Its primary function was to represent its members before the governments of Québec and Canada and other authorities, and to initiate and pursue the land claims negotiation process (Charest 2001). It was mandated to prepare a claim based on the following principles: the recognition of the territorial rights of the Québec Innu; the right of the Innu to receive monetary compensation for damage to their territory; political self-determination; participation in the future development of their land; and the need to base development on ancestral values (Cleary 1989; Dupuis 1985).

The CAM comprehensive land claim was accepted by Canada[1] in 1979 and by Québec in 1980[2] (INAC 2007). The land claimed by CAM is shown in Figure 3 (pink) and in Figure 4 (grey): it overlaps a part of Québec and of Labrador, including most of the project area.

Figure 3: Land Claimed by CAM

Source : Modified from INAC (2003)

Figure 4: Land Claimed by CAM



Source: CAM (1979)

The CAM was dissolved in 1994, after which the Québec Innu and the Atikamekw started to negotiate their claims separately (Ashuanipi 2006; INAC 2007).

[1] A text box in CAM (1979) indicates that the Minister of Indian and Northern Affairs recognized only part of the land claim defined in Figure 4, which is esentially the same as that of Figure 3, but it did not specify which part was not accepted.

[2] Although Québec recognized, in areas under its jurisdiction, traditional fishing and hunting rights and other specific rights to be defined, as well as the necessity of negotiating on an equal basis and consulting the Innu about, and encouraging their participation in, future development in Québec, it ruled out the recognition of any type of sovereignty (Jean-Guy Deschênes Consultation Inc. 1994).

The Québec Innu created three negotiating groups: Conseil Tribal Mamuitun mak Nutakuan; Assemblée Mamu Pakatatau Mamit; and Corporation Ashuanipi. Details on each negotiating group are provided in Table 1.

Table 1: Québec Innu Negotiating Groups

Negotiating Group	Year of Creation	Membership (Innu communities)	Status & Major Achievements
Conseil Tribal Mamuitun mak Nutakuan	1995	Essipit Mashteuiatsh Natashquan[3] (Nutashkuan) Betsiamites[4]	Agreement-in-Principle of a General Nature signed by Québec, Canada and MMN in 2004. Reached agreement with Québec on a pilot project on the Public Territory Allocation Plan. Meets monthly with Québec and Canada. Main topic of discussion is land regime.
Assemblée Mamu Pakatatau Mamit	1995	Mingan (Ekuanitshit) St-Augustin (Pakua Shipi) La Romaine (Unamen Shipi)	In early 2007, tabled a paper that compared its proposed Agreement-in-Principle of a General Nature with that of MMN. Meets monthly with Québec and Canada.
Corporation Ashuanipi	2005	Matimekush-Lac John Uashat mak Mani-Utenam	In January, 2007, submitted a proposed framework agreement specifying topics presented at the negotiation table. Proposed framework agreement being reviewed by parties.

Source: INAC (2003); Ashuanipi (2006)

Although the land claims of the Québec Innu in Labrador have been accepted by Canada, negotiations have not yet started (Beauregard 15 April 2008), because the GNL refused in the early 1980's to negotiate with the CAM on the basis that it prioritizes settling the land claims of the Aboriginal residents of Newfoundland and Labrador (Dupuis 1993; NIMLJ 2003).

The GNL does not have a policy on land claims stating that it deals preferentially or exclusively with First Nations residing in Newfoundland and Labrador, but the foregoing is in fact its current practice (Carter 15 April 2008).

[3] Joined the MMN in November, 2000 (MMN 2008).

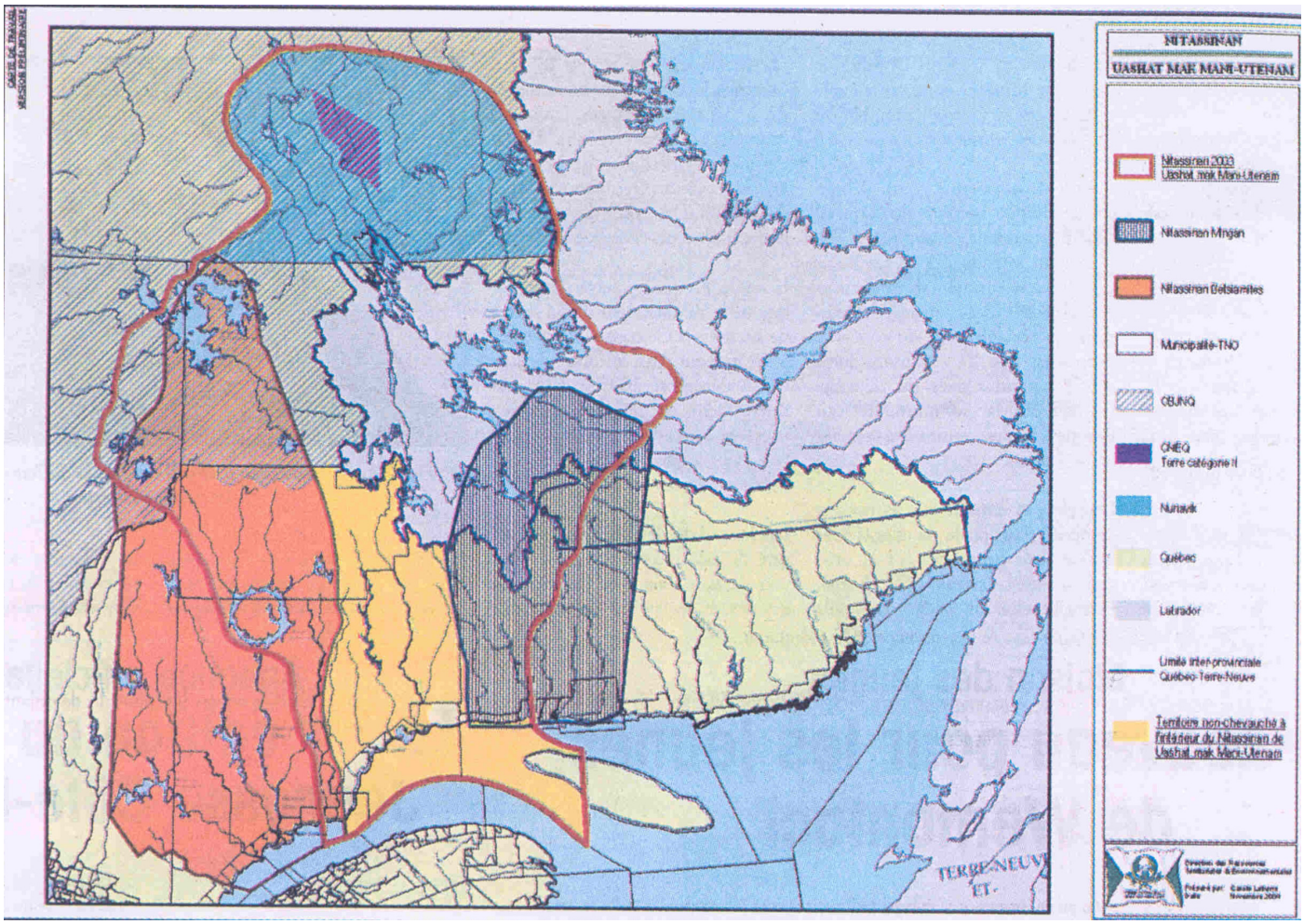
[4] The Betsiamites community has not been represented by the MMN since 2005. The Betsiamites Innu have decided to adopt an approach of litigation. They have launched five lawsuits on the basis that their rights have not been respected by Québec and Canada (INAC 2007).

2.2 Identity of Québec Innu Asserting Claims in Labrador

The maps showing the land claimed by CAM (Figures 3 & 4) do not specify which Québec Innu communities assert claims in Labrador.

Figure 5 shows that the Innu of Uashat mak Mani-Utenam and Mingan assert claims in Labrador, whereas those of Betsiamites do not.

Figure 5: Areas Claimed by Innu of Uashat mak Mani-Utenam, Betsiamites and Mingan



Source: Innuvelle (February 2005)

Other maps showing the areas claimed by the six remaining Innu communities could not be found. It is possible, however, to find relevant information based on the composition of Aboriginal negotiating tables, the comments/involvement of Innu communities on/in proposed projects in Labrador and the existing literature.

For example, a negotiating table composed of Ashuanipi (representing Uashat mak Mani-Utenam and Matimekush-Lac John), AMPM (representing Mingan, St-Augustin and La Romaine), the community of Natashquan and Innu Nation has been created to prepare general principles governing an agreement on the overlapping of Québec Innu land claims in Labrador (Ashuanipi 2006). Ashuanipi (2006) mentions that meetings with two GNL Ministers were scheduled to take place prior to June, 2007, to evaluate the possibility of tabling an official land claim request. No additional information on the foregoing could be obtained.

The following Québec Innu First Nations submittted comments on the draft guidelines for the Project: Natashquan, St-Augustin, La Romaine, Uashat mak Mani-Utenam and Mingan. The following statements demonstrate that they all assert claims in the project area.

Natashquan "It is a well-known fact that the Innu (Montagnais) of Nutashkuan have lived with and exploited the renewable resources of the territory in the area of the future facilities concerned by the project under study and that they still regularly and constantly frequent the said territories to carry on their traditional hunter-gatherer activities" (Tremblay 3 March 2008).

St-Augustin and La Romaine "...the members of these Innu communities continue to frequent the area affected by the project and to use its resources in a traditional way, and furthermore they have never assigned their Aboriginal rights or Aboriginal title in the area concerned by the project" (Sachel 2 March 2008).

Uashat mak Mani-Utenam "The Uashaunnuat and their families also claim collective and individual Aboriginal rights and treaty rights to the territory concerned by the Hydroelectric Project" (McKenzie 27 February 2008).

Mingan "The hydroelectric development project on the Churchill River is a source of concern for members of the Ekuanitshit community because it is likely to affect certain major resources such as caribou, but also our title and rights to that part of Labrador" (Council of the Innu of Ekuanitshit 27 February 2008[5]).

Section 3 of this report presents a summary of the literature containing references to land– and resource-use by the Québec Innu in Labrador. It shows that, although it did not submit comments on the draft guidelines for the Project, the Nation Innu Matimekush-Lac John also asserts claims in Labrador.

The Naskapis of Kawawachikamach do not define themselves as Innu, although they are closely related to the Innu of Natuashish, who called themselves "Naskapis" until the late 1980's. The Naskapis resolved their claims in Québec through the *Northeastern Québec Agreement* of 1978. They filed a claim to parts of Labrador in the early 1990's, but it was not accepted by Canada pending to submission of additional data, which have not yet been submitted. We did not consider the Naskapis to be Innu for the purposes of this report.

[5] The letter mentions that Innu of Matimekush also use the project area.

3. SUMMARY OF AVAILABLE SOCIO-ECONOMIC DATA AND INFORMATION ON CONTEMPORARY LAND- AND RESOURCE-USE ACTIVITIES OF THE QUÉBEC INNU IN LABRADOR

3.1 Explanatory Notes

Table 2 presents a summary of the available socio-economic data and information on contemporary land- and resource-use activities of the Québec Innu in Labrador. It is to be noted that some documents could not be obtained in time to be incorporated into the current report. Those documents are listed in Appendix C. They will be included in Phase 2 of the mandate.

The heading “Period” refers to the date of the information provided in the documents.

The “Scale of Relevance” applies to the land- and resource-use data only. It was determined based on the amount of information available and the reference to use by Québec Innu of Labrador. It has three levels:

1= Highly Relevant (i.e., contains a great deal of relevant information, including mention of use by Québec Innu of Labrador and/or of project area)
2= Moderately Relevant (i.e., contains a limited amount of information, including mention of use by Québec Innu of Labrador and/or of project area)
3= Slightly Relevant (i.e., the relevant information is limited to a paragraph or a few lines in the document, and there is no clear reference to use by Québec Innu of Labrador)

The following acronyms are used in Table 2:

AUG: St-Augustin (Pakua Shipi)
BET: Betsiamites
ESS: Essipit
MAS: Mashteuiatsh
MIN : Mingan (Ekuanitshit)
MLJ: Matimekush-Lac John
NAT: Natashquan (Nutashkuan)
NWR: North West River
ROM: La Romaine (Unamen Shipi)
UAS: Uashat mak Mani-Utenam

Table 2: Summary of Available Socio-Economic Data and Information on Contemporary Land- and Resource-Use Activities of the Québec Innu in Labrador

Reference, Type of Document, Period, Relevance, Notes (if necessary)	Innu Group Involved									Socio-Economic Data	Land- and Resource-Use Data
	MLJ	AUG	ROM	NAT	MIN	UAS	BET	ESS	MAS		
Bouchard (2004) Book describing life and hunting stories of a hunter from MIN. **Bouchard (1974)** Journal article containing part of a story included in Bouchard (2004). ***Period:*** 1890 to 1960 ***Relevance:*** 1			X	X	X						Describes long hunting trips including such details as: travel routes; species hunted and trapped; sites where canoes were stored during freeze-up; trading activities at NWR; description and location of portages and camp sites; hunting strategies; and roles of women and men. Stories also refer to presence of Innu from ROM and NAT in NWR.
Fortin (1992) Book containing anecdotal stories, observations and reflections by M. Jean Fortin, an Oblate of Mary Immaculate missionary, who lived in NAT for 20 years and who travelled extensively on the Lower North Shore of Québec. ***Period:*** 1950 to 1970 ***Relevance:*** 1				X							Mentions that hunters from NAT remember travelling from NAT to Goose Bay/NWR and back to hunt and trap with their families (in fall & winter) when they were younger. Mentions that return travel route passed by Churchill Falls (p. 29). Describes observed life patterns of Innu; family hunting territories; former Innu hunter meeting point between Schefferville and Sept-Îles, where there is a burial ground for hunters who die during winter (p.96).

Reference, Type of Document, Period, Relevance, Notes (if necessary)	Innu Group Involved									Socio-Economic Data	Land- and Resource-Use Data
	MLJ	AUG	ROM	NAT	MIN	UAS	BET	ESS	MAS		
Leacock (1974) Memoir published by the journal *American Anthropologist*. ***Period:*** 1950's ***Relevance:*** 1		X	X	X	X	X					Describes hunting and trapping activities of Innu based on interviews with Innu informants who live(d) in NAT, AUG, ROM, UAS and NWR. Includes: maps of areas trapped by the Innu from UAS, MIN and NAT in Fall 1950; sketch of typical trapping arrangement for NAT Innu; description of the evolution of trapping territories and patterns; life and hunting stories of Innu from NAT. Indicates that hunters from Innu groups that summered on the Gulf of the St-Lawrence used to cross over the Height of Land regularly at Christmas to trade at the NWR post and to hunt caribou above the Hamilton River (p. 19).
MMN (2008) Website of Conseil Tribal Mamuitun mak Nutakuan. ***Period:*** Not mentioned ***Relevance:*** 2				X				X	X	Contains data (up to 2001) on: history, political structure; demographic data; population structure and statistics.	Describes traditional lands occupied by concerned communities. Mentions that NAT Innu occupied Labrador, including the area south of Churchill River.
Charron (1994a-h) Series of popular-language booklets containing general information on Québec Innu communities. ***Period:*** 1534 to 1994 ***Relevance:*** 1 ***Note:*** There is an individual booklet for each community. That of UAS could not be found.	X	X	X	X	X		X	X	X	Contains data on: social, educational and economic activities; demography; political organization; and history of community.	Describes traditional harvesting activities. Contains basic maps showing ancestral territory of Innu communities. Those of ROM, MLJ, NAT and AUG extends into Labrador. That of BET extends very close to the border, but does not seem to overlap. Those of ESS and MAS clearly do not extend into Labrador.

Reference, Type of Document, Period, Relevance, Notes (if necessary)	Innu Group Involved									Socio-Economic Data	Land- and Resource-Use Data
	MLJ	AUG	ROM	NAT	MIN	UAS	BET	ESS	MAS		
Dominique (1989) Book containing autobiographical stories of an Innu from NAT and an analytical description of harvesting territory of that community. ***Period:*** 1895 to 1976 ***Relevance:*** 1			X	X	X						Stories refer to regular travel from ROM to NWR. Mentions presence of Innu from MIN at NWR. Contains detailed maps of: contemporary harvesting territory; principal hunting camps per season, including some located in Labrador. Describes annual harvesting cycles and boundaries of territory.
Canada – National Defence (1994) EIS of Military Flying Activities in Labrador and Québec. Chapter 8 describes the human environment in the area that would be overflown during the proposed military flying activities (Appendix D). The study area extends into the project area. ***Period:*** Early 1980's to 1991 ***Relevance:*** 2	X	X	X	X	X					Contains 1991 data on population and family characteristics of concerned Aboriginal groups.	Contains a section on resource harvesting, which provides a detailed description of the resources harvested in the study area, but does not specify which Aboriginal group does so. Appendix C of that document contains a list of hunting, fishing and outfitting Aboriginal and non-Aboriginal camps in/near study area, but it does not specify the ethnic affiliation of the owners.

Reference, Type of Document, Period, Relevance, Notes (if necessary)	Innu Group Involved									Socio-Economic Data	Land- and Resource-Use Data
	MLJ	AUG	ROM	NAT	MIN	UAS	BET	ESS	MAS		
Jean-Guy Deschênes Consultation Inc. (1994) Literature review of Québec Innu likely to use the territory overflown during military flying activities proposed in Canada– National Defence (1994). ***Period:*** 1950's to 1994 ***Relevance:*** 1	X	X	X	X	X					Describes the communities based on documentary research. Contains details on: -communities (i.e., location, basic demographic structure, political and administrative organizations, land claims); -history of how Innu went from a nomadic to a sedentary lifestyle and current conditions on reserves (e.g., education, health services); -economic conditions, with a focus on monetary and subsistence economies.	The section dealing with wildlife harvesting contains such details as: species harvested; monetary value of country food harvested; income and employment from trapping; roles of men and women; and description of hunting techniques. Contains maps showing: the location of main camps of Innu families from ROM during trapping and hunting season of Fall 1985; the territory of the concerned communities based on available literature. Contains a list of ecosystem components exploited and/or valued by the Innu.
EARP (1986a) Transcript of public meeting held in Schefferville as part of public consultation process for Canada's proposed military flying activities in Labrador and Québec. ***Period:*** 1910's to 1986 ***Relevance:*** 2	X	X		X							Contains testimonies by Innu members of MLJ, including Elders, describing land-use of Innu between Goose Bay and Schefferville and timing and location of caribou hunting grounds. One testimony indicates that Innu of MLJ, AUG and NAT went as far as NWR to hunt caribou (p. 159).
EARP (1986b) Transcript of public meeting held in Montréal as part of public consultation process for Canada's proposed military flying activities in Labrador and Québec. ***Period:*** 1986 ***Relevance:*** 2			X								Contains testimony by an Innu from ROM, mentioning that his father lives in the woods in Labrador, approximately 150 miles from La Romaine (p.1269).

Reference, Type of Document, Period, Relevance, Notes (if necessary)	Innu Group Involved									Socio-Economic Data	Land- and Resource-Use Data
	MLJ	AUG	ROM	NAT	MIN	UAS	BET	ESS	MAS		
Brassard and Charest (1986) Journal article on militarization of Innu ancestral lands. ***Period:*** 1950 to 1982 ***Relevance:*** 1		X	X	X	X						Mentions main animal species harvested by the four communities (in order of priority). Provides list of main species harvested by the Innu in the study area in 1988-89 (in order of monetary value). Contains a map showing Innu campsites in southern part of study area of Canada – National Defence (1994a). Some of those campsites are located in Labrador.
Wadden (1991) Book providing a first-hand look at Innu struggle to safeguard Nitassinan[6] for future generations. ***Period:*** 1950's to 1991 ***Relevance:*** 2		X	X	X	X	X					Contains an interview with an Innu woman from UAS, who describes her nomadic childhood, including details on her family's travel route (UAS to Schefferville, to Fort Chimo, to Utshimassit and to Nichikamau Lake) (p. 48). Describes fur trading activities/patterns at the NWR Hudson Bay Company trading post. An Elder mentions that some Aboriginals from NAT, ROM, AUG, MIN and UAS travelled to NWR with young children (p.63).

[6] Nitassinan is an Innu term meaning "our land" (Lacasse 2003). It is used to define the territory of one or several Innu communities in Québec and in Labrador.

Reference, Type of Document, Period, Relevance, Notes (if necessary)	Innu Group Involved									Socio-Economic Data	Land- and Resource-Use Data
	MLJ	AUG	ROM	NAT	MIN	UAS	BET	ESS	MAS		
Jauvin (1994) Book describing life history of M. Mark, an Innu from ROM. ***Period***: 1920's to 1994 ***Relevance:*** 1			X								M. Mark was born near Lake Kukushishtikuaniunipi in Labrador during a winter hunting season, after which his family returned to ROM (p. 53). His hunting stories refer to a regular winter migration pattern from ROM to Sheshashit. One of his hunting locations is at Minaiku-nipi, Labrador (p. 69). Stories and testimonies contain such information as seasonal hunting patterns, childhood memories, logistics of a hunting trip, daily life habits, religion, traditional medicine, roles of men and women, canoe construction techniques, relationships between communities members, birth and death, etc.
Environmental Systems Group of DeLCan (De Leuw Cather, Canada Ltd.) (1986) EIS of Ross Bay Junction – Churchill Falls Tote road, which is located adjacent to (west) the project area (Appendix E). ***Period:*** 1960's to 1986 ***Relevance:*** 2	X				X	X					Chapter on Native Resource Use mentions that Innu using the area of the proposed road were based mainly in MLJ, UAS and, to a lesser extent, MIN. Describes historic resources, annual harvesting cycles, wildlife species harvested, meeting places and number of animals harvested. Mentions that study area is crisscrossed by Innu travel routes.
Mailhot (1993) Book describing the Innu of the Québec-Labrador Peninsula, with a focus on Sheshashit Nation. ***Period:*** 1960 to 1993 ***Relevance:*** 2		X	X			X					Contains information on: Québec (ROM, AUG and UAS) and Labrador Innu travel routes to and from Lake Melville prior to 1960 (including a map illustrating the routes); family links between Québec and Labrador Innu; hunting and fur trading activities in Lake Melville area; and location of seasonal hunting camps of Innu from UAS and ROM near Lake Melville.

Reference, Type of Document, Period, Relevance, Notes (if necessary)	Innu Group Involved									Socio-Economic Data	Land- and Resource-Use Data
	MLJ	AUG	ROM	NAT	MIN	UAS	BET	ESS	MAS		
Vachon *et al* (1979) A literature review of the socio-economic situation of the Innu of the Québec North Shore with a focus on their hunting, trapping and fishing activities. Document prepared for the upcoming ministerial and governmental negotiations at that time. ***Period:*** 1860 to 1979 ***Relevance:*** 2	X	X	X	X	X	X	X	X		Contains general socio-economic data from the 1970s (e.g., manpower, population, education, economic activities)	Describes hunting, trapping and fishing territories, species harvested, hunting regulations, hunting and trapping harvests by the Québec Innu. Contains a map of hunting territories of Innu from MLJ in 1860s.
Speck (1931) Journal article describing early distribution of Aboriginal groups in the Labrador Peninsula. ***Period:*** 1850 to 1931 ***Relevance:*** 2	X	X	X	X	X	X	X	X	X		First description of the hunting territory in western Labrador and among the neighboring Native groups to the south and farther west. Contains the first maps showing approximate location, since approximately 1850, of Québec Innu groups (among others) based on data obtained at trading posts. Describes briefly each of the communities.
NIMLJ (2003) Brief submitted to Québec regarding the Agreement-in-Principle signed between Conseil Tribal Mamuitun mak Nutakuan, Québec and Canada. ***Period:*** Time immemorial ***Relevance:*** 3	X										Mentions that MLJ ancestors hunted, fished, trapped and gathered in Québec and Labrador from time immemorial.

Reference, Type of Document, Period, Relevance, Notes (if necessary)	Innu Group Involved									Socio-Economic Data	Land- and Resource-Use Data
	MLJ	AUG	ROM	NAT	MIN	UAS	BET	ESS	MAS		
Roy (1976) Literature review of traditional and contemporary occupancy and use (i.e., hunting and trapping) of Ungava Bay area, including NWR, by Naskapis and Québec and Labrador Innu. ***Period:*** 1950 to 1976 ***Relevance:*** 2	X					X					Contains a map showing hunting territories of Naskapis and Labrador and Québec Innu compiled from various sources. That map shows that the Innu of UAS hunted in the project area in early 1950 and that the Innu and Naskapis of Schefferville hunted slightly north of Churchill Falls in early 1960's.
Leacock (1998) Chapter on Innu groups of Labrador contained in a book on Native land claims. ***Period:*** 1920's to 1998 ***Relevance:*** 3		X	X	X							Mentions the practice by Innu from NAT, ROM and AUG of crossing over the "Height of Land" and going down to NWR for the summer and returning in winter (p. 101).
Lacasse (2003) Book on management of Nitassinan. ***Period:*** Not mentioned ***Relevance:*** 3		X	X	X	X						Describes harvesting activities of Québec and Labrador Innu in Nitassinan. Contains extracts of interviews with Québec Innu Elders stating that they travelled to Labrador Innu communities, but does not contain details. Contains extracts of testimonies by Innu, indicating that Innu from MIN, ROM, NAT and AUG used the entire Nitassinan for hunting and trapping.

Reference, Type of Document, Period, Relevance, Notes (if necessary)	Innu Group Involved									Socio-Economic Data	Land- and Resource-Use Data
	MLJ	AUG	ROM	NAT	MIN	UAS	BET	ESS	MAS		
Ratelle (1987) Book describing the evolution of boundaries of Nitassinan from 1760 to 1980. ***Period:*** 1760 to 1980 ***Relevance:*** 3	X	X	X	X	X	X	X	X	X		Provides a detailed description, including maps, of Nitassinan for the following periods: 1760-1790; 1791-1850; 1851-1870; 1871 to 1987. Contains a map of Innu trapping territories in 1980.
Conseil Attikamek-Montagnais (1979) Text on land claims of Atikamekw and the Québec Innu that were tabled with the Department of Indian and Northern Affairs in 1979. ***Period:*** 1760 to 1980 ***Relevance:*** 3	X				X	X	X				Contains background information on: determination of boundaries of Québec Innu ancestral territory; testimonies by Innu members on their hunting areas, including in Labrador; and the nature of their land claims.
Mongeau (1981) Book describing life history of an Innu woman from BET. ***Period:*** 1920's to 1962 ***Relevance:*** 2						X	X				Describes life of an Innu woman from BET who moved to NWR, where she became an important religious leader. Stories refer to her experience in the forest and her round trips to UAS, where she visited her family.
Charest and Walsh (1997) Journal article on wildlife harvests of some Québec North Shore Innu. ***Period:*** Early 1980's ***Relevance:*** 3		X	X	X	X					Contains a section on socio-economic context of concerned communities.	Contains a list of species harvested in 1983 in each community with such details as number, weight, value and season of harvest.
Garneau (1997) Journal article on evolution of Québec Innu population over the past decades. ***Period:*** 1970's to 1990's ***Relevance:*** 3	X	X	X	X	X	X	X	X	X	Contains detailed demographic data.	

Reference, Type of Document, Period, Relevance, Notes (if necessary)	Innu Group Involved									Socio-Economic Data	Land- and Resource-Use Data
	MLJ	AUG	ROM	NAT	MIN	UAS	BET	ESS	MAS		
Gilbert (1966) Study on social and economic organisation of Innu from MIN. ***Period:*** 18th century to 1966 ***Relevance:*** 2					X						Mentions that Innu from MIN (including two interviewed Elders) migrated to Labrador to trade furs at Hudson's Bay Company trading posts. States that overland travel to Goose Bay is no longer a common practice: most Innu born after 1920 have never travelled to Goose Bay.
Harper (1964) Book describing Québec Innu and their neighbors in the Ungava Peninsula. ***Period:*** 1920's ***Relevance:*** : 2		X	X	X		X					Describes distribution and migration routes of Québec Innu from Québec North Shore to Hamilton River, Labrador, and to a meeting point at Sandgirt Lake, ±85 km northwest of Churchill Falls in Labrador (53º58'52.92" N; 65º15'20.71" W).
Rogers and Leacock (1981) Book chapter providing a detailed summary of Innu communities. ***Period:*** 17th century to 1981 ***Relevance:*** 2	X	X	X	X	X	X	X	X	X	Provides details on history, language, population and culture of Innu.	
Loring *et al* (2003) Journal article on archaeology of former Michikamau Lake next to the Smallwood Reservoir in Nitassinan. ***Period:*** Late 1960's ***Relevance:*** 2						X					Includes three testimonies by Innu from UAS describing travel route and meeting points towards NWR.
SAA (2008) **INAC (2008)** **ICEM (2008)** **CDEM (2008)** **Statistics Canada (2008)**	X	X	X	X	X	X	X	X	X	Contains relatively up-to-date socio-economic data and/or community profile.	

Reference, Type of Document, Period, Relevance, Notes (if necessary)	Innu Group Involved									Socio-Economic Data	Land- and Resource-Use Data
	MLJ	AUG	ROM	NAT	MIN	UAS	BET	ESS	MAS		
Ashuanipi Corporation (no date) Map showing family trapping lots and cabins of Innu from MLJ and UAS. ***Period:*** 1971 ***Relevance:*** 1	X					X					Very detailed map showing trapping lots and cabins of Innu from MLJ and UAS in Québec and in Labrador, including the area near Churchill Falls Power Station.

4. OBSERVATIONS AND COMMENTS

The restriction on not contacting Aboriginal groups and other potential sources of information limited the scope of this report. It prevented access to key documents, such as the extensive study of contemporary land-use and-occupancy of Québec Innu conducted by the CAM in the early 1980's as part of its negotiation process.

Those reports contain testimonies of more than 400 Québec Innu and several maps. They are stored in the archive centre of the Conseil de la Nation Atimakekw in La Tuque, and they can be consulted only with the consent of the authors. References to some of those reports (e.g., Deschênes and Dominique (1983), Brassard (1983); Comtois (1983); Laforêt (1983)) and other documents with restricted access are listed in Appendix B.

We noted that the definition of "Innu" varies over time and among researchers. Innu are variously referred to as Montagnais, Naskapis, Montagnais-Naskapis and Eskimos. The evolution of that term, combined with the lack of distinction between the Innu of Québec and those of Labrador and the use of Aboriginal names for lakes and hunting areas, made it occasionally difficult to interpret the contents of articles.

5. CONCLUSION

Based on the information contained in the report, we draw the preliminary conclusion that the following Québec Innu groups use(d) the project area in the contemporary period and that they assert claims to Labrador:

- Matimekush-Lac John;
- St-Augustin;
- La Romaine;
- Natashquan;
- Mingan;
- Uashat mak Mani-Utenam.

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APPENDIX A

Location of Québec Innu and Naskapi Communities

Figure 2: Location of Québec Innu and Naskapi Communities

Source: SAA (2008)

APPENDIX B

Documents to be Requested from Aboriginal Groups if Authorization Granted

Brassard, Denis. 1983. *La Romaine. Rapport sur l'occupation et l'utilisation du territoire par les Montagnai*s. Québec City. Conseil Attikamek-Montagnais.

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APPENDIX C

Documents to be Consulted in Phase 2 Subject to Obtaining any Required Authorizations

Archéotec. 1979. *Étude de l'utilisation des ressources du territoire de La Romaine, de la période préhistorique à la période contemporaine*. Montréal, Hydro-Québec. Vice-présidence Environment (report).

Brassard, Denis. 1986. Études de revenus dans les réserves indiennes de la Moyenne et Basse-Côte-Nord. *Les Cahiers de l'ACFAS*, 41: 173-188.

Dominique, Richard. 1985. Les territoires de chasse: une réponse sociale à l'aménagement et au contrôle du territoire. *Les Cahiers de l'ACFAS*, 30: 81-93.

Frenette, Pierre. 1996. *Histoire de la Côte-Nord*. Sainte-Foy: Presses de l'Université Laval et Éditions de l'IQRC.

Gadacz, Rene R. 1975. Montagnais Hunting Dynamics in Historico-ecological Perspective. *Anthropologica*, 17(2): 149-168.

McGee, J. T. *Field Notes and Report on Summer 1965 Field Work in Mingan, Natashquan, Romaine and St-Augustine*. Ottawa, National Museum of Man (report).

Michaud, Monique. 1987. Natashquan là où l'on chasse l'ours. *Rencontre,* 8(3): 16-18.

Silberstein, Jil. 1998. *Innu: à la rencontre des Montagnais du Québec*. Paris : Albin Michel.

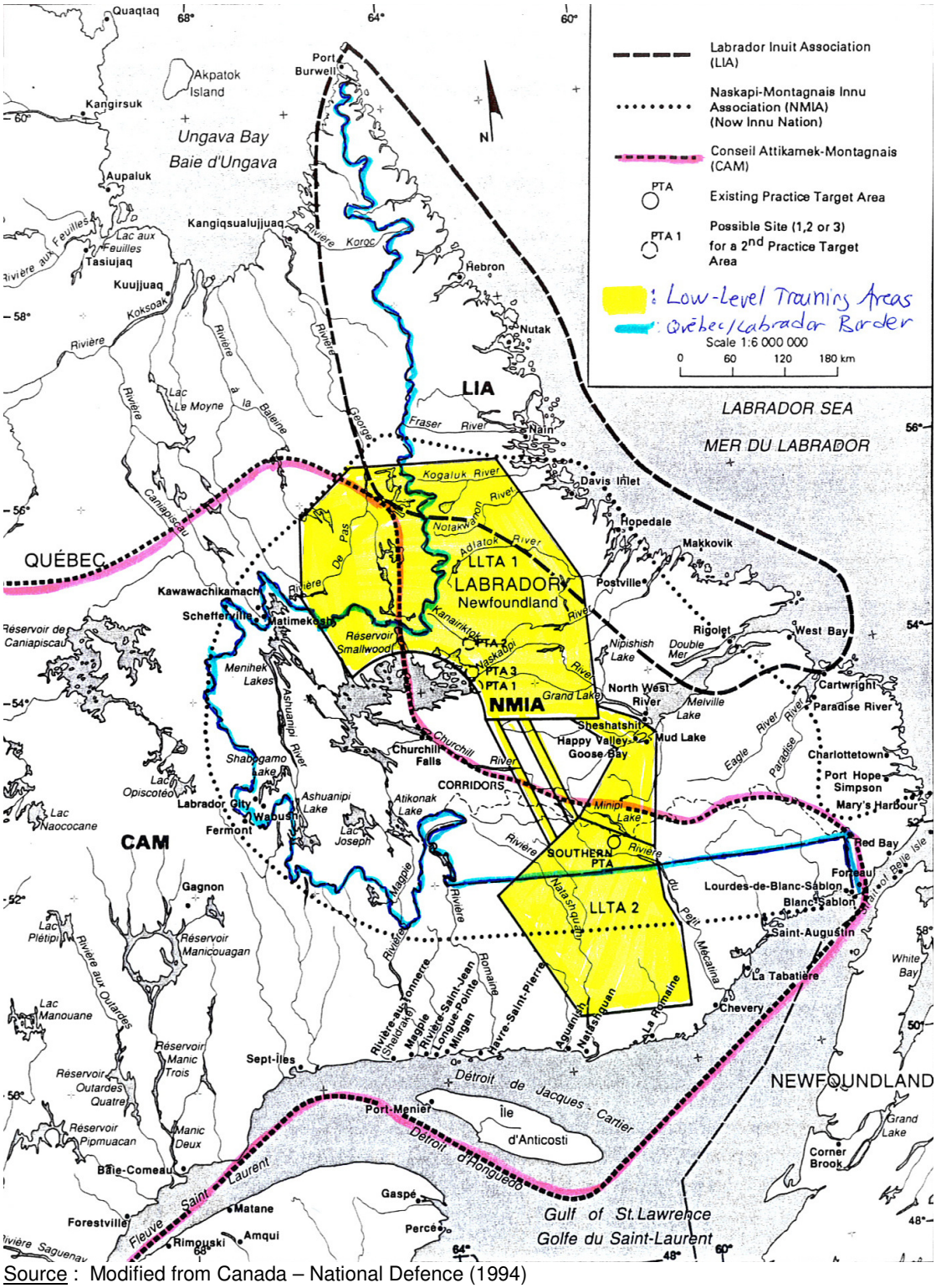
Stiles, William F. 1975. A Trip into the Bush with the St-Augustan Band of the Montagnais-Nascapi Hunters. *Indian Notes*, 11(1): 1-47.

Vincent, Sylvie. 1983. Mistananinueshesh au temps de la mouvance. Notes inspirées par l'autobiographie d'une femme montagnaise. *Recherches Amérindiennes au Québec*, 13(4) : 243-254.

APPENDIX D

Low Level Training Areas and Aboriginal Land Claims

Figure 6: Low Level Training Areas and Aboriginal Land Claims

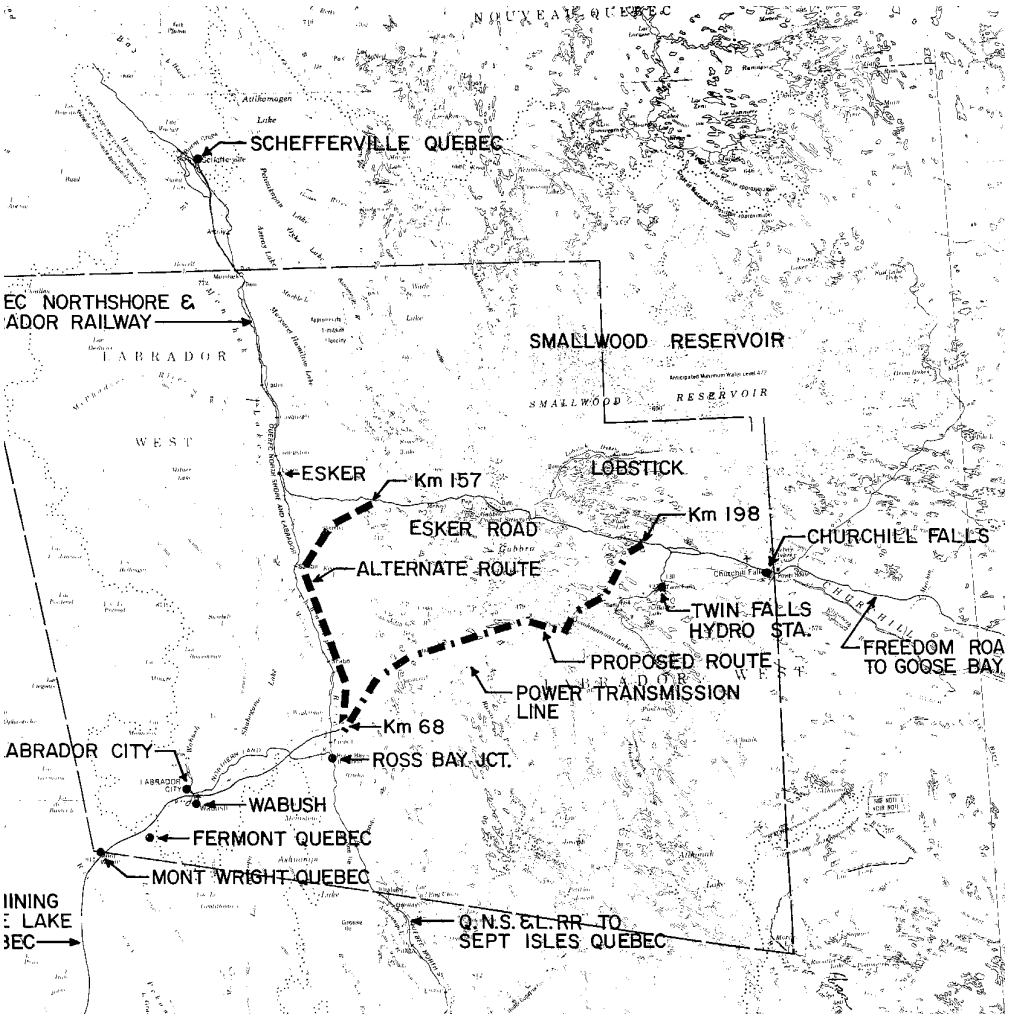


Source : Modified from Canada – National Defence (1994)

APPENDIX E

Study Area of the Ross Bay Junction – Churchill Falls Tote Road

Figure 7: Study Area of the Ross Bay Junction – Churchill Falls Tote Road



Source: Environmental Systems Group of DeLCan (De Leuw Cather, Canada Ltd.) (1986)

Information Request Number: JRP.3

Aboriginal Knowledge

Requesting Organization – Joint Review Panel **Information Request No.: JRP.3**

Subject - Aboriginal Knowledge

References:

EIS Guidelines, Section 2.3 (Guiding Principles)

EIS, Volume IA, Section 9.0 (Environmental Assessment Approach and Methods)

Rationale:

The EIS Guidelines require that "Aboriginal traditional and community knowledge of the existing environment (…) be an integral part of the EIS, to the extent that it is available to the Proponent" (p. 8).

The EIS states that "Nalcor Energy has incorporated knowledge about the environment and its use, principally in the descriptions of the existing environment (…) the information on values held is placed according to topic in the environmental effects prediction and effects management sections of the EIS. Descriptions of the environment and its change over time and space reflect available ITK and provide an improved understanding of local environmental processes (…) The ITK assisted in planning for the prevention or reduction of potential adverse environmental effects, as shown in the various mitigation and effects management measures identified throughout the EIS. ITK has been taken into account in the process of analysis and prediction of environmental effects, including cumulative effects." (Volume IA, p. 9-2).

Verbatim quotes from the Innu Traditional Knowledge Committee Report (ITKC) have been incorporated throughout the EIS, but explicit contributions of Aboriginal Knowledge to the Proponent's assessment of potential environmental effects is limited to finding alternate project design to minimize or reduce disturbances to a rock knoll at Muskrat Falls that is of spiritual and cultural importance.

Requesting Organization – Joint Review Panel **Information Request No.: JRP.3**

Information Request:

In order for the Panel to assess the contribution of Aboriginal Knowledge to the Proponent's analysis and prediction of environmental effects, including cumulative effects:

a. **What methodology has the Proponent used to consider Aboriginal Knowledge in the analysis and predictions of environmental effects, including cumulative effects?**

Response:

The methodology used in the analysis and prediction of environmental effects (including cumulative effects) is described in the EIS (Vol. IA, Section 9.0). This description included consideration of Aboriginal Knowledge as introduced in the EIS and explained the limitations on the use of that information as described in Section 9.1.1. No separate methodology was employed for the analysis of data or prediction of environmental effects in consideration of Aboriginal Knowledge.

The inclusion of Innu Traditional Knowledge (ITK) in the EIS was in accordance with an agreement reached between Innu Nation and Nalcor to document and appropriately incorporate ITK in the environmental assessment process for the Potential Development (i.e., the Lower Churchill Hydroelectric Generation Project). As part of that agreement, a Traditional Knowledge Protocol was developed to address how ITK was to be made public. Thus, it was specified that:

- the Innu Traditional Knowledge Committee (ITKC) Report and the Ushkan-shipiss Report were to be presented in their entirety in the EIS;
- when Innu Traditional Knowledge is referenced in the EIS, the material was to appear verbatim; and
- the EIS must remain flexible to the provision of multiple interpretations of environmental phenomena as well as multiple interpretations of scientific and traditional knowledge.

Innu Nation has cautioned not to over interpret ITK. Accordingly, Nalcor has been extremely cautious in any interpretation of traditional knowledge and in its presentation and incorporation into the environmental effects prediction process.

Requesting Organization – Joint Review Panel **Information Request No.: JRP.3**

Information Request:

b. How has Aboriginal Knowledge influenced the Proponent's analysis and prediction of environmental effects, including cumulative effects? Provide specific examples.

Response:

The Aboriginal Knowledge used in the description of the existing environment informed the assessment of environmental effects and cumulative effects (examples below). As well, Aboriginal Knowledge has served to render more conservative the effects predictions made, in cases where such information was available and relevant to the process of effects prediction (example 2 below).

The following specific examples illustrate how Aboriginal Knowledge influenced the analysis and prediction of environmental effects.

1. Pages 4-17 and 4-53 in Volume II Part A outline Aboriginal Knowledge regarding the potential environmental effects of mercury. These confirmed model results in predicting an increase in fish mercury levels.

2. Page 4-27 in Volume II Part A describes fish habitats that would be affected by the Project. Aboriginal Knowledge described tributary deltas, where tributaries empty into the Churchill River, as areas of higher fish abundance. This information was incorporated into the Mitigation Measures (Section 4.10.2.4 in Volume II Part A) outlined in the Environmental Effects Management section and is reflective of how Aboriginal Knowledge contributed to the environmental effects assessment .

3. Page 4-51 in Volume II Part A outlines a comment related to fish mortality associated with the Project. This comment substantiated the prediction that entrainment of fish will occur.

4. Page 2-76 in Volume III describes the value of Canada Yew as a medicinal plant, including its perception as "rare" in the context of Labrador Innu land use. The effects assessment (p. 5-15 and 5-16) considers the occurrence of this plant, the potential loss of known sites, and plans for mitigation (through re-establishing the plant in other suitable areas).

5. Pages 2-86 to 2-88, p. 6-8 and p. 6-11 in Volume III describe the presence of two known sites of cultural and spiritual importance to the Innu, one of which (*Ushkanshipiss*) is the location of the last shaking tent ceremony (*kushapapshikan*) in Labrador and Quebec. In 2006, Nalcor sponsored a fieldtrip to the site by a group of Innu Elders. This effort served to provide a form of environmental effects management through the commemoration of the ceremony and the documentation of testimony by the participants about this culturally and historically important event.

Requesting Organization – Joint Review Panel **Information Request No.: JRP.3**

Information Request:

c. Have there been any occasions where information derived from Aboriginal Knowledge has conflicted with information derived from other sources? If so, provide specific examples and explain how each conflict was addressed and/or resolved.

Response:

There were no occasions where Aboriginal Knowledge conflicted with information from other sources with respect to:

- descriptions of the existing environment (scientific knowledge about the environment);
- factual knowledge about past and current use of the environment;
- values about how things should be and what is proper to do in relation to the environment; or
- Innu cosmology by which information about the environment is organized.

The available documentation of Innu Aboriginal Knowledge included statements of prediction regarding potential environmental effects. Such predictive statements were inserted as verbatim quotes in the EIS, without interpretation by Nalcor. Predictive statements were at times inconsistent with the analysis and predictions completed by Nalcor. Examples of this are:

- *"Atiku (caribou) will sense/feel the destruction (damage to, breaking up) of the land and will not be seen in the area again" (P8.7.12.06)*

  Page 86 of ITK Report

- *"The fish will be eaten by otter and mink, so they will be affected too. Just as humans get sick from eating the fish, so too will the otters and mink that eat the fish". (P1.5.12.06)*

  Page 86 of ITK Report

As agreed between Innu Nation and Nalcor, no attempt was made to resolve any potential discrepancies between predictions, but rather to present both views.

This approach is consistent with the EIS Guidelines which state:

"*Where the conclusions drawn from scientific and technical knowledge are inconsistent with the conclusions drawn from Aboriginal traditional or community knowledge, the Proponent shall present the various points of view as well as a statement of the Proponent's conclusions*. (Sec 3.1 p.11) "

Information Request Number: JRP.4

Environmental Assessment Approach and Method

Requesting Organization – Joint Review Panel **Information Request No.: JRP.4**

Subject - Environmental Assessment Approach and Method

References:

EIS Guidelines, Section 2.5 (Precautionary Principles); Section 4.5 (Environmental Effects) & Section 4.7 (Residual Effects and Determination of Significance)

EIS, Volume IA, Section 9.0 (Environmental Assessment Approach and Methods); Volume IIA, Section 4.5 (Criteria for Describing Environmental Effects – Aquatic Environment Key Indicator) & Volume IIB, Section 5.5 (Criteria for Describing Environmental Effects – Terrestrial Environment Key Indicators) & Section 5.6 (Determination of Significance)

Rationale:

The EIS Guidelines require that the environmental effects predictions of the Proponent be "explicitly stated and [that] the **theory or rationale** upon which they are based (…) be presented" (p. 32) (emphasis added). The EIS Guidelines also suggest parameters to be used, including, but not limited to, the following:

Magnitude

The same threshold values are used to assess the extent of change from the baseline state in the assessment for both the Aquatic and Terrestrial Environment VECs(Volume IIA, p. 4-6 & Volume IIB, p. 5-15): 5% = low; 5-25% = moderate; and > 25% = high. The Proponent's theory or rationale for selecting these threshold values is not explicitly stated in the EIS.

Ecological context:

According to guidance by the Canadian Environmental Assessment Agency, with regards to "ecological context", adverse environmental effects may be significant if they occur in areas or regions that have already been adversely affected by human activities and/or those that are ecologically fragile and have little resilience to imposed stresses.

The Proponent's theory or rationale for not considering areas that have already been adversely affected by human activities or areas that are ecologically fragile in the assessment of environmental effect significance is not explicitly stated in the EIS.

Level and degree of certainty of knowledge:

Scientific uncertainty is expressed in terms of levels of certainty. There are two levels of certainty presented, low and high, but the Proponent has not provided the theory or rationale on how these were defined and how they have influenced significance determination. The EIS Guidelines specifically require that the Proponent identify where scientific uncertainty exists in the predictions of the environmental effects of the Project (Section 2.5 - Precautionary Principle).

Sustainability:

The EIS states that, for all Terrestrial Environment Key Indicator species other than Caribou, "a significant adverse residual environmental effect from the Project would cause a decline such that a sustainable population cannot be maintained within the Assessment Area" (Volume IIB, p. 5-16). The theory or rationale for selecting "sustainable population" as a measure of significance is not defined nor provided explicitly in the EIS.

Requesting Organization – Joint Review Panel **Information Request No.: JRP.4**

Information Request:

The Proponent is asked to provide the following with respect to parameters used in assessing environmental impacts, residual effects, and determination of significance:

a. **The theory or rationale as to how threshold values for measuring Magnitude were selected for both the Aquatic and Terrestrial Environment VECs;**

Response:

The threshold values for Aquatic and Terrestrial VECs are based on habitat availability and suitability within the Assessment Area, which was estimated using habitat modelling and hence represents a measureable estimation of Magnitude.

The thresholds are:

- "High" (>25% of Assessment Area population or habitat will be exposed to the effect)
- "Moderate" (5 to 25% of Assessment Area population or habitat will be exposed to the effect), and
- "Low" (<5% of Assessment Area population or habitat will be exposed to the effect).

These threshold values are proposed as reasonable and conservative criteria to describe the loss of individuals or habitat of Key Indicators within the Assessment Area that would result in an effect. A similar approach has been used for other completed and accepted environmental assessments, including the following:

- Long Harbour Commercial Nickel Processing Plant Environmental Impact Statement (EIS) and Screening;
- Newfoundland and Labrador Refinery Project EIS and Comprehensive Study;
- Comprehensive Study Report: Southern Head Marine Terminal and Associated Works Related to the Crude Oil Refinery Development Proposal;
- Flemish Pass Exploration Drilling Program: Environmental Assessment;
- Laurentian Sub-basin Exploration Drilling Program Environmental Assessment;
- Husky White Rose Development Project New Drill Centre Construction and Operations Program Environmental Assessment;
- Environmental Assessment of Petro-Canada Jeanne d'Arc Basin Exploration Drilling Program, 2009-2017;
- Environmental Assessment of StatoilHydro Canada Ltd. Exploration and Appraisal/Delineation Drilling Program for Offshore Newfoundland, 2008-2016;
- Environmental Assessment of Exploration Drilling in Annieopsquotch, Bonnawinkie and Gambo Leases; and
- White Rose Oilfield Comprehensive Study and Comprehensive Study Report.

In all cases, the threshold levels were equivalent (e.g., High Magnitude defined as greater than 25%) or more conservative (e.g., Low Magnitude defined as 0 to 10% in other environmental assessments as compared to a Moderate Magnitude of less than 5% in this environmental assessment).

References:

ConocoPhillips Canada Resources Corporation. 2006. Laurentian Sub-basin Exploration Drilling Program Environmental Assessment. Prepared by LGL Limited.

EnCana Corporation. 2002. Environmental Assessment of Exploration Drilling in Annieopsquotch (EL 1052), Bonnawinkie (EL 1056) and Gambo (EL 1048) Leases. Prepared by Jacques Whitford Environment Limited, in association with Coastal Ocean Associates Inc. and S. L. Ross Environmental Research Limited.

Husky Energy Inc. 2006. Husky White Rose Development Project. New Drill Centre Construction and Operations Program Environmental Assessment. Prepared by LGL Limited.

Husky Oil Operations Limited (as Operator). 2001. White Rose Oilfield Comprehensive Study.

Husky Oil Operations Limited (as Operator). 2001. White Rose Oilfield Comprehensive Study Report.

Newfoundland and Labrador Refining Corporation. 2007. Newfoundland and Labrador Refinery Project EIS and Comprehensive Study.

Petro-Canada. 2002. Flemish Pass Exploration Drilling Program: Environmental Assessment. Prepared by Jacques Whitford Environment Limited.

Petro-Canada. 2008. Environmental Assessment of Petro-Canada Jeanne d'Arc Basin Exploration Drilling Program, 2009-2017. Prepared by LGL Limited.

StatoilHydro Canada Ltd. 2008. Environmental Assessment of StatoilHydro Canada Ltd. Exploration and Appraisal/Delineation Drilling Program for Offshore Newfoundland, 2008-2016. Prepared by LGL Limited, in association with Canning & Pitt Associates Inc., and Oceans Limited.

Transport Canada and Fisheries and Oceans Canada. 2007. Comprehensive Study Report: Southern Head Marine Terminal and Associated Works Related to the Crude Oil Refinery Development Proposal. Prepared by SNC-Lavalin Inc.

Vale Inco Newfoundland and Labrador Limited. 2008. Long Harbour Commercial Nickel Processing Plant EIS.

Requesting Organization – Joint Review Panel **Information Request No.: JRP.4**

Information Request:

b. The theory or rationale for not considering ecologically fragile areas with known little resilience to imposed stresses;

Response:

As presented in Table 1 below, the EIS considers ecologically fragile areas with known little resilience to imposed stresses. Nilsson and Grelsson (1995) define fragility as an inherent property of an ecosystem, whether it is exposed to any disturbance or not. Within the context of an environmental assessment, fragility and resilience (the ability to recover from change) of an ecosystem relate to, among other things, the degree of change in species abundance and composition following disturbance over a period of time.

In the EIS, areas or ecotypes within the lower Churchill River ecosystem were delineated using an Ecological Land Classification (Minaskuat Inc. 2008a, 2008b). Vegetative cover defined each ecotype, and reflected a variety of local site conditions including frequency of disturbance. For example, riparian habitats such as *Riparian Meadow* and *Riparian Thicket* (Volume IIA-Section 2.4.2.1) occur in association with waterbodies where they are frequently flooded or scoured by ice. Such sites would have low fragility because of the dynamic nature of natural stresses and would be described as having high resilience. Conversely, another ecotype, *Dry Black Spruce and Lichen Habitat* (Volume IIA-Section 2.4.2.3) comprises species that require a long period of time to establish and, if disturbed, would not be as resilient to change and considered ecologically fragile.

Each ecotype was subsequently evaluated in terms of its ability to provide habitat for each of the Key Indicators in the Assessment Area. Ecological fragility is inherent in each ecotype; however, the temporal scale, spatial scale, level of taxonomic resolution, and numerical resolution are all important considerations (Nilsson and Grelsson 1995). The selection of some Key Indicators for the environmental assessment was based on their association periodically, seasonally or annually with ecotypes that represented the various extremes of ecologically fragile habitats (e.g., Wetland Sparrows as in the case of riparian habitats, Marten in the case of black spruce forest) (Table 1).

Table 1: Ecological Fragility and Resilience of Ecotypes within the Lower Churchill River Watershed

Ecotype	Ecological Fragility And Resilience To Imposed Stresses	Closely Associated Key Indicators
Riparian	Subjected to frequent disturbance through flooding, ice scouring, or current - low fragility and high resilience	Wetland Sparrows, Olive-sided Flycatcher, Rusty Blackbird
Wetlands	Slow changing ecotype - high fragility and low resilience	Red Wine Caribou (calving), Moose, Canada Goose (string bogs for breeding), Surf Scoter (shallow rocky wetlands are important for breeding), Wetland Sparrows (marsh habitat for breeding), Rusty Blackbird
Dry Black Spruce/Lichen	Slow changing ecotype, natural fire based cycle - high fragility and low resilience	Caribou, Black Bear, Common Nighthawk
Wet Black Spruce/Moss	Transitional habitat between coniferous forests and bogs or fens - high fragility and low resilience	Black Bear, Marten, Porcupine
White Spruce/Mixed Wood	Slow changing system, with annual flooding - high fragility and low resilience	Moose, Black Bear, Marten, Porcupine, Osprey (tall dominant trees are important, as are other factors), Gray-cheeked Thrush
Fir-Spruce	Moderate fragility and resilience	Moose, Black Bear, Marten, Porcupine, Gray-cheeked Thrush
Balsam Fir/Mixedwood and Black Spruce/Mixedwood	Low fragility and high resilience	Moose, Marten, Gray-cheeked Thrush
Hardwood	Represents richer sites with primary succession vegetation - low fragility and high resilience	Beaver (aspen is important, as are other factors), Ruffed Grouse
Other (Open Water, Anthropogenic/Disturbed, Gravel Bar, Unvegetated, River)	Frequent disturbance - low fragility and high resilience	Waterfowl (staging , breeding), Osprey (foraging)

Notes – The time frame considered for fragility and resilience is within a 30-year period

References:

Minaskuat Inc. 2008a. Project Area Ecological Land Classification. Prepared for the Lower Churchill Hydroelectric Generation Project.

Minaskuat Inc. 2008b. Regional Ecological Land Classification. Prepared for the Lower Churchill Hydroelectric Generation Project.

Nilsson, C. and G. Grelsson. 1995. The fragility of ecosystems: a review. Journal of Applied Ecology Vol. 32: 677-692.

Requesting Organization – Joint Review Panel **Information Request No.: JRP.4**

Information Request:

c. The theory and rationale for defining low and high levels of knowledge certainty, and how this relates to the use of the Precautionary Principle within the assessment; and

---

Response:

Levels of certainty for Aquatic and Terrestrial Environment were evaluated using four factors. These factors were evaluated for all Key Indicators. The factors used in developing the levels of certainty of environmental effects predictions were:

- fully documenting baseline conditions using accepted protocols, as outlined in Component Studies;
- well-defined Project description and associated activities;
- published information on similar projects and interactions with Key Indicators elsewhere; and
- demonstrated effectiveness of mitigation measure for similar activities.

A High Level of Certainty is one where sufficient information was available for all of the above factors. A Low Level of Certainty is one where sufficient information was not available regarding one or more of the above sources of information.

Regardless of the level of certainty, effects management measures (mitigation), and follow-up are consistent with the *Precautionary Principle* (Volume IA–Section9.12.1) (i.e., a lack of certainty about the probability of environmental effects occurring was not used as a reason for postponing effects management measures). In addition, follow-up programs have been proposed to verify the accuracy of effects predictions, and the effectiveness of mitigation.

Requesting Organization – Joint Review Panel **Information Request No.: JRP.4**

Information Request:

d. The theory or rationale for selecting "sustainable population" as a measure of significance for terrestrial Key Indicator species other than Caribou and how the Proponent defines it.

Response:

The rationale for using sustainable population as a measure of significance is that it provides a measure of biodiversity and ecosystem function. As described in Volume IIA – Section 7.4.2.2, "*…perhaps the issues of greatest importance for Innu and other persons who are concerned about the natural resources of the lower Churchill River watershed are whether these species will persist and whether such areas of abundance will continue*." Thus, the maintenance of regional biodiversity was an important criterion of the environmental assessment.

A sustainable population is defined as one where a population can continue to reproduce and persist in the Assessment Area. The effect of the Project is determined to be not significant if the population in question remains sustainable.

Information Request Number: JRP.5

Need, Purpose and Rationale

Requesting Organization – Joint Review Panel **Information Request No.: JRP.5**

Subject - Need, Purpose and Rationale

References:

EIS Guidelines, Section 4.3.1 (Need, Purpose and Rationale of the Project)

Rationale:

The EIS Guidelines require the Proponent to present the Project's justification in both energy and economic terms, including an evaluation of

- "(e) Export market opportunities, forecasts and expected evolution"
- "(g) Risks to the Project, in-stream flow variability, market prices and schedule delays, interest rates and other risk factors relevant to the decision to proceed with the Project"
- "(h) Projected financial benefits of the Project (including their distribution) as measured by standard financial indicators" (p. 15)."

General Response – Need, Purpose and Rationale

The following is a general statement regarding the Need, Purpose, and Rationale for the Project in addition to the specific answers in the individual Information Requests.

A full federal government Environmental Assessment & Review Process (EARP) Panel Review was completed in 1980 to assess the environmental and socio-economic effects of the Lower Churchill Hydroelectric Project. This involved the collection and analysis of environmental baseline data, the preparation of an Environmental Impact Statement (EIS) and the holding of public hearings. The Panel found that the proposed project was acceptable, provided environmental and socio-economic conditions were met. Specific to the Need and Rationale for the project, the Panel Report stated:

> *The Panel concludes that evidence of project need has been adequately demonstrated and the project would contribute to the national policy objective of energy self-reliance, through development of an indigenous, renewable energy resource.*[1]

Since that time, some significant trends and events further support and justify this Project since the release of the 1980 EARP report:

- The price of fossil fuel has escalated dramatically, and new Canadian developments have moved beyond "conventional" resources, as demonstrated by the recent development of a Liquefied Natural Gas (LNG) terminal in Atlantic Canada and the large-scale development of the Alberta Tar Sands.
- Understanding and awareness of the negative consequences of global warming and the need to reduce GHG emissions have increased dramatically.
- Recent economic developments, including the downturn in segments of the Canadian economy, have increased the importance of large-scale investments as an economic stimulus tool.

[1] Lower Churchill Project - Report of the Environmental Assessment Panel (Executive Summary), December 1980.

Most fundamentally, however, development of the Lower Churchill resource is consistent with the energy and resource economic development policies of The Province of Newfoundland and Labrador.

As noted in section 2.4.2 of the EIS, development of renewable resources, most notably the lower Churchill hydroelectric resource, is a major component of the Newfoundland and Labrador Energy Plan[2].

Development of the Lower Churchill Project clearly falls within the mandate of the Proponent, as indicated in the *Energy Corporation Act*[3], as indicated below:

> **5.** (1) The objects of the corporation are to invest in, engage in, and carry out activities in all areas of the energy sector in the province and elsewhere, including,
>
> (a) the development, generation, production, transmission, distribution, delivery, supply, sale, export, purchase and use of power from wind, water, steam, gas, coal, oil, hydrogen or other products used or useful in the production of power;
>
> (b) the exploration for, development, production, refining, marketing and transportation of hydrocarbons and products from hydrocarbons;
>
> (c) the manufacture, production, distribution and sale of energy related products and services; and
>
> (d) research and development.

The Proponent is undertaking this Project as an investment for its shareholder, the Province of Newfoundland and Labrador. Any decision by the Proponent to continue with the Project will be based on a conclusion that the Project can earn the financial returns necessary to provide the necessary certainty to lenders and the desired return to the Proponent and its shareholder.

[2] http://www.nr.gov.nl.ca/energyplan/EnergyReport.pdf
[3] http://assembly.nl.ca/Legislation/sr/statutes/e11-01.htm

Requesting Organization – Joint Review Panel **Information Request No.: JRP.5**

Subject - Need, Purpose and Rationale

a. In order for the Panel to assess the Project's justification in economic terms, the Proponent is asked to provide more details on its financial analysis of the Project, including assumptions used regarding:

i. Capital cost;

ii. Availability and cost of capital; and

iii. Cost estimates of energy delivered to the various identified markets in the EIS.

Response:

(i) Capital Cost:

The preparation of the capital cost estimate for the Lower Churchill Project followed a standard industry methodology, incorporating best practices as recommended by the Association for the Advancement of Cost Engineering International. The cost estimate incorporates the results of applicable engineering/technical and site investigation studies completed during Phase 2 of the Proponent's Gateway Process[4]. These studies resulted in a basis of design which provides the technical basis of the facilities configuration and material quantities and characteristics required to construct the hydro plants and associated transmission lines.

Industry practice for capital cost estimates may be grouped under the following four categories:

- Project Definition (or Scope) – including the location, plant definition/configuration, major equipment listing, design constraints, materials specifications and quantities.
- Construction Methodology – including the execution and contracting strategy, build or construction sequence of events, constraints, construction techniques and equipment, labor demands, trade mix, in-directs, support facilities and seasonality of the construction works.
- Price – including labor rates, equipment rates, commodity rates, bulk and permanent material cost, overhead, profit, and other pertinent price factors.
- Performance – including assumptions and expectations for labor productivity, mobilization constraints, seasonality impacts and Project management resources.

[4] See Volume 1A, Section 3.3 of the EIS for an overview of Nalcor Energy's Gateway Process.

The cost estimate methodology is illustrated in Figure 1 below:

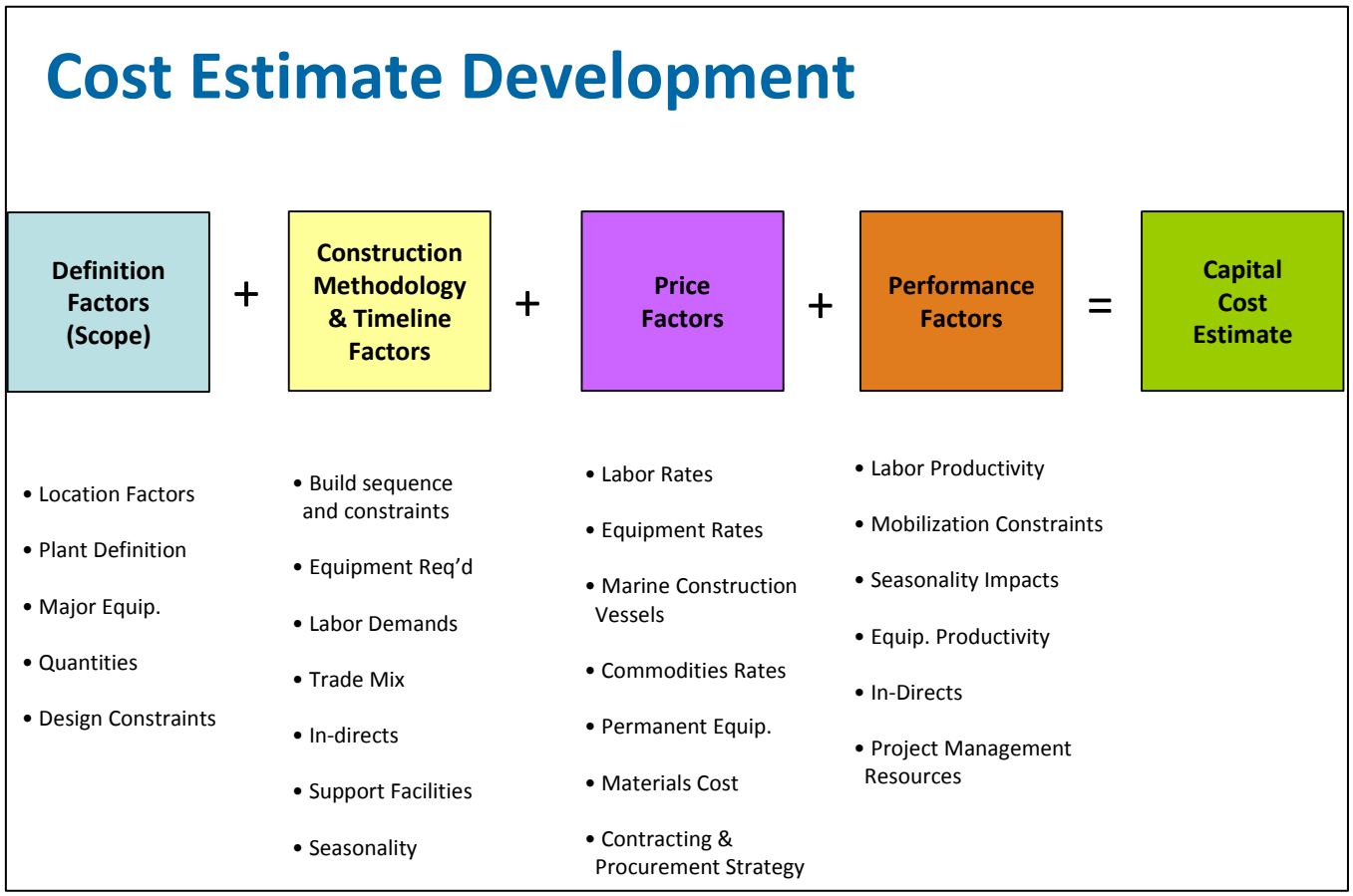


Figure 1

In preparing this cost estimate, all of the various components of costs have been considered (e.g. unit of measure, quantities of units, and cost per unit) to ensure that the estimate was prepared at a level of detail commensurate with the level of engineering completed. To this end, a "bottom-up" strategy was used in developing the estimate in order to reflect all relevant available information considered under the aforementioned four (4) categories.

The cost estimate has been developed using the most current information available, including for example current market rates for labour, bulk materials and equipment in Eastern Canada, budgetary pricing for major equipment items from vendors, and forward-looking market escalation forecasts available from IHS Global Insight (an internationally recognized economic consulting firm) . The latest state-of the-art technologies and market intelligence have been sought out to ensure that the estimate contained the most up to date information. To that end, a number of external parties have been engaged to provide expert engineering studies, scope definition, estimating and construction experience, and market data for inclusion in the estimate.

(ii) Availability and Cost of Capital:

It is expected that between sixty and eighty percent of required capital for the Project will be debt. As discussed in section 5(d) (iii) below, credit markets have been constrained since the third quarter of 2008 due to a global recession. However, the markets are expected to have recovered by the time debt financing will be required for the Project. According to a recent report by RBC, normal lending conditions may materialize as soon as the

second half of 2009.[5] As economic recovery takes place and confidence in the credit market is restored, the unprecedented credit risk premiums that have been observed since the onset of the recession will begin to disappear.[6] The cost of debt has therefore been assumed to be in the range of 7.0% to 7.5%.

The balance of capital required for the Project is assumed to be provided via an appropriate combination of internal equity provided by cash flow from the Proponent's operations and an equity contribution by the Proponent's shareholder, the Government of Newfoundland and Labrador.

(iii) Cost estimates of energy delivered to the various identified markets in the EIS:

Cost estimates for delivered energy are based on either capital cost estimates for facilities to be constructed by the Proponent, or cost estimates provided by transmission providers pursuant to the processes outlined in their respective open access transmission tariffs.

5 RBC Asset Management, p. 21.
6 Ibid., p. 25.

Requesting Organization – Joint Review Panel **Information Request No.: JRP.5**

Subject - Need, Purpose and Rationale

b. The Proponent is asked to provide details on the anticipated financial benefits from the Project (as measured by standard financial indicators), and including how these benefits would be distributed. The Proponent's response should include a sensitivity analysis as to how variations in the assumptions used may affect predicted outputs.

Response:

The anticipated financial benefits from the Project are significant in magnitude and particularly in context of the size of the economy, particularly in Labrador. The financial benefits have been outlined in Chapter 3.5 of the EIS and updated as per IR # JRP.11. The highlights are as follows:

- 22,310 person years of employment in Newfoundland and Labrador during the construction phases of Gull Island and Muskrat Falls. Of this amount, 12,844 person-years of employment will be concentrated in Labrador, a significant economic boost for a region with a population of 26,364 (2006 census);
- Overall Project construction is now expected to enhance provincial income by approximately $2 billion dollars, as updated and reflected in IR # JRP.11. This reflects all incomes earned (direct, indirect and induced) by workers and businesses living or operating anywhere in the Province. In excess of $1.3 billion of this amount is expected to be generated in Labrador.
- Over the life of the construction phase, the Government of Newfoundland and Labrador can expect to receive in excess of $300 million in revenue (from taxation and imputed benefits).

A determination of anticipated financial returns from the Project will be made when the Proponent and its Shareholder make a decision to pass Gate 3.

The distribution of the benefits from the Project is at the discretion of the Proponent's Shareholder.

Requesting Organization – Joint Review Panel **Information Request No.: JRP.5**

Subject - Need, Purpose and Rationale

c. In order for the Panel to assess the Project's justification in terms of market opportunities for the energy produced, the Proponent is asked to provide more details on constraints that may prevent access to each of the markets mentioned in the EIS, and also including the following:

i. The competitive advantage that the Project may have in each market;

ii. How and at what cost energy may be delivered to each market, and;

iii. The degree to which the Proponent considers that it will be successful in delivering energy to each market.

Response

(i) The competitive advantage that the Project may have in each market:

As outlined in Section 2.4.1 of the EIS, the four drivers behind the demand for renewable generation projects in North America are:

- the increasing demand for electricity in general,
- the need to upgrade or replace aging infrastructure,
- rising fuel costs, and
- the need to curb greenhouse gas emissions.

The Project's unique combination of characteristics gives it a competitive advantage in meeting these market drivers in the Northeast electricity markets.

This combination of characteristics is summarized as follows:

- no reliance on a fossil fuel supply
- known, reliable technology
- predictable operating costs
- long service life
- low GHG emissions
- firmness, or dispatch capability (the ability to deliver power on demand)
- load following capability, or the ability to ramp up and down production in response to demand
- large scale, with access to multiple markets
- Diversification within a generation portfolio
  - Diversified inflow sequence compared to other hydroelectric supplies
  - Diversity with respect to energy source (coal, natural gas, oil, wind)

Electricity markets in the Northeast region of North America are facing various challenges as outlined in sections 2.4.4.5 – 2.4.4.11 of the EIS.

While the Proponent considers the Lower Churchill Project to be competitive with other similar hydroelectric generation projects, the ultimate delivered market price is contingent on a number of factors, including:

- the cost of any system upgrades required pursuant to open access tariffs applicable,
- the final cost of any new transmission systems that may be built to access markets,
- the outcome of negotiations with power purchasers, and the price purchasers are ultimately prepared to pay
- the effect that carbon regulation may have on other competing technologies, and
- the outcome of negotiations with lenders.

(ii) How and at what cost energy may be delivered to each market:

The Proponent has three approaches to access export electricity markets:

- transmission services offered by transmission providers via the interconnection with Churchill Falls, in accordance with open access transmission tariffs (OATTs), including the services of Hydro-Québec TransÉnergie, as well as the development of upgraded interconnection capacity into the Québec system.
- development of a HVdc transmission link from Labrador to the Island of Newfoundland (the Labrador – Island Transmission Link)
- an extension of the Labrador – Island Transmission Link to the Maritime Provinces

In addition, local Labrador markets can be served with transmission facilities through the Labrador grid.

The delivered cost of energy, the commercial terms available in a given market, and any associated market risks will form the basis of the Proponent's Gate 3 decision and will be finalized at that time.

(iii) The degree to which the Proponent considers that it will be successful in delivering energy to each market:

The Proponent is sufficiently confident in the ultimate success of its development activities for the Project that the Proponent and its Shareholder have continued to fund the planning activities for the Project.

It is noteworthy that Nalcor Energy has entered into a Transmission Services Agreement with Hydro-Québec TransÉnergie to deliver up to 250 MW from Labrador into the state of New York.

Requesting Organization – Joint Review Panel **Information Request No.: JRP.5**

Subject - Need, Purpose and Rationale

d. In order for the Panel to assess other risk factors relevant to the decision to proceed with the Project, the Proponent is asked to address in greater detail potential uncertainties related to the following:

i. Timing and completion of other transmission line project(s) not included in the scope of this current Project but needed to deliver energy to each of the markets mentioned in the EIS;

ii. Current worldwide economic climate; and

iii. The "portfolio" approach for energy sales referred to in the EIS.

Response:

(i) Timing and completion of other transmission line project(s) not included in the scope of this current Project but needed to deliver energy to each of the markets mentioned in the EIS:

The requirement for any transmission line construction will be determined prior to the Proponent's Gate 3 decision, so the Proponent does not consider this to be a potential uncertainty.

The timing and completion of the Project will be aligned with the availability of market access and markets for power as decisions regarding market access and destination markets are made.

(ii) Current worldwide economic climate:

According to the International Monetary Fund's most recent World Economic Outlook, the current global recession will continue through 2009, followed by a gradual recovery in 2010[7]. An economic downturn can be expected to impact any major capital project, and the Lower Churchill Hydroelectric Project is no exception. In particular, the ability to access financial capital and the impact of the economic downturn on electricity pricing and demand are relevant to the Project.

Private sector access to credit in developed economies is expected to decrease in both 2009 and 2010 according to the International Monetary Fund (IMF). Globally, banks continue to tighten access to credit as they deal with the aftermath of asset write-downs and institutional failures. Total expected write-downs during the period of 2007-2010 are estimated to exceed $4 trillion, two-thirds of which will fall on banks[8]. For Nalcor, the timing of the recovery from the credit crisis may be favorable: Access to credit is not required for the Project until well after the world economy is projected to recover from the current recession, at which time it is anticipated that credit markets will be once again open to high-quality, low-risk deals. Indeed, according to RBC, the credit channel has started to become functional once again, and lending has restarted.[9] The long-term nature of the planning for the Project allows Nalcor to adapt to current market conditions and ensure that appropriate actions are taken to minimize the degree of finance risk to which the Project will be exposed. This will be achieved through adjusting the timing of financial market access as required, and ensuring that the appropriate commercial, technical and regulatory constructs are in place prior to accessing capital markets.

[7] International Monetary Fund, p. 15.
[8] Ibid. p. xv.
[9] RBC Asset Management, p.1 .

The current recession has also had a negative impact on both commodity prices and industrial activity. In 2008 the IMF commodity price index peaked in July, then, fell by almost 55 percent by December. Commodity markets are in a cyclical downturn that is expected to continue in tandem with that of the overall economy. Commodity prices are projected to increase marginally in 2010 compared to current 2009 levels, consistent with current forward pricing. While lower commodity prices (i.e. oil, natural gas, coal) may depress electricity rates in the short term, there may also be some cost savings on materials during the construction phase due to lower market prices on non-energy commodities such as steel.

Despite a substantial industrial slowdown in the U.S., electricity consumption is only expected to decrease by 0.8 percent in 2009, and electricity prices are projected to increase by 4.4 percent due to the cost of new generation and transmission infrastructure.[10] The recognized need to replace aging electricity infrastructure and continue new developments to meet future need appears to have sheltered the North American electricity industry from the worst of the recession. In a recent publication, the Canadian Electricity Association emphasized the need for new infrastructure development in the electricity industry.[11]

The International Monetary Fund (IMF) also advocates infrastructure spending by governments over a number of years. Such sustained expenditures will provide immediate economic stimulus as well as longer term benefits to the country's productive capacity, which is expected to have positive spill-over effect on the global economy.[12]

As with the matter of transmission access, the Project will not pass Gate 3 unless suitable financing sources are available.

(iii) <u>The "portfolio" approach for energy sales referred to in the EIS:</u>

The concept of balancing sales from the Project among long, medium, and short-term contracts and also incorporating regional market diversity with multiple customers is the essence of the "portfolio" approach to energy sales as referenced in 2.4.4.4 of the EIS.

The development of a portfolio of sales optimizes the balance of risk and return for the Project. In the extreme, if all sales were made on a spot market, the Proponent would be exposed to high levels of price volatility. Alternatively, selling energy under exclusively long-term power purchase agreements would minimize revenue uncertainty, but would also limit potential upside gains.

The balanced portfolio approach provides an appropriate mix of revenue certainty and upside opportunity for the Proponent and its shareholder.

The Project would not proceed unless the capacity and energy produced had appropriate sales arrangements in place that satisfy the requirements for financing and meet the investment criteria of the Proponent and its shareholder.

Thus, the potential uncertainties related to the portfolio approach to energy sales are not expected to be an impediment to the Project. To the contrary, the Proponent views the portfolio approach as a fundamental component of its marketing strategy for the Project.

[10] Energy Information Administration, p. 6
[11] Canadian Electricity Association, p. 3.
[12] International Monetary Fund, p. 43.

References:

Canadian Electricity Association, "Enhancing Our Integrated Electricity System: An Opportunity to Build on Success", 2009, retrieved from: www.canelect.ca

Energy Information Administration, "Short-Term Energy Outlook", May 12, 2009, retrieved from: www.eia.doe.com

International Monetary Fund, "World Economic Outlook: Crisis and Recovery", April, 2009, retrieved from: www.imf.com

RBC Asset Management, "The Global Investment Outlook – Summer 2009", June 1, 2009

Information Request Number: JRP.6

Reservoir Preparation

Requesting Organization – Joint Review Panel **Information Request No.: JRP.6**

Subject - Reservoir Preparation

References:

EIS Guidelines, Section 4.3.2.2 (Alternative Means); Section 4.4.4.4 (Description of the Existing Environment – Land and Resource Use); Section 4.4.4.7 (Description of the Existing Environment – Economy, Employment and Business); Section 4.5.1 (Environmental Effects – General) & Section 4.6.1 (Mitigation) EIS, Volume IA, Section 3.7.10 (Alternative Methods of Carrying out the Project – Reservoir Preparation).

Rationale:

Alternative Means

The EIS Guidelines state that "The EIS shall analyze and compare the design alternatives for the Project in relation to their environmental and social costs and benefits, including those alternatives which cost more to build and/or operate but which result in reduced adverse environmental effects or more durable social and economic benefits" (p. 16-17). The EIS Guidelines further state that "A selection of reservoir preparation strategies is necessary to address (…) concerns, including economic, technical and environmental considerations which are to be evaluated in order to select and justify the proposed mitigation measures." (p. 17). The preferred alternative for reservoir preparation, partial clearing, is not adequately justified in the EIS.

The EIS mentions that "both partial and full clearing meet the operational requirements of the Project and are technically feasible." (Volume IA, p. 3-47). It also states that "The partial clearing strategy affords the best opportunity to maximize fibre removal, reduce debris and slash for operation and reduce the emissions of GHG. (…) There is only one economically and technically feasible alternative for reservoir clearing, therefore, no comparison of environmental effects was conducted."(Volume IA, p. 3-47) (emphasis added). The full clearing option appears to be ruled out on economic, not technical, grounds but there is no cost analysis in the EIS justifying it.

Land & Resource Use / Economy, Employment & Business

The EIS Guidelines require the EIS to consider "present and potential timber resource logging and utilization" (p. 28) as well as relevant economy, employment and business elements of "forest resources harvesting" (p. 13). Timber resource opportunities from both partial and full reservoir clearing need to be investigated and included in the EIS, including potential markets for the wood and possible local employment and business benefits.

Environmental Effects

The EIS Guidelines require the EIS to consider "the capacity of renewable resources that are likely to be significantly affected by the Project to meet the needs of present and future generations" (p. 33). The EIS is required to address this, including for the short term, an estimate of merchantable volume not salvaged with the partial clearing option, and for the long term, an estimate of Allowable Annual Cut (AAC) that will be lost due to flooding of the Churchill Rivervalley. A similar calculation is needed with respect to any loss in AAC along the transmission line right-of -ways.

Mitigation Measures

The EIS Guidelines require the EIS to consider "proposed mitigation measures that are technically and economically feasible and that would mitigate the significant adverse effects of the Project and enhance beneficial effects" (p. 36). The EIS Guidelines also require that "Tradeoffs between costs and predicted effectiveness of the mitigation measures shall be justified." (p.38).

Requesting Organization – Joint Review Panel **Information Request No.: JRP.6**

Information Request:

a. In order for the Panel to clarify the preferred option of partial clearing of the reservoir, the Proponent is asked to provide the following:

i. An estimate of the total forested area in the reservoir flood zone and the total merchantable and non-merchantable timber volume;
ii. An estimate or quantification of areas where clearing may not be achieved because of safety and technical considerations;
iii. The location of collection points for the salvaged wood and how the wood is to be transported to the collection points;
iv. What is meant by "all brush and debris will be mechanically processed" (Volume IA, p.
v. 4-51);
vi. An estimate of allowable annual cut (AAC) that will be lost and a similar calculation with respect to any loss in AAC along the transmission line right-of -ways.

Response:

i. The total forested area in the reservoir flood zone is 12,320 ha. The total merchantable timber volume is 2,175,000 m^3. The total non-merchantable timber volume is 2,445,000 m^3.

ii. The primary consideration for safety is the safe operation of forestry clearing equipment. Two factors were considered in determining safety, slope and terrain stability. Based on engineering review of current equipment capabilities and the type of clearing required it was determined that slopes greater than 60% will not be cleared. Terrain stability was based on Terrain Stability Classifications which were developed in accordance with guidelines provided by the Government of British Columbia (Table 1).

Table 1 Terrain Stability Classification (AMEC, 2008)

Terrain Stability Class	Sample Criteria
S1	• floodplains and level to undulating coastal plain areas; and • most terrain with slopes <20%
S2	• most gently sloping (20-40%), poor to well-drained lower slope landforms; and • moderately sloping (40-60%), well-to rapidly drained surficial deposits
S3	• moderately sloping (40-60%), imperfectly to poorly drained surficial deposits that are not glaciomarine or glaciolacustrine; • level to gently sloping (0-40%), imperfectly to poorly drained surficial deposits; and • moderately sloping, deeply gullied surficial deposits that are not glaciomarine or glaciolacustrine
S4	• steeply sloping (>60%), well drained, deeply gullied surfical deposits; • steeply sloping, poorly drained surfical deposits; and • moderately sloping, deeply gullied or imperfectly to poorly drained glaciomarine or glaciolacustrine deposits
S5	• any areas where natural landslides scars are visible on air-photographs or in the field; and, • very steeply sloping (>70%), imperfectly to poorly drained deeply gullied surficial deposits

Slopes with a Terrain Stability Class of S4 or S5 will not be cleared. The area that would not be cleared due to these considerations is quantified in Table 2 below:

Table 2 Estimate of Areas Where Clearing may not be Achieved Because of Safety Considerations

Constraint	Gull Island (ha)	Muskrat Falls (ha)
Slope (> 60%)	500	75
Terrain Stability Class (S4 and S5)	500	825
Total	1000	900

The primary consideration for technical feasibility is accessibility, whether by barge or road. An accessibility review is currently being conducted and will be provided once it is complete (estimated date of completion is September 2009).

iii. Small collection points will be located above the shoreline of the new reservoir and will be located approximately every 1 km. Wood will be transported to the collection points using skidders.

iv. Brush and Debris consists of tree limbs and tree tops with a stem diameter less than 9.1 cm produced during the clearing operation, as well as deadfalls lying on the ground in the clearing area. Several options for "mechanically processing" debris are being considered and include the following:
- Delimbing and topping using track or tire mounted harvester.
- Delimbing and topping using track or tire mounted delimber/slasher.
- Collecting and burying tops, limbs and debris using a hydraulic excavator to reduce floating debris.
- Collecting and capping tops, limbs and debris using hydraulic excavator.
- Collecting and moving tops, limbs and debris above the flood line using excavators and /or forwarders.
- Converting tops, limbs and debris to wood chips using mechanical processor. The chips would be buried within the flood zone to prevent flotation, or spread on the ground above the flood zone.
- Collecting, compacting and wrapping brush and debris using a specialized wheel mounted machine. The bundles would be transported and piled above the flood line where they would be made available for removal by a third party or would naturally decay over time.

v. The majority of the Project is located within Forest Management District 19 (a small potion is located within District 22). Forest Management Area District 19 is divided into three sub-areas. A Forest Management Plan and associated allowable annual cut has only been established for District 19A due to lack of access and lack of inventory in Districts 19B and 19C. District 19 is 7,100,000 hectares in size. The AAC for Forest Management District 19A is 200,000 m^3.

The areas currently designated for forest harvesting are located to the east of the proposed Project footprint and would not be lost due to the Project. Therefore the Project will not result in loss of any current AAC. The current Management Plan also includes a provision that, should the Project proceed, forestry activities and associated allotment of AAC will be directed towards reservoir clearing activities. In terms of future loss of AAC, the total area that would be lost to flooding and the transmission line clearing is approximately 34,000 hectares or 0.5% of the total area in District 19. Therefore the effect of flooding and Transmission line clearing on future AAC is not significant.

References:

Timber Resources, Sikumuit, January 2009

Bank Stability, AMEC, 2008

Requesting Organization – Joint Review Panel **Information Request No.: JRP.6**

Information Request:

b. In order for the Panel to assess partial versus full clearing of the reservoir, the Proponent is asked to provide a cost-benefit analysis of the two options. For each option, the analysis should address and provide details on the following:

i. Estimated volume of commercial timber salvaged;

ii. Estimated harvesting costs;

iii. Value of timber salvaged and possible markets; and

iv. Employment and other local business benefits.

Response:

Full clearing is not technically feasible due to safety considerations as outlined in JRP 6(a)(ii). Based on the value of the timber and the cost of clearing, as shown in Table 3, neither clearing option is economically feasible. Partial clearing is the least cost option that meets operational, environmental, and safety requirements.

A comparison of both options is provided in Table 3 below.

Table 3 Comparison of Reservoir Clearing Parameters for Full and Partial Clearing

Parameter	Full Clearing	Partial Clearing
Estimated volume of commercial timber salvaged	1,600,000 m^3	1,000,000 m^3
Estimated harvesting costs	$215,000,000	$165,000,000
Value of timber salvaged and possible markets	$33,000,000 (Pulpwood)	$22,000,000 (Pulpwood)
Employment and other local business benefits (clearing only)[1]	Direct Employment – 230,000 person days Indirect Employment – 150,000 person days Material and Supplies – $86,000,000	Direct Employment – 190,000 person days Indirect Employment – 125,000 person days Material and Supplies – $64,000,000

Note:

[1] Based on the current District 19A Forest Management Plan, forestry activities in the region will be re-directed to the reservoir area in the event that the project proceeds. Consequently these employment and business benefits represent the displacement of other activities and not new business.

Requesting Organization – Joint Review Panel **Information Request No.: JRP.6**

Information Request:

c. In order for the Panel to assess the options of partial versus full clearing of the reservoir in relation to their environmental costs, the Proponent is asked to discuss the environmental effects of both options.

Response:

As stated in the response to JRP 6(a)(ii) full clearing is not technically feasible and is counter to environmental considerations identified in the assessment (Volume IIB, Table 5-10). However a discussion of the environmental effects of both options for the construction and operations phase of the Project is provided below.

Table 4 has been completed with respect to the construction phase of the Project, under the following assumptions:

- Full clearing would result in the removal of riparian zone forest cover. Both harvesting scenarios would involve the development and establishment of hardwood and riparian marsh habitat above the future shoreline. Artificial nest platforms for Osprey and the transplanting of Canada Yew would also occur at suitable locations above the new shoreline;
- Both harvesting scenarios would be scheduled to avoid where possible conflicts with sensitive wildlife (e.g., presence of caribou, moose wintering areas, known den sites of black bear, nesting periods for migratory avifauna) in conjunction with an environmental management plan to address incidental take;
- Trees and associated slash at the shoreline will be removed in both scenarios to provide unimpeded access for wildlife; and
- The timeline for reservoir clearing will be up to four years prior to reservoir formation.

The potential aquatic effects outlined below would be more prevalent on smaller streams as the overall lower volume of flow would be less capable to buffer loss of riparian habitat.

Table 4 Comparison of Environmental Costs in Relation to Full and Partial Clearing (Construction Phase)

Parameter	Full Clearing	Partial Clearing
Atmospheric	• Additional fuel consumption proportional to the amount of increased activity; • Increased potential for generation of airborne dust; and • Increase in greenhouse gas emissions during Construction compared with partial clearing.	• Reduced fuel consumption compared with full clearing; • Reduced potential for generation of airborne dust; and • Less greenhouse gas emissions.
Terrestrial	Loss of riparian vegetation resulting in: • Change in water quality and quantity (see Aquatic section below) that affects foraging by various species in food chain; • Loss of breeding habitat or movement corridors for associated wildlife; • Increased disturbance for species using wetlands and waterbodies such as moose, beaver, waterfowl, and wetland sparrows; • Loss of Osprey nest sites; and • Loss of hardwood and riparian marsh habitat in areas of limited availability prior to the development of alternative habitat.	Riparian vegetation maintained: • Reduced effects on water quality and quantity and subsequent effects on foraging habitat; • Provides cover for forest avifauna, small mammals, herpetiles and other edge associated species for breeding or as travel corridors; • Reduced disturbance for nesting species in wetlands such as waterfowl, wetland sparrows; • Maintenance of 200m exclusion around active Osprey nesting period; and • Opportunity for alternative habitat initiatives to develop while limited sensitive habitat maintained.
Aquatic	No buffer zones: • Loss of riparian vegetation; • Reduction in Thermal regulation; • Increased potential for erosion/sedimentation; • Reduction in channel stability; • Reduction in flow regulation (greater “peaks and valleys” in flow events); • Increase potential for debris blockages; and • Reduced suitability for fish life-cycle processes for up to 4 years prior to reservoir formation.	Buffer zones maintained: • Riparian vegetation maintained; • Thermal regulation maintained; • Natural erosion/sedimentation processes maintained; • Natural channel stability maintained; • Disruption to flow regulation minimized; • Natural woody debris input maintained; and • Suitability for fish life-cycle processes maintained.

Table 4 Comparison of Environmental Costs in Relation to Full and Partial Clearing (Construction Phase) cont.

Parameter	Full Clearing	Partial Clearing
Economy, Employment and Business	• Up to 20% increase in employment as compared to the partial clearing option; • 1,580 person years or ~160 average person years annually; and • Business impacts very similar under full and partial options as no capacity in Labrador for harvesting equipment.	• Significant economic positive impacts on employment and business; • 1,300 total person-years or ~ 130 average person years annually; and • Business impacts very similar under full and partial options as no capacity in Labrador for harvesting equipment.
Communities		
Physical infrastructure and Services	• Up to a 20% increase in reservoir clearing-related traffic on the road between the site and Happy Valley-Goose Bay, and at the port, due to increased labour force and equipment movements, as compared to partial clearing; • Up to 20% increase in reservoir clearing-related passenger traffic at the airport for the years that the reservoirs are being cleared, as compared to partial clearing; and • Given the effects management measures that will be in place, environmental effects will be similar for Water/Sewer, Power, Communications, Waste, or Real Estate, as compared to partial clearing.	• Overall increase in traffic on the road between the site and Happy Valley-Goose Bay, and at the port, due to labour and equipment requirements will be less than for the full clearing option; • Overall increase in passenger traffic at the airport during the Construction phase will be less than for the full clearing option; and • Given the effects management measures that will be in place, environmental effects will be similar for Water/Sewer, Power, Communications, Waste, or Real Estate, as compared to full clearing.
Social Services and Infrastructure	• Given the effects management measures that will be in place, environmental effects will be similar for Social Services and Infrastructure for full and partial clearing.	• Given the effects management measures that will be in place, environmental effects will be similar for Social Services and Infrastructure for full and partial clearing.
Community Health	• Given the effects management measures that will be in place, environmental effects will be similar for Health Services for full and partial clearing.	• Given the effects management measures that will be in place, environmental effects will be similar for Health Services for full and partial clearing.
Land and Resource Use	• Increased alteration of habitat during the Construction phase (as compared to partial clearing). This, in turn, could lead to changes in harvesting patterns; • Increased changes to reservoir and landscape aesthetics; and • Additional barge activity on the river (as compared to partial clearing) and increased interaction with existing boat traffic.	• Alteration of habitat during the Construction phase will be less than full clearing; • Changes to reservoir and landscape aesthetics during the Construction phase will be less than full clearing; and • Barge activity on the river and interaction with existing boat traffic will be less than full clearing.
Cultural Heritage Resources	• Given the effects management measures that will be in place, environmental effects will be the same for Cultural Heritage Resources for full and partial clearing.	• Given the effects management measures that will be in place, environmental effects will be the same for Cultural Heritage Resources for full and partial clearing.

Table 5 has been completed with respect to the operations phase of the Project.

Table 5 Comparison of Environmental Costs in Relation to Full and Partial Clearing (Operations Phase)

Parameter	Full Clearing	Partial Clearing
Atmospheric	• Slightly less greenhouse gas emissions during Operation.	• During Operation, the partial clearing scenario would produce GHG emission estimates similar to the no clearing values for Gull Island Reservoir and the full clearing values for Muskrat Falls (Minaskuat Inc. 2008b), i.e., an intermediate total value between 55,000 and 60,000 tonnes per year (as an average over the first 100 years). This is similar to, but slightly above, the value for full clearing.
Terrestrial	• Full harvesting would result in wildlife being displaced much earlier in Construction with fewer options available for alternative habitat. As a result under a full harvest scenario, some populations of wildlife would be lower in abundance immediately following inundation. However, eventually populations would be expected to develop into similar levels under either scenario.	• Partial harvesting would allow some period of time for habitat initiatives to establish before the wildlife species would be displaced – during impounding.
Aquatic	• Full harvesting would result in tributaries having reduced aquatic suitability and productivity for up to four years prior to impoundment and hence lower fish abundance available to colonize post-Project habitat. However, populations would be expected to develop into similar levels under either scenario; and • Changes in reservoir water quality as a result of full harvesting would be expected to be similar to the partial harvesting scenario.	• Partial harvesting would allow tributaries of the Churchill River to maintain existing fish habitat suitability and productivity prior to impoundment; and • Water quality of the reservoir would be expected to be similar under either scenario.
Economy, Employment and Business	• No measurable difference in effect on economy, employment and business between full and partial clearing.	• No measurable difference in effect on economy, employment and business between full and partial clearing.
Communities	• Given the effects management measures that will be in place, environmental effects will be similar for Physical Environments (methylmercury levels in humans) for full and partial clearing.	• Given the effects management measures that will be in place, environmental effects will be similar for Physical Environments (methylmercury levels in humans) for full and partial clearing.
Land and Resource Use	• No measurable difference in effect on Land and Resource Use between full and partial clearing after the first 2-3 years of Operation.	• During the first 2-3 years of Operation there will be increased navigation restrictions due to some areas not being cleared. As ice acts as a natural clearing agent, these areas will become clear of these hazards over time.
Cultural Heritage Resources	• No known Historic and Archaeological sites will be lost or disturbed.	• No known Historic and Archaeological sites will be lost or disturbed.

References:

Minaskuat Inc. 2008j Lower Churchill River Greenhouse gas Emissions Study. Prepared for the Lower Churchill Hydroelectric Generation Project.

Scruton, D. A., D. R. Sooley, L. Moores, M. A. Barnes, R. A. Buchanan, and R. N. McCubbin 1997. Forestry guidelines for the protection of fish habitat in Newfoundland and Labrador. Dept. Fisheries and Oceans, St. John's, NL. 63p.

Information Request Number: JRP.7

Greenhouse Gas Emissions

Requesting Organization – Joint Review Panel **Information Request No.: JRP.7**

Subject - Greenhouse Gas Emissions

References:

EIS Guidelines, Section 4.3.2.1 (Alternatives to the Project) & Section 4.5.1 (Environmental Effects – General)

EIS, Volume IA, Section 2.4.3 (Project Rationale – Addressing Climate Change); Section 2.4.4 (Project Rationale – Market Opportunities) & Section 2.5.7 (Alternatives to the Project – No Project)

Rationale:

The EIS Guidelines require the EIS to contain "(…) an analysis of alternatives to the project, including… (e) status quo (no Project)" (p. 15) and "a comparative analysis of environmental effects (…) of alternatives." (p. 16). The EIS Guidelines also require that "Predicted environmental effects (positive and negative, direct and indirect, short and long-term) shall be defined quantitatively and qualitatively for each project alternative and for each VEC." (p. 32).

The EIS Guidelines further require the EIS to contain "a description of specific greenhouse gas emissions that the Project will or could offset, the necessary conditions for that offset occurring, and a quantitative net estimate of potential greenhouse gas reductions or increases." (p. 33).

The EIS is deficient with respect to project markets and alternatives and associated effects on GHG emissions.

Requesting Organization – Joint Review Panel **Information Request No.: IR # JRP.7**

Information Request:

a. **In order for the Panel to assess GHG emissions potentially offset by the Project, in the absence of known markets, the Proponent is asked to provide a comparative analysis of GHG displacement scenarios for possible electricity markets served and generation sources displaced.**

Response:

In compliance with the Guidelines, Section 2.4.3 of the EIS has described the GHG's that the project could offset. As the Project will operate in a competitive electricity market, the destination for the electricity and the markets served will ultimately be determined through market forces and negotiation with counterparties to long-term contracts. To date, neither Canada nor Newfoundland and Labrador has imposed GHG regulation, so the cost of generation alternatives in a GHG constrained market cannot readily be forecasted. As a result, the Proponent has evaluated market options and completed financial analysis with no cost for carbon, and considers increases in market price resulting from carbon constraints as an upside opportunity.

In an unconstrained carbon market, the GHG displacement potential of the Project is largely a factor of the marginal cost of other generation alternatives that are also available to a given market. Since GHG emitting generation sources all have a fuel cost, hydro generating units are inclined to operate as 'price takers' in competitive markets, and will beat out emitting generators that have a fuel cost, since no generator would bid below its variable operating costs.

The GHG displacement and avoidance of the Project will ultimately be determined by the following major factors:

- **Government Policy.** The extent to which various generation sources are removed from a market and the timing of the policy implementation, in the manner as Ontario's decision to retire its coal fired generation, or the Government of Canada's proposal to ban the construction of conventional coal fired generation by 2012.
- **Marginal Operating Costs.** The marginal cost of generation in a market, including any indirect or direct carbon costs, will strongly influence the merit order of generation dispatch.
- **Substitution Effects.** Any increase in demand for electricity resulting from limits on other uses of fossil fuel, such as transportation.

Once the Project is completed, the Project will displace higher cost generation. In the limit, the minimal marginal operating cost of the Project would see the Proponent accepting any price rather than spilling water for no revenue. Consequently, the Proponent has a high degree of confidence that displacement of other generating alternatives will take place if the Project is constructed. It should also be noted that other renewable energy sources also have low marginal operating costs, so the Proponent does not expect to displace other in-service renewable production.

As noted in IR #JRP.5, attributes of the supply from the Project offer competitive advantages in the identified Northeast markets. The Project's lack of GHG emissions is a significant advantage. With the introduction of GHG regulation and a price on carbon, this will translate to a cost advantage. The magnitude of this cost differential will depend on the cost of carbon, the intensity of the GHG emissions of each fossil fuel generation source, and the fossil fuel costs. Higher cost supply will be displaced first.

Table 1 compares the cost of electricity generated from coal and natural gas for a range of carbon costs. In the absence of a charge for carbon emissions coal provides the least cost supply alternative. With a higher carbon cost, it becomes the more expensive option.

Table 1 2020 Forecasted Price of Wholesale Electricity by Fuel Type with Carbon Price ($2007US/MWh)

Fuel Source	Price of Carbon (per tonne)			
	$20	**$50**	**$100**	**$200**
Coal	$38	$66	$111	$201
Natural gas	$62	$74	$95	$137

Source: Lower Churchill Project
Fuel Price Forecasts US Department of Energy, Annual Energy Outlook 2009 (Revised April 2009)

Potential fuel displacement scenarios have been considered based on an assessment of current and forecast generation supply mixes in the respective markets, the supply attributes that the Project can offer in these markets and government environmental policy goals. Both provincial and federal governments recognize the need to address GHG emission reductions in the electricity sector. For example, Nova's Scotia's *2009 Energy Strategy* identifies the need for an orderly transition from dirty coal to cleaner and more sustainable energy sources.

Table 2 provides two displacement scenarios – one primarily based on a Maritime transmission route and one primarily using the Hydro-Québec TransÉnergie OATT:

Table 2 Possible GHG Displacement Scenarios (Mt/yr)

Region	Generation Source Displaced	Maritime Route		Quebec Route	
		Energy Sales in Market (TWh)	**GHG Mt/yr**	**Energy Sales in Market (TWh)**	**GHG Mt/yr**
Newfoundland and Labrador	Heavy Fuel Oil	2.3	1.7	2.3	1.7
Maritimes	Heavy Fuel Oil/ Coal	9.7	8.4	4.7	4.0
Ontario	Natural Gas	n/a	n/a	5.0	2.1
Other	Natural Gas	3.2	1.3	3.3	1.4
Totals		**15.2**	**11.5**	**15.3**	**9.2**

References:

Section 2.4, Environmental Impact Statement *Potential Greenhouse Gas Displacement Forecast*, Lower Churchill Project

Towards a Greener Future: Nova Scotia's 2009 Energy Strategy, Government of Nova Scotia http://www.gov.ns.ca/energy/resources/spps/energy-strategy/Energy-Strategy-2009.pdf

Requesting Organization – Joint Review Panel **Information Request No.: JRP.7**

Information Request:

b. What are the GHG implications of the status quo (no Project) alternative, including both high and low GHG scenarios for the Island of Newfoundland?

Response:

In the absence of the Project proceeding, power to the Island of Newfoundland would continue to be generated at the Holyrood Generating Station. In 2007, emissions from the Holyrood Station accounted for almost 19 percent of the total industrial emissions for the Province. Forecasts indicate that by 2030 between 1.1 Mt and 3.0Mt of greenhouse gases would be emitted annually by the Holyrood Generating Station, an increase of at least 123 percent from 2008 levels. The variation reflects low and high industrial load growth forecasts.

As outlined in Volume 1A, Section 2.4.4 of the Environmental Impact Statement, in the absence of power from the Lower Churchill development, there are limited options available to address future load on the Isolated Island system other than to continue generation at the Holyrood Station and to supplement supplies from other fossil fuel based technologies.

Power supplied to the Island from the Lower Churchill to the Island will displace the total generation from the Holyrood Station therefore displacing the associated greenhouse gas emissions.

These scenarios do not consider substitution of other fossil fuel uses with electricity, an alternative that is made much more difficult without the availability of energy from the Project.

References:

Greenhouse Gas Forecasts, June 16, 2009, Systems Planning Department, Newfoundland and Labrador Hydro.

Online Industrial Greenhouse Gas Search Tool, Environment Canada http://www.ec.gc.ca/pdb/ghg/onlinedata/dataSearch_e.cfm

Requesting Organization – Joint Review Panel **Information Request No.: JRP.7**

Information Request:

c. According to the Proponent, what is the relevance of provincial, regional, national and international targets in determining the significance of GHG emissions?

Response:

The Intergovernmental Panel on Climate Change (IPCC) has conducted significant research into the increase since 1850 in global GHG emissions, the effect of such increases on climate and the resulting biological, social and industrial impacts. The IPCC's *Fourth Assessment Report* establishes that global GHG emissions have increased by 70% from 1970 to 2004 resulting in significant climate change and that the largest growth in GHG emissions over this period was in the energy sector with an increase of 145 percent.

The effects of climate change are profound and will be felt worldwide through:

- increased atmospheric temperature;
- increased sea levels;
- reduced glaciers and ice caps;
- increased precipitation in some areas and decreased precipitation in others; and,
- increased frequency in extreme weather events.

In the absence of global action to address rising GHG emission levels, the IPCC's modeling has projected regional impacts through their modeling including, among others:

- Africa: decreases in agricultural yields
- Asia: decreases in freshwater availability
- Australia: loss of biodiversity in the Great Barrier Reef
- Europe: increases in risk of inland flash floods and coastal flooding
- Latin America: decreases in productivity of some crops; and,
- North America: increases in the number, intensity and duration of heat waves

In its *Fourth Assessment Report*, the IPCC has identified the need to reduce GHG emissions by 50-85% from 2000 emission levels by 2050 to stabilize the impacts of climate change and anticipates that 60-80% of these reductions will come from the energy sector.

The IPCC has identified a number of measures that can help achieve the necessary reductions from the energy sector including:

- increased investment in low GHG technologies and processes
- introduction of a carbon tax or charge
- increased development of hydropower and other renewable resources

Canada's total GHG emissions in 2006 were 721 Mt, almost 22 percent higher than in 1990. The energy sector was the single biggest contributor of emissions in the country accounting for over 80 percent of Canada's total in

2006. The electricity industry was responsible for 115 Mt of GHG emissions in 2006, almost 16 percent of the national total.

The application of international, national, or regional regulatory targets will have a very real impact on the levels of greenhouse gas emissions in the atmosphere. The table below demonstrates the reductions potentially required in GHG emissions from the electricity sector in Atlantic Canada if the various targets identified were implemented.

Table 3 Atlantic Canada Electricity Sector: Reductions Required to Meet Greenhouse Gas Targets

Framework	Target (Mt/yr)	Required Reductions (Mt/yr)[1]
Kyoto Target 2012 (6% below 1990)	13.4	5.9
New England Governors/ Eastern Canadian Premiers Target 2020 (10% below 1990)	12.8	6.4
Government of Canada 2020 (20% below 2006)	13.4	5.8
Government of Canada (60% below 2006)	6.7	12.6
Regional Greenhouse Gas Initiative 2018 (10% below current levels)	16.3	1.8

[1]Required reductions based on the 2004-2006 average electricity sector emissions in Atlantic Canada.
Source: Lower Churchill Project

For Atlantic Canada the available sources of non emitting supplies that can help achieve these targets are limited. Wind energy conversion technology, while helpful, offers limited application as a result of constraints on penetration levels. Electrical energy supplied from the Lower Churchill Project has the potential to help the region achieve all the emissions reductions required of the electricity sector in the region, and then some.

A recent report by the National Round Table on the Environment and the Economy advocates a unified Canadian carbon pricing policy to meet the federal government's Greenhouse gas (GHG) emission reduction targets in 2020 and 2050.1 Part of the plan involves a phasing in a cap-and-trade auction process for emission permits by 2020, with a price ceiling on emission permits to avoid price shocks which could cause damage to the economy. Based on this proposed carbon policy and approach future carbon prices have been derived. The report suggests that the ceiling cost per tonne of carbon ($2006) will need to be $50 in 2015, rising to $100 by 2020 and $200 after 2025.[2]

The report also refers to a trend denoted as "*The electrification of the economy*". It states, "*The economy will not only reduce its dependence on fossil-generated electricity, it will significantly grow the quantity of non-fossil-generated electricity produced…the electricity sectors will grow under the carbon pricing policy by 25% above forecast levels by 2020 and 50% by 2050. All of this will need to come from a comprehensive portfolio of low- or zero-emitting technologies, notably CCS,* ***hydroelectric power****, nuclear Energy and renewables…To ensure that electrification is sustainable, however, it will be necessary to reflect the full economic, environmental, and social costs of generation and transmission*."[3] Overall, the electricity sector will see increased investment as demand for renewable energy products increase and "*rising electricity costs relative to the fossil fuel alternatives*". [4]

The Canadian Council of Chief Executives is an association dedicated to public policy development and solutions and is comprised of 150 sector CEOs and entrepreneurs from across the country and across various sectors

1 National Round Table on the Environment and the Economy, "Achieving 2050: A Carbon Pricing Policy for Canada", 2009, Retrieved from: www.nrtee-trnee.ca
2 Ibid. p. 55.
3 Ibid, p. 80.
4 Ibid. p. 82.

including electricity. In April, 2009 the Council issued a press release publicly announcing its support for the approach outlined in the National Round Table report.[5]

If one were to accept the forecasts of the IPCC, then the development of international, national, regional, and provincial targets must provide the framework to achieve that target. Put simply, the existence (or not) of these targets will not change the need to achieve substantial GHG emission reductions; they will help guide our society to the best way to get there. If reductions on the scale proposed by the IPCC by 2050 were applied to Canada, reductions in the order of 360 to 612 Mt, based on 2006 emissions, would need to be achieved.

There are a limited number of ways to achieve these reductions:

- reduce energy consumption
- displace use of fossil fuel with non-emitting alternatives
- capture GHG's after they have been created and sequester them permanently

No matter how targets are established to reduce emissions, non-emitting generation projects such as the Lower Churchill will need to play a key role, particularly to achieve targets within the next decade.

References:

National Greenhouse Gas Inventory Report 2006, Environment Canada, http://www.ec.gc.ca/pdb/ghg/inventory_report/2006/som-sum_eng.cfm#s4

Online Industrial Greenhouse Gas Search Tool, Environment Canada, http://www.ec.gc.ca/pdb/ghg/onlineData/dataSearch_e.cfm

Climate Change 2007: Synthesis Report, Intergovernmental Panel on Climate Change

Mitigation of Climate Change, Working Group III, Intergovernmental Panel on Climate Change

Achieving 2050: A Carbon Pricing Policy for Canada, National Round Table on the Environment and the Economy, 2009, www.nrtee-trnee.ca

Canadian Council of Chief Executives Press Release, April 16, 2009, http://www.ceocouncil.ca/en/view/?document_id=1345&type_id=1

5 Canadian Council of Chief Executives Press Release, April 16, 2009, http://www.ceocouncil.ca/en/view/?document_id=1345&type_id=1

Information Request Number: JRP.8

Aquatic Vegetation

Requesting Organization – Joint Review Panel **Information Request No.: JRP.8**

Subject - Aquatic Vegetation

References:

EIS Guidelines, Section 4.4.4.2 (Description of the Existing Environment – Aquatic Environment)

EIS, Volume IIA, Section 2.3.3.1 (Existing Environment – Aquatic Environment)

AMEC Earth & Environmental Ltd. 2008. Lower Churchill Hydroelectric Generation Project Aquatic Vegetation Studies. Prepared for Newfoundland and Labrador Hydro, St. John's, NL. ii + 25 pp. + Appendices.

Rationale:

In its Aquatic Vegetation Survey, AMEC (2008) indicates that it has inventoried a number of aquatic plant species along the Churchill River that could be considered rare or potentially rare according to rankings by the Atlantic Canada Conservation Data Centre (ACCDC).

While none of the species inventoried is listed as Endangered or Threatened under Newfoundland and Labrador's *Endangered Species Act*, Canada's *Species at Risk Act* or by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), the EIS makes no reference in Section 2.3.3.1 to aquatic plant species given a rare or potentially rare ranking by the ACCDC, nor is a discussion provided on the effects of the Project on the status and integrity of these species.

Requesting Organization – Joint Review Panel **Information Request No.: JRP.8**

Information Request:

In order for the Panel to assess the effects of the Project on rare or potentially rare aquatic plants, the Proponent should confirm the presence and status of rare or potentially rare aquatic plant species identified by AMEC (2008) in the Lower Churchill, and provide an evaluation of the effects of the Project on the status and integrity of these species.

Response:

1. Status of Species Identified by AMEC (2008)

Species at risk listings are maintained by the Federal Government under the *Species at Risk Act* (SARA) and by the provincial government under the *Newfoundland and Labrador Endangered Species Act* (NLESA). Species listed as endangered or threatened under SARA and species listed as endangered, threatened or vulnerable under NLESA are subject to protection under each respective Act. The Atlantic Canada Conservation Data Centre (ACCDC) also maintains a listing of species which it considers to be potentially rare, although it carries no regulatory authority.

No species found during the 2006 aquatic vegetation surveys in the lower Churchill River are listed under SARA or listed under the NLESA or have been designated as in danger of disappearing in Canada by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

Species at Risk Act (SARA)

The vascular plant species listed under Schedule 1 of SARA that have a range within Newfoundland and Labrador has not changed since 2007 (Table 1).

Newfoundland and Labrador Endangered Species Act (NLESA)

Two plant species were added to those species already listed in 2007: Crowded Wormseed Mustard (*Erysimum inconspicuum var. coarctatum,* Endangered), and Mountain Fern (*Thelypteris quelpaertensis*, Vulnerable) (Amendment 9/08 under the *Endangered Species List Regulations*, 2008). Both are only known to occur in Newfoundland and neither is an aquatic plant.

Table 1 Floral Species at Risk in Newfoundland and Labrador (SARA[1], COSEWIC[2], NLESA[3])*

Scientific Name	Common Name	NLESA	SARA, Schedule 1	COSEWIC	Found during 2006 Aquatic Vegetation Survey?
Vascular Plants					
Astragalus robbinsii var. fernaldii	Fernald's Milk-vetch	Vulnerable	Special Concern	Special Concern	No
Braya fernaldii	Fernald's Braya	Threatened	Threatened	Threatened	No
Braya longii	Long's Braya	Endangered	Endangered	Endangered	No
Erysimum inconspicuum var. coarctatum	Crowded Wormseed Mustard	Endangered (New)	--	--	No
Neotorularia humilis	Low Northern Rockcress	Endangered	--	--	No

Scientific Name	Common Name	NLESA	SARA, Schedule 1	COSEWIC	Found during 2006 Aquatic Vegetation Survey?
Polystichum scopulinum	Mountain Holly Fern	--	Threatened	Threatened	No
Thelypteris quelpaertensis	Mountain Fern	Vulnerable (New)	--	--	No
Salix jejuna	Barren Willow	Endangered	Endangered	Endangered	No
Non-Vascular Plants					
Erioderma pedicellatum	Boreal Felt Lichen	Vulnerable	Special concern	Special Concern	No
Mielichhoferia macrocarpa	Porsild's Bryum	Threatened	--	Threatened	No

* Data current as of May 11, 2009.
[1]Species at Risk Act
[2]Committee on the Status of Endangered Wildlife in Canada
[3]Newfoundland and Labrador Endangered Species Act

Atlantic Canada Conservation Data Centre

The Atlantic Canada Conservation Data Centre (ACCDC) is a non-profit, registered charitable organization that assembles and provides information about species and ecological communities within Atlantic Canada. Data used to rank species by ACCDC is based on reported and confirmed occurrences of each species. Provincial and federal regulators may use the ACCDC data as a guidance tool to prioritize species for listing consideration under appropriate legislation (i.e. NLESA or SARA; however, it has no regulatory authority of its own.

Table 2 indicates the ACCDC ranking for each of the 83 species identified in the 2006 aquatic vegetation survey (AMEC, 2008). Numerous plants recorded during the 2006 survey have been ranked S1, S2 or S3 by ACCDC. Plants ranked S1, S2 or S3, or combinations thereof, are considered to be of conservation concern by ACCDC. Species ranked as S4 or S5 are relatively common within the province. Draft S ranks are the proposed ranks for species that have yet to be approved (A. Durocher, Newfoundland ACCDC, personal communication, 2009). These draft ranks will be adopted when the ACCDC list is updated in 2010 (ibidem).

The ACCDC ranking of species in Labrador is very much a work in progress. Labrador's vegetation is understudied and since ACCDC rankings depend on the reported and confirmed occurrences, many species newly recorded in Labrador will be initially ranked in one of the categories indicating conservation concern (S1, S2, S3 or combinations thereof eg. S1S2), until sufficient records exist. Continuing efforts at plant surveys in conjunction with various infrastructure projects contribute to the knowledge on vegetation species, abundance and distribution. Therefore, it can be expected that a number of species currently listed as "of conservation concern" by ACCDC will be removed from these categories.

2. Effect of the Project on Rare or Potentially Rare Aquatic Plants Species

In order to assess the potential effect the Project may have on the status and integrity of the species considered rare or potentially rare by ACCDC, results from recent plant surveys in Labrador and a literature review was undertaken to better understand the species distribution.

Species ranked as S4, S5 or S4S5 by ACCDC are considered to be well established throughout the province and not of conservation concern. The status and integrity of these species are unlikely to be adversely affected by the Project due to their common nature within the province (Table 2). In total 13 of the 83 species encountered during the AMEC 2008 aquatic vegetation survey were either ranked S4, S5 or S4S5. Therefore these species are not assessed further.

Table 2 Atlantic Canada Conservation Data Centre ranking of Species Identified in the Aquatic Vegetation Survey (AMEC 2008)

Scientific Name	Common Name	ACCDC S-Rank[1]
Submergent		
Potamogeton sp.	A Pondweed	S?[3]
Potamogeton alpinus	Alpine Pondweed	S3S4
Potamogeton alpinus ssp.tenuifolius	Alpine Pondweed	Included in *P. alpinus*[3]
Potamogeton epihydrus	Ribbonleaf Pondweed	S?
Potamogeton gramineus	Variableleaf Pondweed	S?
Potamogeton pusillus ssp. pusillus	Slender Pondweed	SRF
Potamogeton richardsonii	Richardson's Pondweed	SH
Sparganium sp.	A Burreed	S?[3]
Sparganium cf. americanum	American Burreed	S?[3]
Sparganium cf. emersum	Unbranched Burreed	SU
Sparganium cf. emersum ssp. emersum	Green-fruited Burreed	S?[3]
Sparganium cf. emersum ssp. acaule	Stemless Burreed	Included in *S. emersum*[3]
Callitriche verna	Vernal Waterstarwort	S?
Eleocharis acicularis	Least Spikerush	S?
Hippuris vulgaris	Common Mare's Tail	(S4S5)
Myriophyllum sp.	Water Milfoil	
Myriophyllum cf. alterniflorum	Alternate-flowered Water Milfoil	(SR)
Ranunculus flammula var. reptans	Greater Creeping Spearwort	(S5)
R. aquatilis var. diffusus (=R. trichophyllus)	White Water-crowfoot	S?
Subularia aquatica	Water Awlwort	(S3S5)
Utricularia vulgaris= U. macrorhiza	Common Bladderwort	S?
Utricularia intermedia	Flatleaf Bladderwort	S3S5
Utricularia cf. minor	Small Baldderwort	S?
Large Green Algae (e.g. Chara sp., Nitella sp.)		S?[3]
Filamentous 'algae'		S?[3]
Moss		S?[3]
Floating-Leafed		
Sagittaria cuneata	Wapato, Arrowhead	SU
Emergent		
Calamagrostis canadensis	Blue Joint	(S? var. langsdorfii; S3S5 var. Canadensis)
Calamagrostis neglecta	Bentgrass	Included in *C. stricta*[3]
Calamagrostis stricta	Slim-Stem Bog (Northern) Reedgrass	(S? - all three subspecies)
Carex sp.	A Sedge	S?[3]
Carex crawfordii	Crawford's Sedge	(S1S2S)
Carex nigra	Black Sedge	(S3S5)
Carex projecta	Necklace Sedge	(S1S2)
Carex rostrata	Beaked Sedge	(S3S5)
Carex stipata	Stalk-grain Sedge, Awl-fruit S.	(S2S3)
Carex cf. tenera	Slender Sedge	S?[3]

Table 2 Atlantic Canada Conservation Data Centre ranking of Species Identified in the Aquatic Vegetation Survey (AMEC 2008) cont.

Scientific Name	Common Name	ACCDC S-Rank[1]
Scientific Name	**Common Name**	**ACCDC S-Rank1**
Carex utriculata	Bottle Sedge	S?
Carex vesicaria	Inflated Sedge	(S3S5)
*Equisetum fluviatile**	Water-horsetail	S1S3
Equisetum cf. litorale	Shore Horsetail	S?
Equisetum cf. palustre	Marsh Horsetail	S1
Juncus sp.	A Rush	S?[3]
Juncus cf. arcticus	Baltic Rush	(S3S4 var. balticus; SU var. alaskanus)
*Juncus brevicaudatus**	Narrow-panicled Rush	S3
Juncus effusus	Soft Rush	-
Juncus filiformis	Thread Rush	S4S5
Glyceria borealis	Northern Manna-grass	S?
Scirpus sp.	A Bulrush	S?[3]
Scirpus atrocinctus	Black-Girdle Bulrush	S?
*Scirpus microcarpus**	Red-tinge Bulrush	(S2S3)
Trichophorum cespitosum	Tufted Clubrush	(S3S5)
Shoreline and High Shore		
Iris sp.		S?[3]
Iris setosa	Beach-head Iris	S4
Agrostis scabra	Twin Bent Grass	(S2S3 var.geminata; S3S5 var. scabra)
Cicuta bulbifera	Bulbous Water-hemlock	S?
Galium sp.	A Bedstraw	S?[3]
Galium labradoricum	Bog Bedstraw	S?
Galium trifidum	Three-petaled Bedstraw, Dyer's Cleavers	S?
*Galium triflorum**	Sweet-scent Bedstraw	(S2S3)
Lycopus uniflorus	Bugleweed, horehound	(S3S5)
Lysimachia terrestris	Yellow Loosestrife, Swamp Loosestrife, Swamp Candles	(S1)
Ranunculus pensylvanicus	Bristly Crowfoot	(S1)
Salix sp.	A Willow	S?[3]
Salix bebbiana	Bebb's Willow	S?
Salix lucida	Shining Willow	(S? ssp. Lucida)
Sanguisorba canadensis	Canada Burnett	(S3S5 ssp. canadensis)
Riccia sp., a liverwort		S?[3]
Viola sp.	A Violet	S?[3]
Achillea millefolium var. lanulosum	Yarrow	(S3S5 var. lanulosa; SE var. millefolium)
Alnus incana subsp. rugosa	Speckled Alder	(S3S5)
Artemisia canadensis (syn. A. campestre)	Field Wormwood	(S? ssp. borealis; S3S5 ssp. canadensis)
Astragalus alpinus	Alpine Milkvetch	(S3S5)
Cornus sericea	Red Osier Dogwood	S3S5
Chamerion latifolium	River Beauty	(S4)

Table 2 Atlantic Canada Conservation Data Centre ranking of Species Identified in the Aquatic Vegetation Survey (AMEC 2008) cont.

Scientific Name	Common Name	ACCDC S-Rank[1]
Equisetum arvense	Field Horsetail	S4S5
Myrica gale	Sweet Gale	(S4S5)
*Onoclea sensibilis**	Sensitive Fern	S2S3
Phleum pratense	Timothy	S?
Symphyotrichum novi-belgii	New York Aster	(S3S5 var. novi-belgii)
Thalictrum pubescens	Tall Meadow-Rue	(S? var. pubescens)
Athyrium filix-femina	Lady Fern	S3S5
*Veronica scutellata**	Marsh Speedwell	(S2S3)

[1] Draft ACCDC ranks are in brackets. These will become adopted when the list is updated un 2010.
[2] These species are synonyms of other species and have been combined.
[3] No ranking provided by ACCDC, assumed to be S?
* Species will be removed from rare status with next update (C. Hanel, NLDEC, personal communication, July 03, 2007)
Grey shading: potentially new Records for Labrador

Definitions of Provincial (subnational) ranks – SRANKS (ACCDC, 2009)

S1 Extremely rare throughout its range in the province (typically 5 or fewer occurrences or very few remaining individuals). May be especially vulnerable to extirpation.

S2 Rare throughout its range in the province (6 to 20 occurrences or few remaining individuals). May be vulnerable to extirpation due to rarity or other factors.

S3 Uncommon throughout its range in the province, or found only in a restricted range, even if abundant in at some locations. (21 to 100 occurrences).

S4 Usually widespread, fairly common throughout its range in the province, and apparently secure with many occurrences, but the Element is of long-term concern (e.g. watch list). (100+ occurrences).

S5 Demonstrably widespread, abundant, and secure throughout its range in the province, and essentially ineradicable under present conditions.

S#S# Numeric range rank: A range between two consecutive numeric ranks. Denotes range of uncertainty about the exact rarity of the Element (e.g., S1S2).

SH Historical: Element occurred historically throughout its range in the province (with expectation that it may be rediscovered), perhaps having not been verified in the past 20 - 70 years (depending on the species), and suspected to be still extant.

SU Unrankable: Possibly in peril throughout its range in the province, but status uncertain; need more information.

S? Unranked: Element is not yet ranked.

SR Reported: Element reported in the province but without persuasive documentation which would provide a basis for either accepting or rejecting (e.g., misidentified specimen) the report.

SRF Reported falsely: Element erroneously reported in the province and the error has persisted in the literature.

? Inexact or uncertain: for numeric ranks, denotes inexactness, e.g., SE? denotes uncertainty of exotic status. (The "?" qualifies the character immediately preceding it in the SRANK).

Note: ACCDC has not assigned ranks to non- vascular plants yet, such as *Riccia sp.*, or green algae.

To better understand the relative distribution of species ranked as S1, S2, S3 or ranking combinations that included these classes by ACCDC, a literature review was conducted to better understand the species presence elsewhere in Labrador.

Of the remaining 56 vascular plant species, 40 have been identified as present within surveys outside the proposed reservoir area in other recent plant surveys in Labrador (*see* AMEC 2000; AMEC 2005; Minaskuat 2008). Table 3 presents a summary of the locations of additional records. Many of the species were found at numerous locations and an adverse effect on their status and integrity is not likely due to the extended distribution beyond the proposed reservoir area.

Of the remaining 16 species, three are synonymous with species found during the AMEC 2000, AMEC 2005 and Minaskuat 2008 plant surveys. A literature review of the remaining 13 species was undertaken to determine if the species distribution extends beyond the proposed reservoir area. A brief description of the distribution of each species and an assessment of the effect of the Project on the species is outlined below.

Artemisia canadensis

Artemesia campestris a synonym of *A. canadensis* has been indicated by Meades et al. (2000) to be distributed throughout Labrador and western, northwestern and central Newfoundland. Distribution indicates that this species is widespread and adverse effects on status and integrity of the species due to Project activities are unlikely.

Table 3 Species Encountered during Vegetation Surveys in Labrador

Species	TLH II – Red bay to Cartwright[1]	TLH III – Cartwright to Goose Bay[2]	Lower Churchill River Basin[3]	Goose River[3]
Achillea millefolium var. lanulosum		X	X	X
Agrostis scabra			X	X
Alnus incana subsp. rugosa	X	X	X	X
Astragalus alpinus			X	
Athyrium filix-femina	X		X	X
Calamagrostis canadensis	X	X	X	X
Calamagrostis stricta			X	X
Callatriche verna				X
Carex crawfordii			X	
Carex nigra			X	X
Carex projecta			X	X
Carex rostrata	X		X	X
Carex stipata	X		X	X
Carex utriculata			X	X
Carex vesicaria			X	X
Chamerion latifolium		X	X	X
Cicuta bulbifera	X			X
Cornus sericea	X	X	X	X
Eleocharis acicularis			X	X
Equisetum arvense			X	X
Equisetum fluviatile		X	X	X
Equisetum litorale				X
Equisetum palustre			X	X
Galium labradoricum	X			X
Galium trifidum		X	X	X
Galium triflorum		X	X	X
Glyceria borealis			X	X
Hippuris vulgaris			X	
Iris setosa	X			
Juncus arcticus	X			X
Juncus brevicaudatus		X	X	X
Juncus filiformis		X	X	X
Lycopus uniflorus	X		X	X
Lysimachia terrestris		X	X	X
Myrica gale	X	X	X	X
Onoclea sensibilis		X		
Potamogeton epihydrus			X	X

Table 3 Species Encountered during Vegetation Surveys in Labrador cont.

Species	TLH II – Red bay to Cartwright[1]	TLH III – Cartwright to Goose Bay[2]	Lower Churchill River Basin[3]	Goose River[3]
Potamogeton gramineus	X		X	X
Ranunculus flammula var. reptans			X	X
Ranunculus pensylvanicus				X
Salix bebbiana		X	X	X
Salix lucida		X	X	X
Sanguisorba canadensis			X	X
Scirpus atrocinctus		X	X	X
Scirpus microcarpus		X	X	X
Sparganium emersum		X	X	X
Symphiotrichum novi-belgii			X	X
Thalictrum pubescens		X	X	X
Trichophorum cespitosum	X		X	X
Utricularia minor			X	
Utricularia intermedia			X	X
Utricularia vulgaris			X	
Veronica scutellata			X	X

[1] Rare plant assessment conducted by AMEC prior to the construction of the Trans Labrador Highway Phase II
[2] Rare plant assessment conducted by AMEC prior to the construction of the Trans Labrador Highway Phase III
[3] Rare plant assessment conducted by Minaskuat (2008) within the Lower Churchill River Valley

Carex cf. tenera

The species has a distribution in Canada extending through Quebec, the Maritime Provinces, and westward to British Columbia. However, the specimen found during the 2006 aquatic vegetation surveys is likely a new record for Labrador, since it is not ranked by ACCDC, there is no record in Meades et al. (2009) and the species is not shown to be distributed within the province (USDA 2009). The Project may affect the status and integrity of this species within Labrador as no other records are known, however it is unlikely to affect its species status and integrity in Canada.

Juncus effusus

The species is reported by Rousseau (1974) along the western portion of the Quebec North Shore, along the Gaspe Peninsula, and elsewhere in southwestern Quebec. Meades et al. (2000) indicate that the species is also located throughout Newfoundland. However, the specimen found during the 2006 aquatic vegetation surveys is likely a new record for Labrador, since this species is not ranked by ACCDC and there is no record in Meades et al. (2009). The Project may affect the status and integrity of this species within Labrador as no other records are known, however it is unlikely to affect its species status and integrity in Canada.

Myriophyllum cf.alternifolium

Rousseau (1974) has indicated that the species is distributed in numerous places in Labrador and Quebec. In particular, records were indicated for the species at the mouth of the Churchill River; western Labrador (Schefferville area); Quebec North Shore; Gaspe Peninsula; and a number of additional locations within central and western Quebec. Meades et al. (2000) report the species throughout western, northwestern, central and eastern Newfoundland and indicate the species has been reported within Labrador but requires confirmation. Observations of this species in Labrador outside of the proposed reservoir area of the Project have been recently confirmed (M. Sensen, AMEC, pers. comm., 2009). The distribution indicates that this species is widespread, though frequency may be low. Adverse effects on the status and integrity of this species in Labrador or in Canada are unlikely.

Phleum pratense

The species is widespread with a distribution that stretches from Newfoundland and Labrador across to the west coast of Canada (USDA 2009). Furthermore the USDA (2009) indicates that the species is distributed throughout the continental United States and northward into Alaska, Greenland and the Yukon and Northwest Territories. In addition, Day (1999) indicates that the species is found near the mouth of the Churchill River. The species is also noted to be an introduced species of European dissent which occurs throughout the island portion of the province and extends north to central Labrador (Meades et al. 2000). Adverse effects on status and integrity of the species are not likely.

Potamogeton alpinus

The Flora of North America indicates that the species *Potamogeton alpinus* has a distribution throughout central Labrador from the western portion of Lake Melville, westward to the Quebec-Labrador border and northward to Ungava Bay (Flora of North America 2009). In addition, the species is also distributed in western, southern and throughout the Avalon Peninsula of the island portion of the province. Overall, the species range extends from the southwest tip of Greenland, across Canada, into the northwestern United States and northward into Alaska. In addition, Day (1999) indicated a record of the species from northern Labrador in the vicinity of Ramah Bay. Meades et al. (2000) describe a distribution North to northern Labrador. Adverse effects on the status and integrity of this species due to Project activities are unlikely.

Potamogeton pusillus ssp pusillus

Meades at al. (2000) do not indicate records for this subspecies in Labrador nor in Newfoundland, and there is no ACCDC ranking. However, the author is aware of a recent observation of this sub species outside of the potential flood zone of the Project. Therefore, the Project may have an adverse effect on the status and integrity of this subspecies within Labrador, but not across Canada. The subspecies does occur elsewhere in Canada, and south to Florida (Hinds 2000).

Potamogeton richardsonii

The species *Potamogeton richardsonii* was shown by the USDA PLANTS Database to have a distribution throughout both the mainland (Labrador) and island (Newfoundland) portion of the province (USDA 2009). Furthermore the distribution extends across Canada and throughout the northern United States (USDA 2009). In addition, Day (1999) has indicated the presence of the species near the mouth of the Churchill River. Meades et al. (2000) indicate a distribution in Labrador north to central Labrador. The species appears to be widespread, though the number of individuals and/or populations may be small. Adverse effects on the status and integrity of this species in Labrador or in Canada are unlikely.

Ranunculus aquatilis var diffusus

Ranunculus trichophyllum a synonym of *R. aquatilis var diffusus* is indicated by Meades et al. (2000) to be distributed throughout the mainland and island portion of the province. Furthermore Day (1999) indicated that there were specimens recorded from an area near the mouth of the Churchill River, Seven Islands Bay and near the northern tip of Labrador. Observations of this species in Labrador outside of the proposed reservoir area of the Project have been recently confirmed (M. Sensen, AMEC, pers. comm., 2009). The distribution and observed distribution indicate that this species is widespread. Adverse effects on the status and integrity of this species due to Project activities are unlikely.

Sagittaria cuneata

Sagittaria cuneata has been shown to be distributed throughout Labrador (USDA 2009). In addition, Rousseau (1974) has indicated the presence of the species within the Gaspe peninsula, along the Quebec North Shore, and along the Quebec-New Brunswick and Quebec-Ontario borders. The species has a distribution north to central Labrador (Meades et al. 2000). Also, the author is aware of one recent confirmed observation of this species in Labrador outside of the reservoir area of the Project. The species appears to be widespread, though the frequency may be low. Adverse effects on the status and integrity of this species are unlikely.

Sparganium cf. americanum

The species is reported to have a distribution within temperate North America with a provincial distribution throughout all but northwestern Newfoundland (Meades et al. 2000). Meades et al. (2000) do not indicate records for Labrador. The Project may affect the status and integrity of this species within Labrador, as no other records are known, however it is unlikely to affect its species status in Newfoundland or within Canada.

Sparganium cf.emersum ssp. emersum

The subspecies has a distribution across North America, and is considered to be fairly common (Hinds 2000). However, Meades et al. (2000) do not indicate records for this subspecies in Labrador nor Newfoundland unless the lack of records is due to consideration of plant systematics (as indicated by the fact that another subspecies is considered to be synonymous with the species (Meades et al. 2000)). The Project may affect the status and integrity of this species within Labrador, as no other records are known, however it is unlikely to affect its species status in Canada.

Subularia aquatica

Subularia aquatica has been shown to be distributed throughout the province (USDA 2009). Day (1999) has provided locations near the mouth of the Churchill River and Blanc Sablon-Forteau area where specimens were recorded. Rousseau (1974) has also indicated that the species is distributed in numerous places in Labrador and Quebec. In particular, records were indicated for the species at the mouth of the Churchill River; Blanc Sablon-Forteau area; Quebec North Shore; western Labrador (near Schefferville); near Ungava Bay; a number of areas along Hudson Bay; and a number of additional locations within central and western Quebec (Rousseau 1974). Meades et al. (2000) indicate that the species is distributed throughout western, central, southern and eastern Newfoundland and north to central Labrador with specific records indicated for Goose Bay and Indian Harbour. Adverse effects on status and integrity of the species due to Project activities are unlikely.

3. Summary

While none of the species inventoried are listed as endangered or threatened under Canada's *Species at Risk Act* or Newfoundland and Labrador's *Endangered Species Act*, there are a total of five species/subspecies recorded within the reservoir area that have previously not been recorded in Labrador. This may be due to a lack of surveying as stated previously; however, in order to further delineate their distribution and status Nalcor will conduct additional sampling in consultation with regulatory authorities before construction begins. Nalcor will develop plans to deal with the species in question if they are found to be in danger of extirpation because of the Project.

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Information Request Number: JRP.9

Telemetry Programs (Black Bear and Moose)

Requesting Organization – Joint Review Panel **Information Request No.: JRP.9**

Subject – Telemetry Programs (Black Bear and Moose)

References:

Minaskuat Inc. 2009b. *Black Bear (Ursus americanus) Study in the Lower Churchill River Watershed.* Interim report prepared for the Lower Churchill Hydroelectric Generation Project.

Minaskuat Inc. 2009c. *The Lower Churchill Hydroelectric Generation Project Environmental Baseline Report: Moose (Alces alces).* Interim report prepared for the Lower Churchill Hydroelectric Generation Project.

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Rationale:

The Component Studies by Minaskuat Inc. (2009b) and Minaskuat Inc. (2009c) indicate that telemetry programs for Black Bear and Moose will be completed in summer and spring 2009 respectively. The Proponent indicates that the telemetry programs were required to provide information on the movement patterns of Black Bear and Moose in the Study Area.

Requesting Organization – Joint Review Panel **Information Request No.: JRP.9**

Information Request:

a. **In order for the Panel to complete its review of the EIS, all studies should be submitted to the Panel by September 2009. The Proponent is asked to confirm whether it will be possible to file the completed telemetry program study reports on Black Bear and Moose with the Panel by this date.**

Response:

The Proponent will submit the completed reports to the Panel by the end of September 2009.

Requesting Organization – Joint Review Panel **Information Request No.: JRP.9**

Information Request:

b. The Proponent is asked to indicate how incomplete data collection on Black Bear and Moose has influenced the environmental effect determination and conclusion of the EIS.

Response:

The determination of environmental effects on Black Bear and Moose was completed using:

- Ecological Land Classification (Minaskuat Inc. 2009b, 2009c) and identification of relevant ecotypes;
- understanding of habitat/species relationships based on the literature;
- previous experience of the Study Team in Labrador with this species, including the insight to date from the telemetry programs; and
- the Study Team's understanding of the reactions recorded elsewhere to similar activities.

These information sources provided a high degree of certainty in the baseline conditions and prediction of environmental effects. The preliminary telemetry data also assisted in the interpretation to date and, when completed, will be used to further increase the level of certainty in the assessment.

Requesting Organization – Joint Review Panel **Information Request No.: JRP.9**

Information Request:

c. Given the small sample size for the two telemetry programs, the Proponent is asked to provide an evaluation of how representative the sample population is with respect to species specific habitat use and movements in the area and to justify the level of certainty of habitat association and impact prediction accorded to Black Bear and Moose within the EIS.

Response:

As indicated in JRP.9b above, the telemetry component of these Environmental Baseline Programs was designed to supplement existing information and knowledge of the Study.

In terms of representativeness, the Study Team captured Black Bear at locations where construction activities will be most intensive and where interactions with humans may be expected. The issue of human-bear interactions at similar construction projects in Labrador is well-documented (e.g., VBNC 1997) and improved understanding of movements would assist in the design and implementation of the Project EPP and monitoring programs (Volume IIB-Chapter 7).

Moose were captured and collared during their use of wintering areas within the lower Churchill River valley. The seasonal use of the lower Churchill River valley had been observed previously (as described in Volume IIA-Section 2.4.5.2), but not documented through the collection of continuous movement, such as through a telemetry program. The information presented to date has provided insight on daily and seasonal movements, habitat association during these periods, and timing of seasonal shifts in range for animals within the lower Churchill River watershed.

In relation to certainty, please refer to the response in IR#JRP.4 for a more complete explanation.

Requesting Organization – Joint Review Panel **Information Request No.: JRP.9**

Information Request:

d. The Proponent is asked to indicate and explain to the Panel any changes to the environmental effects assessment determination and conclusion of the EIS that may have resulted from new information collected during the telemetry programs.

Response:

It is not anticipated that there will or would have been any changes to assessment conclusions of the EIS resulting from the new information. To the contrary, it is anticipated that the additional information will further substantiate the conclusions.

The completed Environmental Baseline Reports (on Black bear and Moose) will be submitted to the Panel by the end of September 2009; the response to this IR will be submitted by October 9, 2009.

JRP.9
Supplemental Information
Black Bear Report

(Click above link to go to file)

JRP.9
Supplemental Information
Moose Report Part 1

(Click above link to go to file)

JRP.9
Supplemental Information
Moose Report Part 2

(Click above link to go to file)

Information Request Number: JRP.10

Herpetiles

Requesting Organization – Joint Review Panel **Information Request No.: JRP.10**

Subject - Herpetiles

References:

EIS Guidelines, Section 4.4.4.3 (Description of the Existing Environment – Terrestrial Environment)

EIS, Volume IA, Section 5.2.3.2 (Regional Environmental Setting and Context – Herpetiles) & Volume IIA, Section 2.4 (Existing Environment – Terrestrial Environment)

Minaskuat Inc. 2008g. Herpetile Surveys in the Lower Churchill River Valley. Prepared for the Lower Churchill Hydroelectric Generation Project.

Minaskuat Inc. 2008k. Wetland Assessment and Evaluation. Report prepared for the Lower Churchill Hydroelectric Generation Project.

Rationale:

The EIS Guidelines require the proponent to provide information on "composition, abundance, distribution, population dynamics and habitat utilization of terrestrial fauna, including mammals, avifauna (…) and **herpetiles**" (p. 27) (emphasis added).

Some information is provided in Minaskuat Inc (2008g) and Minaskuat Inc (2008k), which also recognize limitations in the data collected.

The EIS mentions the presence of several species of amphibians in Labrador (Volume IA, Section 5.2.3.2) and identifies the ecotypes that provide habitats for herpetiles (Volume IIA, Section 2.4). However, the EIS provides no indication on composition, distribution, abundance, population dynamics and habitat utilization as required in the guidelines, nor does the EIS provide an evaluation of the effects of the projects on herpetiles

Requesting Organization – Joint Review Panel **Information Request No.: JRP.10**

Information Request:

In order for the Panel to understand the effects of the project on herpetiles, the Proponent is asked to provide an analysis of the predicted environmental effects of the Lower Churchill Project on herpetiles, including the rationale for such predictions.

Response:

Please see Attachment A

ATTACHMENT A

Herpetiles

Environmental Effects Analysis

INFORMATION RESPONSES
LOWER CHURCHILL PROJECT
CEAA REFERENCE NO.07-05-26178

JOINT REVIEW PANEL

JRP.10
Herpetiles

June 29, 2009

nalcor energy
LOWER CHURCHILL PROJECT

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1.0 INTRODUCTION

The EIS Guidelines for the Lower Churchill Hydroelectric Generation Project issued by the Government of Canada and the Government of Newfoundland and Labrador in July 2008 made reference to herpetiles in the context of the requirements for the Description of the Existing Environment (Section 4.4.4.3). As a result of the initial review of the EIS by the Joint Review Panel, Nalcor received the following Information Request (IR):

> *In order for the Panel to understand the effects of the Project on herpetiles, the Proponent is asked to provide an analysis of the predicted environmental effects of the Lower Churchill Project on herpetiles, including the rationale for such predictions.*

The following assessment of environmental effects related to herpetiles follows the same approach that was used for other terrestrial Key Indicators (KI) as outlined in Chapter 9 of Volume IA (Nalcor Energy 2009). The assessment also follows the general format and structure of other terrestrial KIs as presented in Chapter 5 of Volume IIB (Nalcor Energy 2009).

2.0 EXISTING ENVIRONMENT

The term herpetile is derived from the word herpetology which is the study of amphibians (including toads, frogs and salamanders) and reptiles (including snakes, lizards and turtles). Amphibians and reptiles are both cold-blooded four legged vertebrates. The following discussion addresses amphibians as there are no records of reptiles occurring in Labrador. Although reptiles are not known in Labrador, the ITKC report identified a term for snakes.

> *"manitush (creatures with maleficent power, including toads, spiders, snakes, etc.)."*
>
> (p. 27)

Seven species of amphibians have been documented in Labrador. These include four species of frog; the wood frog (*Rana sylvatica*), mink frog (*Rana septentrionalis*), northern leopard frog (*Rana pipiens*) and the northern spring peeper (*Pseudacris crucifer*); the American toad (*Bufo americanus*) and two species of salamander; the blue-spotted salamander (*Ambystoma laterale*) and the northern two-lined salamander (*Eurycea bislineata*).

The amphibians found in the lower Churchill River watershed can be classified into two general groups (terrestrial and aquatic amphibians) based on their habitat preferences. Terrestrial amphibians typically breed in vernal pools where predators are not abundant, forage in several terrestrial habitats and hibernate underground. This group includes wood frog, spring peeper, blue-spotted salamander, and American toad. American toad is unusual in that they can breed in both permanent and vernal waters due to the fact that their tadpoles are poisonous.

The aquatic amphibians breed in permanent pools or streams, forage in or near aquatic habitat and hibernate in aquatic environments. This group includes mink frog, northern leopard frog and northern two-lined salamander. Northern two-lined salamanders however, hibernate both underwater and by burrowing in terrestrial habitat. This species also lives in streams rather than standing water.

The ITKC report refers to frogs in general and also provides reference to four species of amphibians.

> *"Kukamess (lake trout) eat mice, insects in or on the water such as butterflies, small fish such as cisco, small suckers and small burbot, as well as something that looks like mud. We have not seen lake trout eat frogs"(P3.28.11.06).*
>
> (p. 62)
>
> *"aniku American toad Bufo americanus*
> *Teteu northern leopard frog Rana pipiens*
> *Umatshashkuku mink frog Rana septentrionalis*
> *utshîtnâkuesh blue-spotted salamander? Ambystoma laterale reported for neighbouring rivers such as Kenamu, Goose, Beaver, and Red Wine Rivers. It may be present on Mishta-shipu. Drapeau (1991) records ushitshilauesh"*
>
> (p. 32-33)

2.1 Primary Sources of Information

Nalcor has prepared this response to IR00010 by providing an overview of the existing environment as it relates to amphibians:

- Available information presented in the Environmental Baseline Report (EBR) LCP 535746 – Herpetile Surveys in the Lower Churchill River Valley (Minaskuat Inc. 2008) is summarized;
- Amphibian sightings during environmental baseline surveys subsequent to the release of the EBR (Appendix A) are collated; and
- Innu environmental knowledge of the Mishta-shipu area of Labrador was completed by the ITKC (Innu Nation 2007) is compiled.

It should be noted that most literature related to amphibians in Labrador is of a distributional nature. Information regarding behaviour and other ecological aspects are derived from the extensive experience of the Study Team, from Labrador and elsewhere in Canada.

2.2 Baseline Conditions for Amphibians

The following discussion provides a brief summary of the population status of amphibians in Labrador which includes distribution and life history characteristics, as well as habitat and limiting factors of each of these species in Labrador. Species are grouped as terrestrial (wood frog, spring peeper, blue-spotted salamander, and American toad) or aquatic (mink frog, northern leopard frog and northern two-lined salamander). The discussion is based on the published literature, dedicated surveys undertaken for the Project (Minaskuat Inc. 2008a) and incidental (unpublished) observations by the study team in Labrador.

2.2.1 Wood Frog

Population

Wood frog records in Labrador are clustered within the Lower Churchill River watershed and in western Labrador north of Esker (Maunder 1997). Chubbs and Phillips (1998) also report wood frogs from the Kainairiktok and Adlatok watersheds north of the Churchill River. Wood frogs are explosive early spring breeders. Depending on temperature the breeding season may last only a week or two, extending under cooler conditions. The briefness of their breeding period, relatively cryptic colouration, and dispersed nature of individuals outside the breeding season make wood frog detection difficult. Chubbs and Phillips (1998), which provide more northern records, suggest that it is likely wood frogs are more common in Labrador than is

indicated by Maunder (1997). It would be expected that these frogs would have a range that extends further north as this species occurs in Alaska on the tundra. They are likely the most widely distributed and abundant frog species in Labrador, but due to difficulties with detection and identification there is a lack of credible records as shown in Maunder's (1997) range record map. In July of 2006, 2007, and 2008 a variety of directed surveys and incidental encounters during flora and other faunal surveys within the lower Churchill River watershed as well as brief casual searches revealed many locations where adult, juvenile or larval wood frogs were encountered.

Habitat Association

Wood frog typically breed in fishless and most often ephemeral pools (which have low numbers of multi-year development Odonata nymphs and other invertebrate predators) in both natural wetlands and roadside ditch pools. The ITKC report provides some insight regarding the interaction between fish and frogs in general.

> *Kukamess (lake trout) eat mice, insects in or on the water such as butterflies, small fish such as cisco, small suckers and small burbot, as well as something that looks like mud. We have not seen lake trout eat frogs (P3.28.11.06).*
>
> (p. 62)

Wood frog are primarily terrestrial (outside the breeding season) and can inhabit a variety of wooded and shrub covered habitats. Any forested or shrubby habitat can support wood frogs (vegetation composition not being especially relevant) as long as breeding pools are available and moist refuges like wetlands, forest pools or streams are nearby. These refuges are sought out in dry conditions during the active season. Wood frogs are less likely to occur in open, sandy or otherwise dry spruce and lichen forest or other more xeric vegetation communities far from any moist refuges, as wood frog lack the degree of moisture loss resistance of the skin and ability to dig down deeply into the soil. Drier and more open habitats far from water may be sought out during wet conditions. Wood frogs hibernate terrestrially and shallowly, typically in the forested or shrub dominated habitats that they use in the active period, beneath the leaf litter or in shallow soils within the frost line as they tolerate freezing. Here they depend on the modest insulation of the litter and soil and the snow above, and on the concentration of cryoprotectant in their bodies to keep them from experiencing lethal freezing. Wood frog habitat is therefore abundant in the Assessment Area.

Limiting Factors

Wood frog require vernal pool type habitat to breed (while toads have a wider range of breeding habitats) but these breeding habitats are not limited in Labrador. In one way wood frog terrestrial habitat is somewhat less broad than American toads, as they do not typically inhabit the drier areas that toads may frequent.

Wood frog populations are limited in Labrador because at increased latitudes or at higher elevations the growing season is too brief and temperatures too low to permit successful larvae development to transformation and development of some fat reserves prior to hibernation, or the shallow soil depths where wood frogs hibernate typically experience low temperatures exceeding their freeze tolerance

2.2.2 Northern Spring Peeper

Population

Northern spring peeper have relatively recently been confirmed as occurring in Labrador. Maunder (1983, 1997) did not include this species in Labrador's herpetofauna because reports of a sight record reported by Bleakney (1954, 1958) from western Labrador and an auditory record from a brook in the lower Churchill River watershed were unconfirmed.

Bergman (1999) reported and recorded choruses of spring peepers at points along Goose River and Peters River near Goose Bay and in an addendum reported an account given by Goose Bay teachers finding diminutive sticky footed tree frogs with spring peeper like colouring from near two lakes near the limits of the Town of Happy Valley-Goose Bay.

A variety of biological and ecological surveys (not directed towards amphibians) associated with this Project, in July of 2006, identified seven locations from both sides of the Churchill River where spring peeper were observed. These surveys were conducted outside the breeding season and no calls were heard. This species was directly encountered as adult and juvenile frogs, except for one tadpole found in a string bog/poor fen wetland which also supported northern leopard frog tadpoles and adults and mink frogs.

It is unclear if the locations of spring peeper from the lower Churchill River watershed are restricted in distribution and highly discontinuous from the nearest populations in Quebec or from the possible occurrence in western Labrador reported by Bleakney (1954, 1958). If Labrador spring peeper populations are disjunct, are relatively local and in low numbers, and have an abbreviated calling season then this could account for the lack of substantial records of peepers from the area, though Bergman (1998) describes a large chorus on June 14, 1998 in a wetland off the Goose River. Additionally the spring peeper breeding and post breeding calls can sometimes be confused with bird calls. Spring peeper are often heard but seldom seen in their spring habitats unless intensely searched for. In their terrestrial habitats spring peepers are highly dispersed and cryptic in colouring and behaviour so they are seldom seen.

The tadpole found in a string bog pool in 2006 suggests that, at least within the region of the lower Churchill River and the lower Goose River there is no scarcity of suitable breeding and terrestrial habitat. While little is known about the distribution of spring peeper in Labrador, it seems likely that many populations occur. All these factors (aside from simple lack of reporting) may explain the apparent paucity of local records.

Habitat Association

Spring peeper breed most often in fishless, often ephemeral, ponds and small water bodies both in and outside a variety of wetlands, including roadside ditch pool habitats. They are less affiliated with ephemeral pools than wood frog and may also breed in side pools off lakes and streams as well as in permanent ponds. In a given region they start breeding and calling after the wood frog and tend to continue calling many weeks after wood frogs are finished breeding. Bergman (1999) reports from June 14-15, 1998, scattered calls during the day, a large chorus at 22:15 and 2 calling near midnight from wetlands along Goose River. Chorus size is a function of the time in the breeding season, time of day or night, and temperature. Recently transformed and growing peeper froglets were noted from at least one site during the lower Churchill River rare plant survey on July 24, 2006 (Minaskuat Inc. 2008b). Outside the breeding season spring peeper are primarily terrestrial and although in the tree frog family (*Hylidae*) tend not to climb high in trees although they do occur in shrubs and herbaceous plants under damp conditions. They prefer forested and thicket habitats, in both wetlands and uplands, that have extensive canopy cover and are generally most abundant This species prefers more mesic forest and shrub habitats where moist refuges are available, rather than dry open forest types. Like wood frogs,

spring peepers hibernate within the frost affected ground zone and depend on cryoprotectants as well as the nominal insulation of forest litter and snow to protect them from lethal freezing.

Limiting Factors

Habitat suitable for spring peeper appears to be abundant in the lower Churchill River area and around Goose Bay. The apparent lack of records may reflect the lack of knowledge of spring peeper calls. Spring peepers may be limited in Labrador by areas where winter temperatures are so low that soil temperatures drop below the freeze tolerance of the shallowly hibernating frogs or where the growing season is too short to permit adequate growth of tadpoles to survive hibernation.

2.2.3 Blue-spotted Salamander

Population

The Labrador distribution of the blue-spotted salamander, a member of the *Ambystomatidae* (mole salamander family) is shown by Maunder (1997) to extend from points along the Trans-Labrador Highway from the Goose Bay area to near Churchill Falls. A 1974 record from 16 km south of Wabush and an apparently reliable sight record from Ugjoktok Bay, near Hopedale are reported in Maunder (1983). The range map in Petranka (1998) indicates that blue-spotted salamander have a primarily boreal and sub-boreal distribution and further west extend up to the lower and middle shores of James Bay. Many of the Labrador records are of adult or transformed juveniles, found under objects at the soil surface. As mole salamanders spend much time underground when not breeding this is remarkable, as outside of the breeding season it is often difficult to locate the transformed individuals. Petranka (1998) relates that blue-spotted salamanders are commonly found at the soil surface during the summer season. This, and the likelihood of finding adults under cover near breeding ponds in the spring and transformed juveniles in the fall, increases the odds of location. Blue-spotted salamander larvae do not closely resemble nor are generally found in the same habitat as the larvae of northern two-lined salamander.

The blue-spotted salamander was not observed during directed amphibian surveys and other biological surveys for this Project in 2006. On July 24, 2007 during a rare plant search, a road side pond along the north side of the Trans-Labrador Highway was opportunistically sampled and revealed three blue-spotted salamander larvae amid a greater number of wood frog and American toad tadpoles. On the evening on July 14, 2008 a roadside pond connected to drainage from a nearby wetland, along the north side of the Trans-Labrador Highway, west of Goose Bay was briefly sampled with a shallow net. This revealed over 20 blue-spotted salamander larvae as well as more numerous wood frog larvae. The distribution is evidently not limited to the lower Churchill River valley. The ITKC report notes this species in several locations in central Labrador.

> *"Utshîtnâkuesh (possibly the blue-spotted salamander - Ambystomalaterale) is found in Labrador, and Innu have seen it at Kamikuakamiu-shipu (Red Wine River), Mitinissiu-shipu (Beaver River), Uashikanashteu-shipu (Goose River), and Tshenuamiu-shipu (Kenamu River). It could also be in the Mishtashipu area" (P1/P5. 28.11.06).*
>
> (p. 52)

Blue spotted salamanders are likely much more widely distributed and common in Labrador than the relative paucity of records (Maunder 1997) suggests, though they require landscapes with soil depth sufficient for hibernation below the frost line.

Habitat Association

Like wood frog, blue-spotted salamander tend to be explosive breeders and may finish breeding in only a few nights to 2-3 weeks depending on location and temperature. Adults move to breeding ponds in early spring (likely mid- May into early June in Labrador) depending on weather conditions. Suitable breeding sites are comprised of a variety of fishless aquatic habitats including pools off lake shores, quarry and sand pit ponds, road side ditch pools, and woodland pools and some wetland pools and pools off small slow streams. Breeding waters can be ephemeral or permanent. These salamanders do not breed in streams or rivers, even if fishless, as the larvae are not adapted to moving waters. The eggs are deposited in small drifts and globs and sometimes singly amid aquatic vegetation and on pond debris and are far less detectable than the larger globular masses of wood frogs that may share their breeding sites. Larval development is brief, typically lasting only 2-3 months. In Labrador, larvae likely transform from August into September and move into nearby terrestrial habitats to hibernate.

Adult and juvenile blue-spotted salamander, outside the breeding season, are terrestrial and while often subterranean, are reported as much more active at or near the ground surface during summer months unlike most *Ambystoma* (Petranka 1998). Forest or tall shrub thicket with near breeding habitat is generally preferred over more sparsely vegetated habitats. At night when conditions are damp this species may forage at the surface. They hibernate deep in the soil below the frost line as they lack freeze tolerance.

Limiting Factors

Regions too far north or elevated to sustain a growing season sufficient to permit successful larval development to terrestrial juveniles able to hibernate would tend to lack blue-spotted salamander populations. Regions where soil depth is insufficient to enable these salamanders to penetrate below the frost line would limit this species. Soil and breeding water acidity may be a limitation but as Labrador has more recently deposited tills these have not likely leached out excessively and the salamanders will tend to be more tolerant of acidity.

The ITKC report provided the following comment from one of their informants.

> *"At times, the unusual can be fearful as the story of a white utshishkatataku (salamander) found up Tshenuamiu-shipu (Kenamu River) illustrates.* [94]
>
> > *Have you heard a story from our grandfathers of a utshishkatataku on Tshenuamiu-shipu? They say it is small like an otter. I heard she got bitten by it, when she was removing the boughs from an old camp site. The late Austin [Settler man] told us he saw something there too, about the size of a baking powder container, but it was long and thin, white in colour. They used a salmon spear to puncture it. They cut it in half, but the pieces joined back together again on their own. They threw gasoline all over it, and lit it, and that killed it" (P1, P3.28.11.06).*
>
> (p. 80)

2.2.4 American Toad

Population

Maunder (1997) presents American toad records from much of the easily accessed and settled southern Labrador. These are from the southern Labrador coast (near the lower Lewis River area up to the Domino area and Paradise River), and from the Lake Melville region (from Gull Lake on the lower Churchill River, the north western end of Grand Lake, from Churchill Falls and the southern reaches of the Smallwood Reservoir) and in extreme north western Labrador (as well as near Labrador City and Wabush). An apparent absence of toad records appears to exist from the upper reaches of the lower Churchill River watershed below Churchill Falls. The ITKC notes the presence of this species.

> *"In the past there used to be a lot of toads along the shore [at Sheshatshiu], but now there are no toads there. At my cabin at Mile 95 [on the Trans Labrador Highway] there are still lots of toads. There used to be more shore birds here as well. Also, there used to be a lot of dragonflies along the shore at Sheshatshiu, but there are hardly any now. Innu know the utshashumeku (Atlantic salmon) are in when there are dragonflies" (P1.16.11.2006)."*
>
> (p. 77)
>
> "*Mukamishu (American bittern) is found in rivers. It can dive. Eats toads. When dogs eat toads, they drool a strange fluid from their mouths. Slimy saliva. This is the only bird I know that eats toads" (P3.23.11.06).*[65]
>
> (p. 60)
>
> *"Tshinusheu (northern pike) eats mice and insects such as butterflies" (P1.28.11.06). "Pike also eats fish – any kind of fish it can find and it eats toads (aniku)" (P4.1.12.06).*
>
> (p. 62)

Environmental baseline studies associated with this Project in 2006, 2007, and 2008 (Appendix A) revealed many additional locations (to that of Minaskuat Inc. 2008a) along the lower Churchill River area and up the Goose River where American toads and their tadpoles occur. Toads appear to be widespread in Labrador, at least in the southern regions at moderate altitude. The wide range of terrestrial habitats as well as aquatic breeding habitats suitable for them means they likely occur throughout those regions of Labrador where there is sufficient soil depth and friability for toads to get below the level of frost penetration and the summer temperatures are sufficient to allow toads to grow, successfully hibernate and complete their larval development. The distinctive appearance of toads (as well as their short hops when retreating), make them easy to identify and capture relative to other Labrador frogs. Toads are frequently present in drier terrestrial habitats, in addition to the wetlands, and damp woods other amphibians as well as toads typically frequent. They often may be present in towns, gardens, and golf courses. Toad tadpoles are toxic, often schooling and are distinctively black in colour with small pigmented fins. This species tends to advertise presence rather than be as cryptic and quick to flee as near all other Labrador amphibian larvae. Toad tadpoles are often along quieter sections of rivers, and lake shores and are quite noticeable. These facts account in part for the greater records of toads from Labrador compared to any other individual amphibian species presented in Maunder (1997).

Habitat Association

American toad are among the most terrestrial of Labrador amphibians. Although they breed in water and may be highly amphibious in the breeding season, they are more desiccation resistant than the other six amphibian species in Labrador due to the nature of their thickened skin and their fossorial habits, digging into the soil to avoid dry conditions if moist refuges or cover objects are unavailable.

Toads emerge from hibernation when the soil thaws and generally start breeding immediately or soon after emergence. This is typically in June in Labrador and males may call day or night if temperature is sufficient. Their trilling call is distinctive. They breed in a variety of permanent and ephemeral aquatic habitats including the warmer, shallow and quiet waters of all sizes of rivers and streams, shallow and often well vegetated areas of lakes, ponds, ephemeral wetland pools, floodplain pools, ditch pools, farm, fire and gravel pit ponds. Toads may be excluded from the most acid waters and to some degree from the more ephemeral sites that do not endure long enough to achieve metamorphosis or where competition from wood frog tadpoles further retards their ability to transform. The eggs and tadpoles can develop in slightly brackish waters also, an anathema to most amphibians, and may be common in pools above the splash zone on rocky shores along the coast. The long gelatinous strings of black eggs are distinctive as are the resultant black tadpoles. The larvae transform to tiny toadlets in one season, noted in late July in the lower Churchill River watershed.

Toads inhabit most terrestrial habitats from open fields and roadside exposures to various shrub communities, and upland forests ranging from coniferous to deciduous tree dominated by varying moisture regimes from wet to dry as long as suitable breeding sites occur nearby. Human alteration of the habitat and fragmentation is less negative to toads than it is for many amphibians and they often persist in portions of cities and towns as well as landscapes intensively converted to agriculture. Toads will often show greater abundance in more mesic and productive areas where foraging opportunity greater than in drier habitats. Toads may also use the drier portions and fringes of a variety of wetland environments when not breeding. They can be active day or night but are more nocturnal when it is warmer especially under drier conditions. Without freeze tolerance (Storey and Storey 1992) American toad hibernate terrestrially below the frost line. Consequentially they require substrate where they can burrow below the frost. Given this, toads could be absent from large areas of surface bedrock exposure with little till depth cover or in areas where the permafrost meets the seasonal frost zone.

Limiting Factors

American toads are adaptable ecologically; in many ways with a greater niche depth in terms of both terrestrial and aquatic breeding habitats than any other Labrador amphibian. They are limited only in comparison to wood frogs by their lack of freeze tolerance which requires them to have a substrate or soil sufficient in depth and consistency present for them to get below the frost line to hibernate. Areas where permafrost meets seasonal frost penetration depth should exclude toads even if the other limitations of too short a growing season at higher latitudes or altitudes do not permit them to carry through their life cycle.

2.2.5 Mink Frog

Population

Mink frog records in Labrador (Maunder 1997) are from the lower Churchill River area in central Labrador, the southern shore of Lake Melville, along the western shore of Pocket Knife Lake, near Hopedale along the coast, South of Rigolet, and possibly from the vicinity of Nutak, in northern Labrador.

In 2006, 2007 and 2008 environmental baseline surveys for this Project, documented several records for mink frog along the lower Churchill River, as well as east of the Kenamu River (Appendix A). Mink frog appear to be

widely dispersed throughout the lower Churchill River valley, and are probably abundant in much of southern Labrador and perhaps northern Labrador. Mink frog have a clucking call, generally heard in July in Labrador, which may not be recognized as a frog call. Frogs are often skittish and jump into the water or duck beneath the surface prior to being detected. This behaviour, along with the relative scarcity of observers submitting accurate records or specimens to institutions may account for the relative paucity of mink frog records from Labrador.

Habitat Association

Mink frog are amphibious and are the most aquatic of the amphibians in Labrador. Except during relatively rare overland dispersals, mink frog are found in the water, often amid or on floating aquatic vegetation, or at the water's edge. They seek shelter in the water. Mink frog core habitat is in permanent water of lakes, larger pools in a variety of wetlands, and calm sections, side pools and lakes of river systems. Areas with abundant emergent and floating vegetation are preferred. Their tadpoles take more than a year to metamorphose, and they as well as the adults and juveniles hibernate under water in situations that do not freeze or become anoxic. Given these requirements, a small pool in a wetland that will freeze to the bottom may have mink frog during the summer but not be occupied during winter where the frog will hibernate or deposit its eggs. Dispersing juveniles may use such small pools. Mink frogs emerge relatively later from hibernation than other Labrador amphibians but by July they are calling and soon lay masses of eggs that may sink to the bottom and hatch into tadpoles in the warm water during summer. Tadpoles require at least two or more growing seasons to transform into froglets.

Water courses facilitate mink frog dispersal between wetlands and the ponds and lakes they inhabit. They can occupy sites with fish presence but will be more abundant in fishless ponds, or smaller sections or side pools of lakes and rivers where predatory fish like northern pike (*Esox lucius*) largely are excluded. The surrounding upland habitat type is not especially relevant to mink frogs but more mesic environments would tend to facilitate overland dispersal between lakes, rivers and wetlands with large pools.

Limiting Factors

Potential as well as recorded mink frog habitat in Labrador is abundant and widespread and the species undoubtedly is common. In areas of more northerly latitude or higher elevation, the short summer season and cold winter temperatures will at some point exclude mink frog whether by inhibiting successful larval development or hibernation.

2.2.6 Northern Leopard Frog

Population

Northern leopard frog records in Labrador are primarily from the lower Churchill River valley near Goose Bay and the lower Paradise River valley (Maunder 1997). Environmental baseline studies along the lower Churchill River have extended the known distribution further upstream towards Lake Winokapau. On July 18th, 2007 two adult northern leopard frog were observed along the Goose River. A credible sighting was made of a single northern leopard frog from a riparian shrub thicket some 25 km north of the Quebec Border, south of Minipi Lake, in September of 2004 (Appendix A).

Northern leopard frog are cryptically (yet distinctively) patterned but often jump when approached. This and the fact that they often forage along riparian meadows or in anthropogenic meadows near wetlands , rivers and lakes allows people to come across and identify leopard frogs at least in the more settled areas near Goose Bay and elsewhere where they have been reported (e.g., Paradise River).

It is possible that northern leopard frog are attracted to the lower Churchill River valley and its environs due to locally warmer temperatures. Knowledge about the true regional extent of their distribution in Labrador is also influenced by a lack of reporting of observations.

Habitat Association

Northern leopard frog are later spring breeders usually after the wood frog have completed their egg deposition. Their snoring and chuckling calls do not carry far and larvae should transform into juvenile froglets in one growing season and therefore breeding sites need not be perennial. In Wyoming some larvae are reported to overwinter (Baxter and Stone 1985) so this may occur in Labrador. Most larvae noted in July 2006 surveys of the lower Churchill River watershed were large, about to transform to the next lifestage, and wary. Recently transformed froglets and transforming larvae have been observed in late July 2007 surveys. Northern leopard frog tadpoles were found in the larger permanent pools of open string bogs/poor fens, as well as in apparently fishless oxbow marsh ponds adjacent to the Churchill River. These aquatic habitats do not dry up, may not freeze to the bottom or go anoxic and so could support any potential overwintering larvae as well as adults and juveniles. In Labrador, adult and juvenile northern leopard frogs prefer mesic open areas to forest and inhabit riparian and lacustrine marshes, open string bogs and poor fens, riparian meadows and more sparsely vegetated cobble shores, riparian thickets, and wetland fringing shrub thickets. Though amphibious, northern leopard frog use terrestrial habitats far more than mink frogs but less than American toad and wood frog. They hibernate aquatically at sites that do not freeze to the bottom. Areas with sufficient depth as well as some movement of water due to springs, or streams flowing through wetlands are preferred hibernation sites.

Limiting Factors

Northern leopard frog in Labrador extend farther upstream along the Churchill River than shown by Maunder (1997) but the extent of their distribution overall in Labrador is unknown. Northern leopard frog have a much greater range to the south and west than mink frog. In this northern end of their range the relatively warmer climate of the lower Churchill River as well as the abundant riparian meadows, riparian and oxbow and side channel marshes and ponds along this section of river may constitute important habitat and a dispersal corridor for leopard frog in this region of Labrador or they may have a broader as yet unrecorded range that connects to populations in Quebec.

2.2.7 Northern Two-lined Salamander

Population

Northern two-lined salamander appear to be widespread in southern Labrador with records extending from the Goose Bay area to Churchill Falls along the Churchill River and along the Trans-Labrador Highway. The first recorded specimen was noted about 16 km northeast of Labrador city in 1972 (Maunder 1983, 1997). As shown in Maunder (1997) in July of 1988 this author evidently did some directed searching under rocks along seepage slopes above brooks and rivers along the Trans-Labrador Highway between Goose Bay and Churchill Falls and found four locations, essentially demonstrating that this adaptable stream salamander is easily detected in prime habitat.

In surveys associated with this Project between 2006-2008 three sightings were made of this species: amid the wet cobble at two separate locations along the Churchill River immediately upstream of Muskrat Falls; and at an impoundment along the north side of the Trans-Labrador Highway, 22 km west of Goose Bay. A mink frog tadpole was caught and two adult mink frog, and American toad tadpoles were also noted in the pond.

Most of the records of northern two-lined salamander in Labrador are outside of the lower Churchill River watershed. They are likely more widespread in southern Labrador than the records from more settled or easily accessed areas suggest.

Habitat Association

Northern two-lined salamander are associated with small headwater perennial streams and seepage tracts, especially those with rocks beneath the surface and protruding. These areas generally do not contain fish and provide the moist conditions needed by the adults, as well as aquatic nesting and multi-year larval development sites. It is in these habitats that northern two-lined salamander can reach their greatest densities. These salamanders are adaptable and can also occur in larger streams and rivers, as well as perennially running slow streams over peaty bottoms in a variety of wetlands, though at lower densities where fish and other predators are in greater abundance or where nesting sites are scarce. While associated with running water, northern two-lined salamander can also breed in some types of ponds and other water bodies, and in some instances in lakes, especially where fish are not present (Bahret 1996). Riparian forest along a water body provides shade, and prevents the drying of smaller water courses but the adult and juvenile salamanders often move well away from the water during the summer if local conditions are moist enough. While it is unclear if northern two-lined salamanders mate on land, in the water, or both (Petranka 1998), females with collected spermatophores lay their white eggs to the underside of rocks, or other suitable cover in the waters of seeps, streams, and rivers. The females guard the eggs through hatching with incubation taking from 4-10 weeks depending on the population and temperature. The gilled larvae are generally benthic feeding during day and night but tending to stay under cover in calmer pools during the day. Northern two-lined salamander larvae take from 1 to 2 and sometimes 3 years to transform, especially in more northern areas, so perennial streams or seeps are essential for breeding. Transformed salamanders may spend time in brooks and other waters but often forage terrestrially both near water courses and at times more than 100 m away in mesic forest. In autumn they return to the seeps and streams where they either hibernate in the water or below the frost line near the banks. These habitats usually do not freeze and some feeding may occur in both adults and larvae though at a reduced rate throughout the winter.

Limiting Factors

Northern two-lined salamander are widespread in Labrador as the relatively few records suggest (Maunder 1983). Increasing elevation or latitude increases the shortness of the growing season and intensity and duration of cold temperatures will interfere sufficiently with recruitment or the physiology at some stage in the life cycle of the species to have the population excluded. Localized intense acidity may exclude these salamanders from streams.

2.3 Amphibian Habitat Classification for Labrador

Much of the terrestrial habitat in the lower Churchill River watershed provides some level of habitat quality for terrestrial amphibians; however, areas of primary habitat are restricted to wetland habitat and anthropogenic habitats such as roadside ditches and borrow pits which occupy a much smaller proportion of the landscape. The higher concentrations of these species appear to be associated with the more productive wetland habitats that occur mainly in the lower Churchill River valley. The distribution of aquatic amphibians is even more closely tied to wetland and riparian habitats found mainly in the lower Churchill River valley. Members of this group will be susceptible to change in habitat because within the Assessment Area they are highly dependent on habitat found primarily along the lower Churchill River valley. Any sections of the approximately 368 km of roads and 263 km of new transmission line that pass through wetlands could result in loss or alteration of habitat affecting the presence and breeding success of amphibians.

Primary habitat for terrestrial amphibians consists of wetland habitat and anthropogenic habitats such as roadside ditches and borrow pits that provide the vernal pool habitat that these species prefer as breeding habitat. A wide variety of terrestrial habitats and aquatic habitats provide secondary habitat. Tertiary habitats consist of terrestrial habitats that are too dry to provide good foraging or breeding sites. Primary habitat for aquatic amphibians includes wetland, riparian and open water habitat. All other habitat types provide tertiary habitat. Based on the knowledge of the Study Team of the habitat and life history characteristics of the species outlined above, the existing habitat of the lower Churchill River valley was classified as primary, secondary and tertiary for both the terrestrial and aquatic amphibians (Figures 2-1, 2-2, 2-3, 2-4).

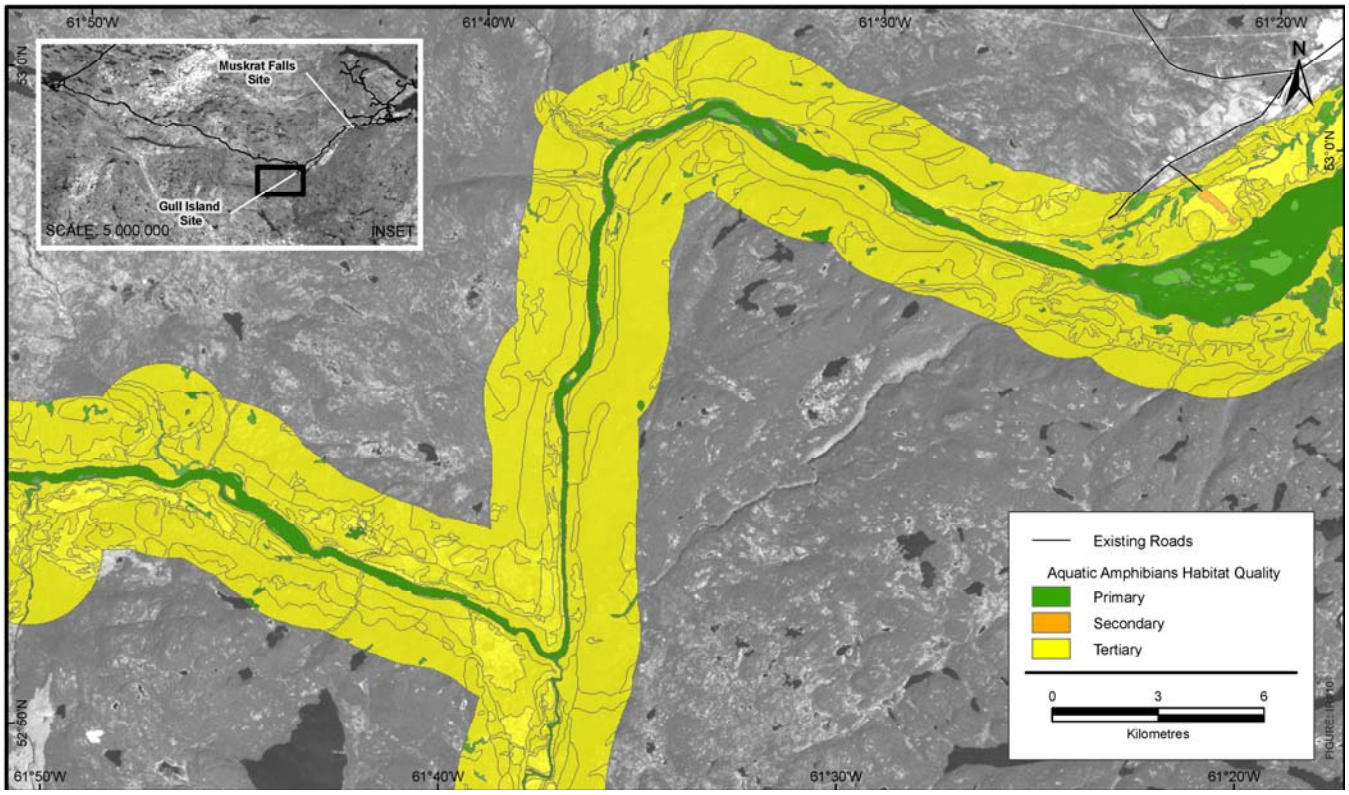

Figure 2.1 Aquatic Amphibians Habitat Quality: Gull Island

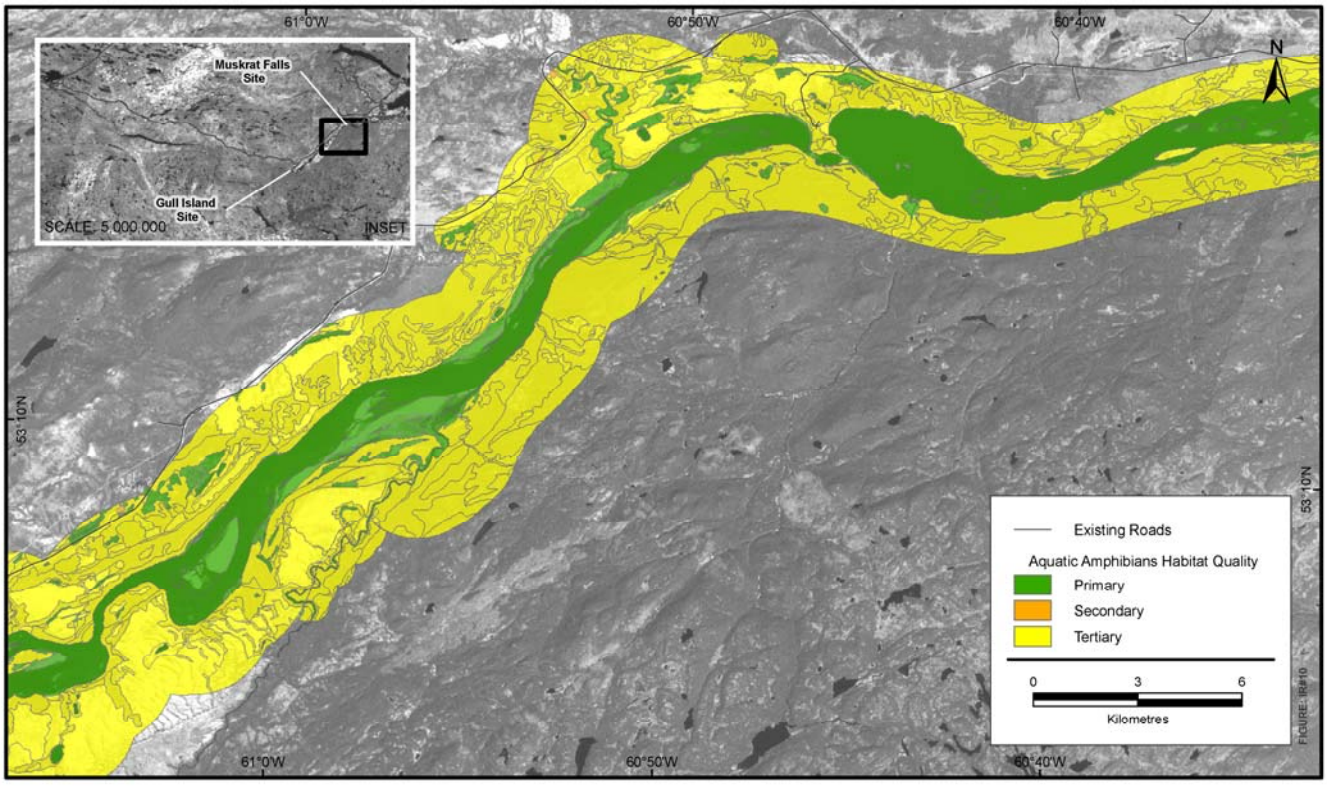

Figure 2.2 Aquatic Amphibians Habitat Quality: Muskrat Falls

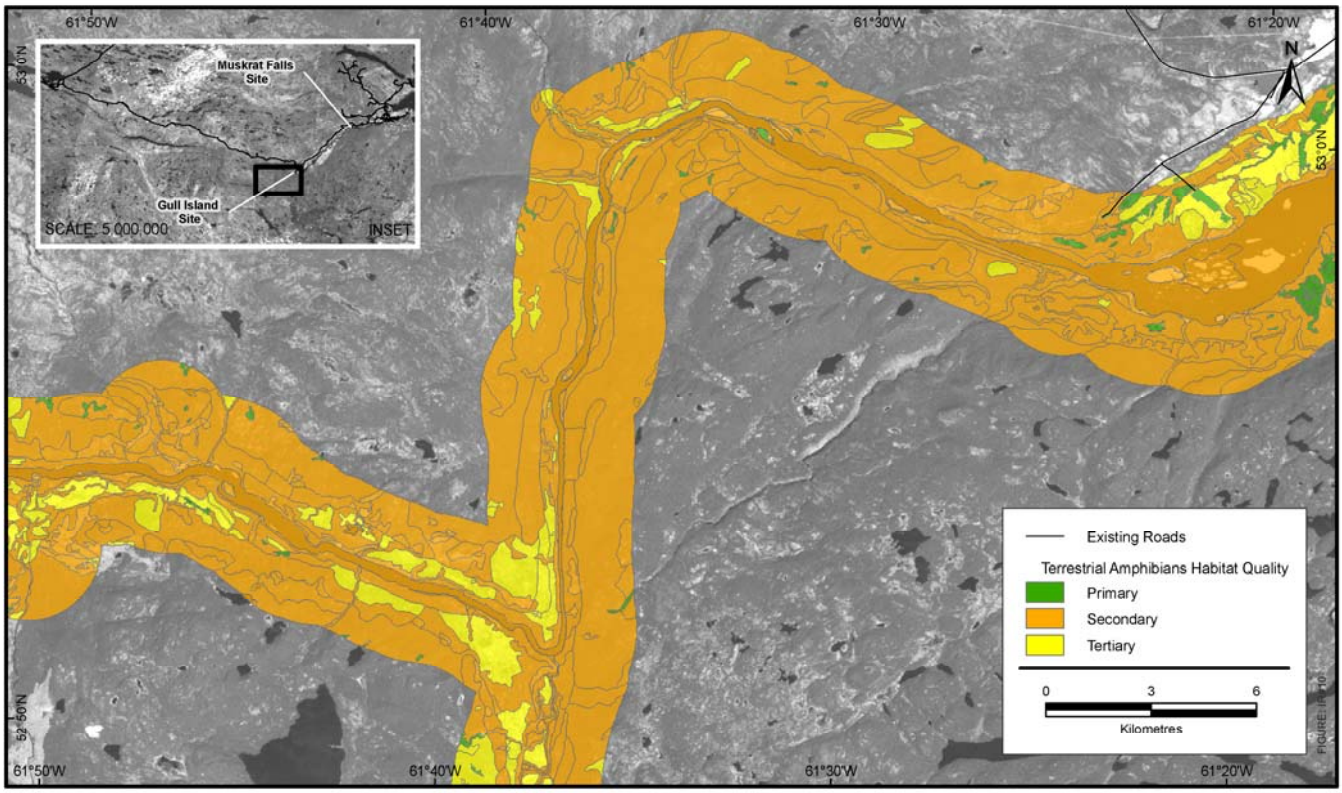

Figure 2.3 Terrestrial Amphibians Habitat Quality: Gull Island

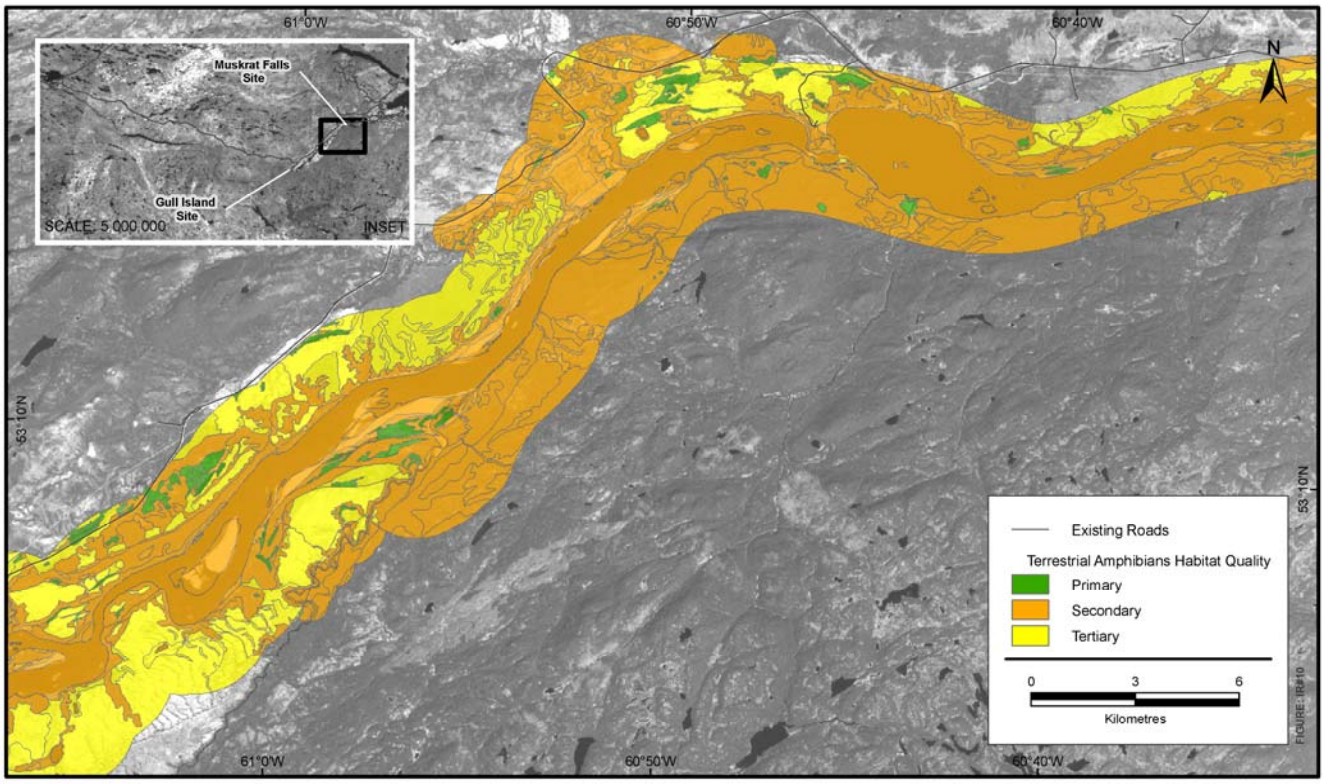

Figure 2.4 Terrestrial Amphibians Habitat Quality: Muskrat Falls

3.0 POTENTIAL INTERACTIONS

An interaction matrix between amphibians and all Project activities and components associated with each phase is presented in Table 3-1. Each potential interaction is ranked as 0, 1 or 2, depending on the level of expected effect. Where the Project does not have a measurable interaction with the Key Indicator (KI), a ranking of 0 is applied. For these interactions, Project-related environmental effects are unlikely and these are not considered further in the environmental assessment.

Any interaction that has the potential to result in a measurable environmental effect is ranked 2. These interactions require full assessment to determine the potential for significant adverse residual effects and to determine requirements for Project-specific mitigation and follow-up. Each of these interactions is fully assessed according to three effects categories:

Change in habitat – measured as the quantity (proportion) of primary habitat within the Assessment Area (i.e., the lower Churchill River watershed) that will be altered or lost because of the Project. Note that while there are other aspects of the Project that will cause habitat loss, the reservoirs are the main source;

Change in health – the life history of these species is compared to the life history of Osprey and otter (these species were assessed in a ecological risk assessment) to provide a relative indication of the potential for change in health; and

Mortality – number of fatalities as a proportion of the population present in the Assessment Area.

Table 3-1 Interaction of the Project Activities with Amphibians

Project Activities and Physical Works	Amphibians
Construction	
Upgrading and Constructing Site Access Roads	2
Site Preparation and Construction of Site Buildings	2
Excavation for and Installation of Generation Components	2
Concrete Production	1
Transmission Line Construction	2
Site Water Management	1
Camp Operations	1
Vehicular Traffic on-site	2
Quarrying and Borrowing	2
Reservoir Preparation	2
Impounding	2
Employment	0
Transportation and Road Maintenance	2
Expenditures	0
Operation and Maintenance	
Water Management and Operating Regime	2
Operation of Generation Facilities	1
Site Waste Management	1
Inspection, Maintenance, Repairs along Transmission Line	2
Employment	0
Transportation / Presence and Maintenance of Access Roads	2
Expenditures	0
Accidents and Malfunctions[A]	
Dam Failure	2
Forest Fire	2

Key:

0 No measurable interaction will occur. Assessment of environmental effects is not required

1 Identified interactions that are well understood, are subject to prescribed environmental protection measures or normal regulatory processes, and/or which can be mitigated/optimized through the application of standard environmental protection management measures and practices. Based on past experience and professional judgement, the potential environmental effects resulting from these interactions are rated not significant

2 Identified interactions that may result in more substantive environmental effects and/or public or regulatory concern. These interactions require more detailed analysis and consideration in the environmental assessment, in order to predict, mitigate and evaluate potential environmental effects

[A] Accidents and Malfunctions are addressed in Section 8

Interactions ranked 1 indicate their relatively limited extent, and/or standard procedures to mitigate any potential effects. In all cases, the rating of an interaction as 1 is based on the professional experience and knowledge of the study team and its confidence that there is no possibility for a significant adverse residual effect to occur, or for the effect to contribute measurably to the cumulative environmental effects of the Project. A significant adverse residual effect from the Project would cause a decline such that sustainable

amphibian populations cannot be maintained within the Assessment Area. A residual adverse environmental effect that does not meet these criteria is not significant.

Measurable parameters have been identified for each of the potential environmental effects categories discussed above (i.e., change in habitat, change in health and mortality). A measurable parameter is a definable aspect of a KI compared against a baseline value or condition. The measurable parameters used vary among KIs for each effect.

Table 3.2 Project Activities Ranked as 2 for Amphibians for Each Measureable Parameter

Project Activities and Physical Works	Change in habitat	Change in Health	Mortality
Construction			
Upgrading and Constructing Site Access Roads	✓	✓	✓
Site Preparation and Construction of Site Buildings	✓	✓	✓
Excavation for and Installation of Generation Components	✓	✓	✓
Transmission Line Construction	✓	✓	✓
Site Waste Management			
Camp Operations			
Quarrying and Borrowing	✓	✓	✓
Reservoir Preparation	✓	✓	✓
Impounding	✓	✓	✓
Transportation and Road Maintenance	✓	✓	✓
Operation and Maintenance			
Water Management and Operating Regime	✓	✓	✓
Operation of Generation Facilities			
Site Waste Management			
Inspection, Maintenance, Repairs along Transmission Line	✓	✓	✓
Transportation/Presence and Maintenance of Access Roads	✓	✓	✓
Accidents and Malfunctions A			
Dam Failure	✓	✓	✓
Forest Fire	✓	✓	✓
A Accidents and Malfunctions are addressed in Section 8			

4.0 ENVIRONMENTAL EFFECTS MANAGEMENT

Consistent with the *Environmental Policy and Guiding Principles* of Hydro, which has been adopted by all lines of business within Nalcor Energy, this Project has a central environmental objective of maintaining a high standard of environmental responsibility and performance through the implementation of a comprehensive environmental management system (Hydro 2002). A summary of standard effects management measures during both construction and operation and maintenance applicable to the terrestrial environment is provided

in Volume IIB, Table 5-9. Additional effects management measures specific to amphibians are provided in Table 4-1. Note these are in addition to those measures identified in Volume IIB, Table 7-1.

Table 4-1 Specific Effects Management Measures for Amphibians

Effects Management Measures
As part of the mitigation measures identified for other species (e.g., Wetland Sparrows), amphibians will also benefit from the development of alternative areas of riparian habitat within the lower Churchill River watershed that contain similar vegetation and structure
Prior to flooding of the reservoir an amphibian relocation program will be undertaken to move amphibians from the flood zone into newly created habitat
Wetland habitat along the transmission line route will be enhanced as amphibian habitat by excavating pools to create breeding and hibernation sites for amphibians
Habitat construction or creation of anthropogenic features such as ditches, settling ponds and borrow pit ponds would occur early in the construction phase to provide adequate time for plant communities to establish before flooding of the reservoir occurs
Borrow pits that are suitable for pond construction will be rehabilitated as pond and marsh habitat wherever possible once they are decommissioned.

5.0 ENVIRONMENTAL EFFECTS ASSESSMENT

5.1 Environmental Effects Assessment - Change in Habitat during Construction

The amphibian species present in Labrador require a combination of breeding, foraging and hibernation habitats. Breeding habitat consists of areas of open water in which eggs are laid and larval amphibians can develop. Foraging habitats consists of terrestrial, wetland and open water habitats that are used for feeding. Hibernation occurs in terrestrial habitat as well as in aquatic habitats depending on species.

A number of Project activities will affect amphibian habitat. Road construction will have both adverse and beneficial effects on amphibian habitat. Road construction can result in the loss of wetland habitat that provides primary habitat for both terrestrial and aquatic amphibians. However, roadside ditches and abandoned borrow pits can provide good breeding habitat for terrestrial amphibians that require vernal pools for breeding. Larger borrow pit pools could also provide suitable breeding, feeding and hibernation habitat for aquatic amphibians. Roads can also act as barriers to dispersal of amphibians.

Transmission line construction can result in disturbance of wetlands that may reduce their ability to support amphibians. However, rutting of wetland habitat from machinery tires can also create pools that provide amphibian habitat.

Reservoir creation will result in both a direct loss of breeding, foraging and hibernation habitat as well as a reduction in the quality of riparian habitat that re-establishes following completion of the flooding process. Much of the most productive amphibian habitat is situated in the floodplain of the lower Churchill River. Reservoir creation has the greatest potential to cause adverse effects to amphibian populations in the Project area (Table 5-1). Once the reservoirs are filled, approximately 25.7 km^2 or 7.6 percent of the primary aquatic amphibian habitat and approximately 3.4 km^2 or 6.5 percent of the primary terrestrial amphibian habitat in the lower Churchill River valley will be transformed into open water (Table 5-1). As indicated in Volume IIA, Section 2.4.2, primary habitat cannot be effectively characterized using the information for the Regional ELC (Minaskuat Inc. 2008c) for some species; however, the study team is aware that such primary habitat tends to be concentrated in the lower Churchill River Valley (Minaskuat Inc. 2008c, 2008d).

Table 5-1 Primary Aquatic and Terrestrial Amphibian Habitat for Aquatic Amphibians and Terrestrial Amphibians in the Lower Churchill River Valley following Construction

	Aquatic Amphibian Habitat in the Lower Churchill River Valley Project Area ELC		Terrestrial Amphibian Habitat in the Lower Churchill River Valley Project Area ELC	
	Km^2	Percentage	Km^2	Percentage
Total Area	1,635.0	100.0	1635.0	100.0
Existing Primary Habitat	338.5	20.7	52.6	3.2
Primary Habitat Lost due to Reservoirs	25.7	7.6	3.4	6.5
Remaining Primary Habitat	312.8	92.4	49.2	93.5

Displaced amphibians will move to occupy other habitats adjacent to the reservoirs. Because a moderate percentage (7.6 percent) of the primary habitat in the Assessment Area will be lost to inundation, alternate habitat may be of lower quality, and possibly cause a crowding effect. Amphibians could experience a change in health related to increased energy demands because of competition and lower quality forage or shelter. Dispersing amphibians would also be subject to higher rates of predation since crowding would make them more susceptible to predators. If the reservoir is flooded in the fall just before amphibians seek hibernation sites, amphibian mortality may increase due to a lack of suitable hibernation sites. Any change in abundance will reflect the reduced productivity associated with use of lower quality habitat, or increased intra-specific competition. Together, these additional stresses may result in a decline in abundance during construction.

Habitat change associated with Project activities can be expected to have a greater adverse affect on aquatic amphibians than on terrestrial amphibians. The oxbow ponds and marsh and rich fen habitat found in the floodplain of the Churchill River provide better aquatic amphibian habitat than the less productive bogs and poor fens associated with upland areas. Aquatic amphibians also make extensive use of riparian habitat which is abundant along the Churchill River.

The highly productive floodplain habitat also provides good habitat for terrestrial amphibians; however, these species are more widely dispersed on the landscape and less of their primary habitat is located within the area to be flooded. This group of amphibians may also benefit from the creation of vernal pool habitat associated with construction of roadside ditches, borrow pits and the creation of rut pools in wetlands crossed by transmission lines.

To offset the change in habitat, removal of forest vegetation 3 m above the future shoreline and the specific encouragement of the formation of riparian marsh wetland at selected locations in the watershed (Table 7-1, Volume IIB) will assist development of new riparian zones and eventually provide primary habitat for aquatic amphibians. Although alder-dominated thickets may establish along the new high water level, the hydrology, soil and microclimatic conditions do not favour the natural re-establishment of marshes. The haul roads used to remove timber and the access roads for dam construction will provide suitable breeding habitat for terrestrial amphibians in the form of vernal pools. Wherever possible, road ditch construction should favour the retention of water to provide vernal pool habitat. This is particularly important for portions of roads that are located outside of the flood zone. No special consideration is required for roads in the flood zone since these areas will be lost as amphibian habitat once the area is flooded. When roads are decommissioned following the end of construction activities, ditches that hold water should be left intact. Settling ponds and borrow pits will also provide good amphibian habitat. The larger pools can be expected to be colonized by aquatic amphibians which will use them for breeding, foraging and hibernation habitat while the smaller pools will be used by terrestrial amphibians as breeding habitat. Borrow pits that are suitable for pond construction will be rehabilitated as pond and marsh habitat wherever possible once they are decommissioned.

As a mitigation measure to reduce environmental effects during construction, riparian vegetation of approximately 30 m wide (Hang 2000; Whitaker and Montevecchi, 1997, 1999) will not be removed during the preparation of the Muskrat Falls Reservoir. Primary habitat occurs along the Churchill River, but outside the river valley riparian marsh is uncommon (Table 5-1). Nalcor Energy proposes to offset this loss of habitat by developing alternative areas within the lower Churchill River watershed that contain similar vegetation and structure. If creation of riparian marsh habitat is successful, it will provide good habitat for a variety of amphibian species including both aquatic amphibians and terrestrial amphibians.

The dust and noise associated with Project activities will further influence immediately adjacent habitat not surficially disturbed. Dust can greatly influence the productivity of adjacent wetlands by limiting the penetration of sunlight as it settles on water, and through clogging the pores of photosynthesizing plants.

5.2 Environmental Effects Assessment - Change in Habitat during Operation and Maintenance

During the operational phase of the Project some suitable amphibian habitat may develop along the margins of the reservoir. The value of these areas as amphibian habitat will be influenced by the timing and consistency of drawdown events and the nature of the substrates. Drawdown areas containing shallow pools and dense vegetation would provide good habitat particularly if they remain drawn down during the period when amphibians are active. Frequent flood and drawdown events during the summer months that would reduce the ability of these areas to support amphibian populations by exposing larvae and adults to predation by fish and altering the ability of the site to support plant cover are not expected.

Inspection, maintenance and repairs along the transmission line could cause physical disturbance to wetland habitat along the transmission line route. This damage can have both adverse and beneficial effects on amphibians. There is some potential for mortality of adults, larvae and eggs as a result of the passage of maintenance equipment through wetlands. However, wheel or track ruts created by these activities can also result in the formation of suitable breeding habitat for amphibians, particularly terrestrial amphibians.

5.3 Environmental Effects Assessment - Change in Health

The Project could adversely affect the health of amphibians as a result of exposure to methylmercury for amphibians occupying the margin of the new reservoirs. Mercury is naturally occurring and present in all organisms. When land is flooded through reservoir creation, existing mercury in the soil (whether naturally occurring or deposited through the global mercury cycle) and mercury that migrates to the new sediment (i.e., flooded soil) through the water column can undergo methylation, primarily by sulphate-reducing bacteria. Methylation is a chemical process that converts less toxic inorganic mercury to a more toxic form, methylmercury. Newly flooded areas can have higher methylmercury concentrations than natural water bodies because flooded vegetation (e.g., ground cover, leaves, and moss) is used as a food source by the bacteria responsible for methylation. As smaller aquatic organisms are eaten by larger ones, methylmercury biomagnifies in the consuming wildlife and becomes more concentrated in species at each step higher in the food chain.

Increased methylmercury levels are a potential issue for amphibians since they spend much of their life in water where they consume aquatic animals and plants. Aquatic amphibians such as mink frog, northern leopard frog and northern two-lined salamander would have the greatest potential to accumulate methylmercury for several reasons. Firstly, they would be more likely to spend more of their life in the reservoirs than terrestrial amphibians such as wood frog, spring peeper and blue-spotted salamander. The aquatic amphibian group typically spends their larval stage and much of their adult stage in or near aquatic habitats. With the exception of the northern two-lined salamander, they also hibernate under water. Mink frog would be the species most

likely to be exposed to methylmercury. Mink frog larvae take several years to mature rather than one year and the adults rarely leave the water. As such, they obtain most of their food from aquatic environments. They also tend to favour larger water bodies such as shallow areas of reservoirs.

Terrestrial amphibians would have less potential to accumulate methyl mercury. These species typically avoid large fish bearing water bodies such as reservoirs. Their larvae spend only a few months in aquatic environments and the adults do much of their foraging in terrestrial habitats. They also hibernate in terrestrial habitats and would therefore be less likely to absorb methylmercury through dermal contact.

Little is known regarding the effect of exposure to elevated concentrations of methylmercury on amphibian populations however these species are known to accumulate this compound. In Ontario concentrations of methylmercury in amphibians was found to range from 68 to 445 micrograms per kilogram wet weight of tissue, compared to 130 to 2,200 micrograms per kilogram wet weight for fish and 14 to 2,200 micrograms per kilogram wet weight for invertebrates (Environment Canada 2009: internet publication Canadian Tissue Residue Guidelines: Methylmercury). Pig frogs (*Rana grylio*) present in mercury contaminated wetlands contained concentrations ranging as high as 2.05 milligrams of total mercury per kilogram fresh weight which was higher than the Florida safe level for fish consumption of 1.5 milligrams per kilogram fresh weight (Eisler 2006: Mercury Hazards to Living Organisms: CRC Press 312 pp). Toxicity testing on South African clawed frogs (*Xenopus laevis*) has demonstrated impaired gamete function and reduced early life survival at mercury body burdens greater than 0.48 milligrams of mercury per kilogram fresh weight (Eisler 2006). Toxicity testing of tadpoles of the toad *Bufo melanositcus* and the frog *Rana breviceps* revealed a 96 hour LC50 of 56.0 micrograms of mercury per litre of medium for the toad tadpoles and 60.0 micrograms of mercury per litre of medium for the frog tadpoles.

Amphibians (particularly aquatic amphibians) are likely to accumulate methylmercury in a manner similar to omnivorous fish or fish species that are primarily insectivorous. Methylmercury concentrations in lake whitefish (an insectivorous species) in the Le Grande reservoir complex in Quebec (Schetagne et al. 2006) increased to concentrations two to three times higher than baseline concentrations within five years of reservoir flooding but returned to baseline conditions within ten to twenty years of reservoir flooding. It is unlikely that amphibians will be eliminated from the newly created reservoirs during the ten to twenty year period in which methylmercury concentrations will be elevated.

5.4 Environmental Effects Assessment – Change in Mortality during Construction

There are several potential sources of mortality during the construction phase of the Project including flooding of the reservoir, construction of roads and transmission lines, forest harvesting, and collisions with vehicles. Flooding of the reservoir will have the greatest potential adverse effect on amphibian populations. Given the proposed timing of the reservoir flooding in late summer and fall and the limited ability of amphibians to disperse, it is likely that most amphibians located within the flood zone will perish as a result of flooding either through direct mortality or the effects of possible crowding after flooding has been completed depending on local availability and distribution of some habitats. Although only about 8 percent of primary habitat for aquatic amphibians and 6 percent of primary habitat for terrestrial amphibians will be lost overall as a result of flooding, the habitats located in the lower Churchill River watershed provide better quality amphibian habitat and can be expected to support greater concentrations of amphibians.

Road construction and forest harvesting operations will result in the loss of amphibians that are unable to avoid heavy equipment. Most of this activity will occur in the flood zone of the reservoir and will not represent additive mortality since most amphibians present in this area will be lost as a result of the flooding. Roads constructed outside of the flood zones would contribute to additional amphibian mortality. The area occupied

by roads is small and traffic volumes are not high so the numbers of amphibians lost as a result of construction activity and road kill is not expected to be high.

Construction of transmission line could also result in mortality of amphibians. In transmission line construction the forest floor will be left intact so the potential for terrestrial amphibians to be killed by construction activities is reduced.

Mitigation to minimize mortality to amphibians would include avoidance of disturbance of wetland habitat wherever possible. These areas typically do not contain merchantable timber and are difficult for heavy equipment to traverse so there is no incentive to enter them. Where it is necessary to cross wetlands, corduroy road should be constructed and all traffic should be routed through a single crossing point rather than multiple crossing points.

5.5 Environmental Effects Assessment - Change in Mortality during Operation and Maintenance

The main source of mortality during the operational phase of the Project will be road kill of amphibians on access roads. Roadside ditches can be expected to attract terrestrial amphibians seeking breeding sites. This will increase the concentration of amphibians around roads particularly during the spring when amphibians gather to breed and later in the summer when larvae metamorph into adults and leave their natal pools. The road surfaces are a hostile environment for amphibians and they are unlikely to linger on them unless there are relatively deep puddles or wheel ruts that they can use for cover and rehydration. Frogs often jump into these wheel ruts to escape approaching vehicles and can be killed when the vehicle's tires run through the rut. The amount of traffic on these roads is not expected to be high so the incidence of amphibian road kill is not expected to have a significant adverse effect on local amphibian populations. The frequency of amphibian collisions could be reduced by maintaining the road surfaces well graded to prevent the formation of rut pools deep enough to attract frogs and by regulating vehicle speed.

6.0 SUMMARY OF RESIDUAL ENVIRONMENTAL EFFECTS AND EVALUATION OF SIGNIFICANCE

A summary of the significance of residual environmental effects of Project activities on amphibians is presented below. The environmental effects ratings in terms of change in habitat are determined for primary breeding habitat.

6.1 Construction

The main environmental effect will be the loss of amphibian breeding habitat within the Terrestrial Environment Assessment Area due to the creation of reservoirs. These sites will not be disturbed during reservoir preparation until they are inundated in the fall (following the breeding season). There will be a loss of approximately 7.6 percent of aquatic amphibian primary habitat and 6.5 percent of terrestrial amphibian habitat within the lower Churchill River valley. There will be an additional 16 km^2 of habitat cleared due to temporary and permanent access roads that would extend beyond the valley and connect with the TLH. The exact location of the access roads, and therefore the quantity and quality of habitat altered or lost, is not known at this time, but is expected to be minor in comparison with the effects of impounding. It was not possible to delineate primary habitat beyond the lower Churchill River valley (Regional ELC scale) in the remainder of the Assessment Area. While other primary habitat undoubtedly exists elsewhere in the watershed, it is limited in abundance. This limitation suggests that the magnitude of site-specific and local activities is moderate (i.e., 5 to 25 percent of Assessment Area population or habitat would be affected) during construction. Only the environmental effects from transmission line construction would be reversible. This change in habitat quantity and quality will result in similar effects (i.e., magnitude, geographic extent, duration, reversibility and ecological context) for distribution

and abundance of amphibians, with both expected to result in a population decline. Changes in health may occur in situations where animals displaced temporarily or permanently occupy new habitats, potentially of lower quality. The resulting changes in territory size and range may also increase the vulnerability of individuals to predation.

Residual primary habitat will remain within the Assessment Area, to which amphibians may be displaced following impoundment. Baseline studies indicate that the diversity and productivity of wetlands outside the existing floodplain are lower than those within and are unlikely to support those displaced individuals. This will result in an overall decline in abundance for the Assessment Area. Displacement may also predispose individuals to greater levels of predation.

Wherever possible, habitat construction or creation of anthropogenic features such as ditches, settling ponds and borrow pit ponds should occur early in the construction phase to provide adequate time for plant communities to establish before flooding of the reservoir occurs. Early construction will also provide time for amphibians to colonize these sites before reservoir flooding occurs. Just prior to flooding of the reservoir an amphibian relocation program will be undertaken to relocate amphibians from the flood zone into newly created habitat. The relocation operation will ensure that amphibians have an opportunity to colonize the constructed habitat and will help to reduce the number of amphibians lost as a result of reservoir flooding. The operation could be conducted by workers such as students under the direction of persons skilled in amphibian identification and natural history. It will be important to ensure that species are relocated to appropriate habitat to maximize success.

Wetland habitat along the transmission line route could be enhanced as amphibian habitat by excavating pools to create breeding and hibernation sites for amphibians. These pools will be constructed in wetlands that provide good foraging habitat or are located immediately adjacent to good foraging habitat. The pools would also be constructed near the edge of the wetland and close to an existing access route to minimize disturbance to the wetland.

Among the options for mitigation under consideration and evaluation is the creation of comparable wetland habitat along the riparian fringe of the newly created reservoirs or creation of suitable wetland habitat along tributary streams and watercourses adjacent to the reservoir. This would benefit both aquatic and terrestrial amphibians but would have the greatest benefit for aquatic amphibians. As indicated above, the construction of roads, settling ponds and borrow pits provides opportunities to create additional amphibian habitat and pools associated with these activities would mainly benefit terrestrial amphibians. Road and transmission line construction will also provide opportunities to enhance amphibian habitats in existing wetlands through the construction of pools. These mitigation measures may offset some amphibian habitat loss and further reduce potential adverse effects. Habitat creation would be the subject of follow-up monitoring to confirm the effectiveness of this mitigation.

Dust generated during construction activities will be addressed through a series of mitigation measures outlined in the EPP to control dust emissions. Estimated noise levels could interfere with the ability of frog and toad species to attract mates since their vocalizations may be obscured by construction noise. This potential adverse effect should be local and will last only for the duration of the construction phase of the Project.

Change in health due to amphibians being displaced permanently, or at least temporarily, may occur because of occupying habitat that is of lower quality and, therefore, more energy demanding. In addition, release of methylmercury as a result of decomposition of inundated ground cover can be expected to increase mercury body burdens in amphibians residing around the periphery of the reservoirs possibly resulting in adverse health

effects such as reduced reproductive success. This effect will be temporary and mercury concentrations in amphibians are expected to return to baseline levels within 10 to 20 years.

Direct amphibian mortality can also occur as a result of amphibians being killed by heavy equipment and vehicles engaged in road and transmission line construction and forest harvesting. This source of mortality is not significant in comparison to mortality associated with reservoir flooding and in most cases is not additive to reservoir flooding since the forest harvesting and most road construction will occur in areas that will be flooded.

In these cases, the environmental effects will be difficult to measure, but, due to the limited availability of adjacent high quality primary habitat, Project construction is expected to have an adverse environmental effect on abundance and distribution of amphibians related to the loss and alteration of habitat. Although the magnitude of the residual environmental effect is high and a decline is anticipated for these species, amphibians will continue to breed in the Assessment Area, including in the anticipated new wetland areas and breeding pools developed in association with construction activities (ditches, settling ponds, borrow pits and enhancements to existing wetlands). The residual environmental effect of Project activities during construction is therefore considered to be **not significant** (Table 6-1). Further details are presented in Appendix B.

Table 6-1 Summary of Residual Environmental Effects Assessment for Amphibians

Criteria	Construction Phase	Operation and Maintenance Phase
Nature	Adverse	Adverse (and positive for some aspects)
Magnitude	High	Low
Geographic Extent	Local	Local
Duration / Frequency	Permanent, Regular Basis	Permanent, Regular Basis
Reversibility	Reversible	Irreversible
Ecological Context	Undisturbed	Disturbed
Certainty	High	High
Significance	Not Significant	Not Significant
Likelihood	Not applicable	Not applicable
Notes: As the residual adverse environmental effect is not significant, there will be no change in species richness, and therefore no change in biodiversity Methods explained in Volume IA, Chapter 9 Criteria defined in Volume IIB, Section 5.5		

6.2 Operation and Maintenance

There will be no further surface disturbance beyond the Project area. Over time, riparian vegetation and wetland habitat will establish around the periphery of the reservoirs. How much, riparian and wetland habitat establishes is not known at this point; however, over time there will be a net improvement in amphibian habitat. The magnitude of the environmental effect would be high on a local scale, and occur continuously for the life of the Project.

The distribution of amphibians as a result of activities during construction (e.g., reservoir preparation, impoundment) would adjust to the changes on the landscape and stabilize as individuals colonize new habitat. Vegetation management along new transmission lines will alter habitat on previously disturbed (during construction) areas and, by continuing over the life of the Project, could potentially cause infrequent and small scale mortality events associated with amphibians being struck by equipment. Similarly, vehicle traffic on access roads can also be expected to cause some mortality of amphibians along roads.

These activities will occur over a relatively small area (compared to that of construction activities) with water management considered as irreversible and vegetation management as reversible. Because amphibians will persist, despite disturbance, in remaining and newly created habitats, the environmental effect during operation and maintenance is considered to be **not significant** (Table 6-1). Further details are presented in Appendix B.

7.0 CUMULATIVE ENVIRONMENTAL EFFECTS

The Innu include this group of species among important 'environmental health indicators'.

> *To summarize the results of the discussion concerning the environment today, ITKC members identified a number of "environmental health indicators" including body fat, marrow fat in the case of caribou, water that tastes "good," absence of disease in animals, and absence of animals that have not died for no apparent reason. A relative scarcity of some species such as toads, dragonflies, and bake apples may be seen as an indicator of problems in the normal state of affairs, attributed in part to proximity to Goose Bay and Sheshatshiu, although the agents directly responsible for these changes were not identified.*
>
> *(p. 78)*

Although the Project is expected to have an adverse effect on local amphibians, the environmental effect is predicted to be minimal to the continental population of amphibians. All of the amphibian species present in the Project area are common, with secure populations in the southern portions of their ranges. The environmental effect within the Assessment Area may be further mitigated through the creation or enhancement of additional amphibian habitat. Other future activities in the Assessment Area are not expected to have a noticeable adverse effect on amphibians even at a local scale. The greatest influences on amphibian populations overall are likely to remain habitat loss with respect to all parts of their life cycle, most of which are likely to continue increasing in the future. A description of the other activities under consideration is presented in Volume IIB, Section 5.15.

Creation of the reservoirs is likely to account for nearly all of the habitat loss in the Assessment Area. The construction of access roads will contribute additional habitat loss and alteration, but of lesser consequence. Other activities such as transmission line and road construction may have a minor additional effect on distribution and abundance through additional habitat loss. Military training will not result in measurable environmental effects to amphibians. The cumulative environmental effect will be at a regional level, continue over the long term, will be reversible and will occur predominantly in a previously undisturbed area. As a result of inundation, much of the existing population will be displaced, and a reduction in abundance is to be expected. There will be a long term recovery period resulting in the population stabilizing at a level likely to be lower than that of the pre-disturbance population.

During operation and maintenance, some additional pressure is expected on amphibian populations due to forestry operations, and some maintenance and expansion of roads. Disturbance to primary habitat such as riparian and wetland habitat is expected to be minimal. Forest harvesting operations can adversely affect amphibian habitat over fairly large areas. Habitat loss associated with forestry operations will be temporary and will be partially offset through the creation of additional breeding habitat in the form of roadside ditches and wheel rut pools along skidder trails. Maintenance programs related to the Project may cause temporary local disturbance and localized mortality of small numbers of amphibians. These activities will continue at the regional level, in perpetuity, will be reversible and will generally not occur in primary amphibian habitats. Once populations stabilize following construction, the populations of amphibians are not expected to change substantially because of any subsequent activities.

Nalcor Energy proposes to establish/create primary habitat for aquatic and terrestrial amphibian species. This will include construction of habitat approximating riparian meadow and marsh habitat along the shores of the reservoirs as well as the modification of existing wetlands to enhance amphibian habitat and rehabilitation of anthropogenic features such as roadside ditches, settling ponds and borrow pits to provide primary amphibian habitat. The program of habitat creation will require follow-up monitoring to maximize the probability that it is successful. As a result of the proposed mitigation and environmental protection measures, and the fact that other primary habitat exists beyond the reservoirs, the cumulative effect of all past, present and reasonably foreseeable projects and activities, in combination with the environmental effects of the Project, is considered to be **not significant** during the construction or operation and maintenance phases.

8.0 ACCIDENTS AND MALFUNCTIONS – AMPHIBIANS

A description of the scenarios evaluated under Accidents and Malfunctions is presented in Volume IIB, Section 6.0.

A dam failure would inundate and alter or destroy primary habitat for amphibians in riparian habitats downstream of the dam failure. Mortality of amphibians would also be expected to occur. These areas would be recolonized in subsequent years, depending on the local hydrology and associated vegetation succession.

A forest fire caused by the Project would likely cause only limited direct loss of wetland or riparian habitat, but could result in destruction of large areas of secondary habitat for terrestrial amphibians. The fire would likely result in mortality of terrestrial amphibians foraging in forest habitats. The burned areas would be transformed into tertiary habitat until forest cover re-establishes on the burns. The magnitude of the effect would likely be low and the duration short term.

9.0 CONCLUSIONS AND SUSTAINABILITY

As the summary of environmental effects on amphibians was concluded to be not significant, these findings are therefore consistent with the conclusions presented in Volume IIB, Section 7.2.3. As outlined in Volume IIB, Section 7.4.2.2, the environmental effects of the Project on all terrestrial Key Indicators were predicted to be not significant during either construction or operation and maintenance. This infers that the sustainability of each population, including the amphibian populations examined in this IR, will not be compromised as a result of the Project.

A monitoring program will be initiated to assess the effects of methylmercury contamination on amphibians in the lower Churchill River valley. The monitoring program would collect baseline concentrations of methylmercury in local amphibian populations both inside and outside the reservoirs. Amphibians would be collected before and after the formation of the reservoirs and tested for methylmercury.

Although adverse environmental effects are noted, they will be managed and monitored accordingly; the species present in the lower Churchill River watershed will continue to persist. Therefore, biological diversity is not affected by the Project.

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APPENDIX A

ADDITIONAL AMPHIBIAN SIGHTINGS
SUBSEQUENT TO MINASKUAT INC. 2008

Central Labrador **Appendix A - Additional Amphibian Sightings Subsequent to Minaskuat Inc. 2008**

Species	Number	Date	Site	Location or General Co-ordinates	Habitat	Survey
LEFR	1 Ad	?-10-2004	Practice Target area south of Minipi Lake	Practice Target area south of Minipi Lake	RT	Mike Crowell
AMTO	>1000 Tads	31-7-2006	LCM 34	long. 60.7315, lat. 53.2366	RI, side pools	Rare Plant
AMTO	>4, juv. Yr. +	31-7-2006	LCM36	long. 60.7315, lat. 53.2366	GB	Rare Plant
NTLS	2 Ads	12/7/2007	LCM2	20U 0593177, 5872167	RI	Rare Plant
WOFR	1 Ad	13-7-2007	LCM6	Wp477, long 61.745, lat 52.8825/ 584403, 5859936	WL, SD edge	Rare Plant
MIFR	> 8 Ads calling	13-7-2007	LCM6	Wp477, long 61.745, lat 52.8825/ 584403, 5859936	WL	Rare Plant
LEFR	> 5 Ads + Tads	13-7-2007	LCM7	Wp 487 (long 61.8281,lat 52.8935)	BF, pond	Rare Plant
MIFR	several Ads + Tads	13-7-2007	LCM8	20U 0566386, 5862434 (long 62.0146, lat 52.9060)	RI, WL pools	Rare Plant
AMTO	>500 Tads	13-7-2007	LCM8	20U 0566386, 5862434 (long 62.0146, lat 52.9060)	RI, WL pools	Rare Plant
LEFR	>5 Ads + juvs	14-7-2007	LCM9	Wp 498-517 (long. 62.3172, 53.0997)	GB,RM, RT	Rare Plant
AMTO	> 100 Tads	18-7-2007	GRM 1	Wp 532 (long. 60.4771, lat. 53. 37822/ or 20U 0667810.9, 5917311	RI, pool	Rare Plant
AMTO	100's to 1000+ Tads	18-7-2007	GRM2	Wp535, 20U 0663528, 5915992	RI, pool	Rare Plant
AMTO	2 juvs	18-7-2007	GRM3	Wp 538, 20U 0662839, 5914503	Sand bar, RT	Rare Plant
LEFR	1 Ad	18-7-2007	GRM4	Wp 541, 20U 0658105, 5912902	RM, RT	Rare Plant
AMTO	1 juv	18-7-2007	GRM 4	Wp 541, 20U 0658105, 5912902	RM, RT	Rare Plant
LEFR	1 Ad	19-7-2007	GRM 6	Wp 551, 20U 0652848, 5916023	WL	Rare Plant
AMTO	1 Ad	19-7-2007	GRM 6	Wp 555, 20U 0652848, 5916023	RT	Rare Plant
WOFR	1 Ad	19-7-2007	GRM7	Wp 560, 20U 0651137, 5918115	RT	Rare Plant
LEFR	2 Ads	21-07-2007	Ferry Terminal	long. 60.4191, lat. 53.3951	RM, RT	Casual
MIFR	several juvs	24-7-2007	RPM5	wp 645 Gps file: long 61.735, lat. 53.08247 or 5883004 y, 633337.2 x	LA, WL	Rare Plant
AMTO	>500 Tads	24-7-2007	RPM6	WP 657, 20U 590986, 674732.	RI	Rare Plant
AMTO	2 Ads	24-7-2007	RPM7	WP 668 Gps file: long.60.593, lat. 53.28414 or 5906582 y, 660458 x	MD, off a WL	Rare Plant
WOFR	>200 Tads	24-7-2007	RPM2	wp 628 Gps file : long. 60.974, lat. 53.20424 or 5896907 y, 635316.7 x	RSP/ or AP	Rare Plant
AMTO	>100 Tads	24-7-2007	RPM2	wp 628 Gps file : long. 60.974, lat. 53.20424 or 5896907 y, 635316.7 x	RSP/ or AP	Rare Plant
BLSS	>3 larvae	24-7-2007	RPM2	wp 628 Gps file says long. 60.974, lat. 53.20424 or 5896907 y, 635316.7 x	RSP/ or AP	Rare Plant
MIFR	>3 adults	9/7/2007	TRL Wp421	21U 0390599, 5832575	WL	Trans Lab Rare Plant
MIFR	4 juvs	9/7/2007	TRL Wp424	21U 0379043, 5828875	WL	Trans Lab Rare Plant
MIFR	1 Ad likely	10/7/2007	TRL Wp 434	21U 0316400, 5843127	WL	Trans Lab Rare Plant
MIFR	2 ads, several Tads	14-7-2008	Along Trans-Lab. Hwy	long. 60.6778, lat. 53.2734	RSP/ AP	Road Side search
NTLS	1 Ad	14-7-2008	Along Trans-Lab. Hwy	long. 60.6778, lat. 53.2734	RSP/ AP	Road Side search
AMTO	>20 Tads	14-7-2008	Along Trans-Lab. Hwy	long. 60.6778, lat. 53.2734	RSP/ AP	Road Side search
BLSS	>20 larve	14-7-2008	Along Trans-Lab. Hwy	long.60.4609, lat. 53.2809	RSP/AP	Road Side search
WOFR	>200 larvae	14-7-2008	Along Trans-Lab. Hwy	long.60.4609, lat. 53.2809	RSP/AP	Road Side search
AMTO	>50 tadpoles	14-7-2008	Along Trans-Lab. Hwy	along Tans. Lab between long. 60. 6778, lat 53.2734 and 60.4609, 53.2809	RSP/AP	Road Side search
MIFR	several adults, juv, tads	14-7-2008	Along Trans-Lab. Hwy	along Tans. Lab between long. 60. 6778, lat 53.2734 and 60.4609, 53.2809	RSP/AP	Road Side search
AMTO	>50 Tads	13?-7-2008	Below Goose R. bridge	long. 60.4206, lat. 53.3923	RI	Road Side search

Notes: Ad(s) = adults, Juv(s)= juveniles, Tad(s) =tadpoles, WL=wetland, RT=Riparian Thicket, RM= Riparian Meadow, RI=Riparian (in the river,and side pools and flows), GB=Gravel Bar, LA=Lacustrine, Lake, RSP/AP= Roadside Pond/Anthropogenic Pool , BF=Black Spruce-feathermoss Forest MD= Mixed deciduous dominated woodland, WOFR - Wood Frog, NOSP - Northern Spring Peeper, BLSS - Blue-spotted Salamander, AMTO - American Toad, MIFR - Mink Frog, LEFR - Northern Leopard Frog, NTLS - Northern Two-lined Salamander

APPENDIX B

AMPHIBIAN ENVIRONMENTAL ASSESSMENT SUMMARY TABLES

Amphibian – Summary of Project Environmental Effects				
Description of Environmental Effect	**Contributing Project Activity or Physical Work**	**Proposed Effects Management (Mitigation measures)**	**Residual Environmental Effect**	**Compensation Measure**
Terrestrial Environment: Moose				
Construction				
Change in Habitat	Upgrading and Constructing Site Access Roads	Existing roads, quarries and other distributed areas will be used where possible. Avoid wetland habitat. Enhance ditches, settling pond and borrow pits to provide amphibian habitat.	Nature: Adverse Magnitude: Low Geographic Extent: Site-specific Duration/Frequency: Permanent / Occurs once Reversibility: Irreversible Ecological Context: Developed Level and Degree of Certainty of Knowledge: High	Not Applicable
Change in Habitat	Site Preparation and Construction of Site Buildings	Follow EPP and Best Practices. Stay within footprint. Environmental monitors will oversee EPP, Encourage formation of riparian marsh wetland.	Nature: Adverse Magnitude: Low Geographic Extent: Site-specific Duration/Frequency: Permanent / Occurs once Reversibility: Irreversible Ecological Context: Developed Level and Degree of Certainty of Knowledge: High	Not Applicable
Change in Habitat	Excavation for and Installation of Generation Components	Follow EPP and Best Practices. Stay within footprint. Environmental monitors will oversee EPP. Encourage formation of riparian marsh wetland.	Nature: Adverse Magnitude: Low Geographic Extent: Site-specific Duration/Frequency: Permanent / Occurs once Reversibility: Irreversible Ecological Context: Undisturbed Level and Degree of Certainty of Knowledge: High	Not Applicable
Change in Habitat	Transmission Line construction	Maintain right-of-way adjacent to existing right-of-way wherever possible. Minimize traffic through wetlands. Enhance some wetlands to provide better amphibian habitat.	Nature: Adverse Magnitude: Low Geographic Extent: Site-specific Duration/Frequency: Short Term/Occurs once Reversibility: Reversible Ecological Context: Undisturbed Level and Degree of Certainty of Knowledge: High	Not Applicable

Description of Environmental Effect	Contributing Project Activity or Physical Work	Proposed Effects Management (Mitigation measures)	Residual Environmental Effect	Compensation Measure
Change in Habitat	Quarrying and Borrowing	Follow EPP and Best Practices. Identify locations as near as possible to construction areas. Rehabilitate borrow pits and quarries as amphibian habitat.	Nature: Adverse Magnitude: Low Geographic Extent: Site-specific Duration/Frequency: Short Term/Occurs on a regular basis and at regular intervals Reversibility: Irreversible Ecological Context: Undisturbed Level and Degree of Certainty of Knowledge: High	Not Applicable
Change in Habitat	Reservoir Preparation	Follow Best Practices for clearing. Management Plan will reduce risk of disturbance to amphibian primary habitat. Encourage formation of riparian marsh wetland. Forestry roads outside of the flood zone should be modified to provide amphibian habitat.	Nature: Adverse Magnitude: Moderate Geographic Extent: Local Duration/Frequency: Short Term/Occurs once Reversibility: Reversible Ecological Context: Undisturbed Level and Degree of Certainty of Knowledge: High	Not Applicable
Change in Habitat	Impounding	Follow EPP and Best Practices.	Nature: Adverse Magnitude: High Geographic Extent: Regional Duration/Frequency: Permanent / Occurs once Reversibility: Irreversible Ecological Context: Undisturbed Level and Degree of Certainty of Knowledge: High	Not Applicable
Change in Habitat	Transportation and Road Maintenance	Project personnel to maintain posted speed limits. Keep roads well graded to prevent ponding of water on road surfaces. Access roads and work areas to be restricted to Project personnel.	Nature: Adverse Magnitude: Low Geographic Extent: Local Duration/Frequency: Long Term/Occurs on a regular basis and at regular intervals Reversibility: Reversible Ecological Context: Developed Level and Degree of Certainty of Knowledge: High	Not Applicable
Assessment of Residual Environmental Effect for Construction: Adverse, Not significant				

Description of Environmental Effect	Contributing Project Activity or Physical Work	Proposed Effects Management (Mitigation measures)	Residual Environmental Effect	Compensation Measure
Operation and Maintenance				
Change in Habitat	Water Management and Operating Regime	Fluctuations will be similar or less than existing conditions.	Nature: Adverse Magnitude: Low Geographic Extent: Local Duration/Frequency: Permanent / Occurs on a regular basis and at regular intervals Reversibility: Reversible Ecological Context: Developed Level and Degree of Certainty of Knowledge: High	Not Applicable
Change in Habitat	Inspection, Maintenance, Repairs along Transmission Line	If used, herbicides will be applied from the ground, by hand. Management Plan will reduce risk of disturbance to wetland habitat.	Nature: Adverse Magnitude: Low Geographic Extent: Local Duration/Frequency: Short Term / Occurs sporadically at irregular intervals Reversibility: Reversible Ecological Context: Developed Level and Degree of Certainty of Knowledge: High	Not Applicable
Mortality	Transportation / Presence and Maintenance of Access Roads	Project personnel to maintain posted speed limits. Keep roads well graded to prevent ponding on road surfaces. Access roads and work areas to be restricted to Project personnel.	Nature: Adverse Magnitude: Low Geographic Extent: Local Duration/Frequency: Long Term/Occurs on a regular basis and at regular intervals Reversibility: Reversible Ecological Context: Developed Level and Degree of Certainty of Knowledge: High	Not Applicable
Assessment of Residual Environmental Effect for Operation and Maintenance: Adverse, Not significant				

Legend/Key:

- nature: the long term environmental effects of the Project on the KI
  - adverse
  - positive
  - neutral
- magnitude: the extent of change from the baseline state.
  - for Caribou:
  - low: no measurable change in habitat availability or population size relative to baseline conditions
  - moderate: measurable change in habitat availability or population size relative to baseline conditions that does not cause management concern
  - high: measurable change in habitat availability or population size relative to baseline conditions that does cause management concern
  - for other KIs:
  - low: <five percent of Assessment Area population or habitat will be exposed to the effect
  - moderate: five to 25 percent of Assessment Area population or habitat will be exposed to the effect
  - high: >25 percent of Assessment Area population or habitat will be exposed to the effect
- geographic extent: the physical area within which interactions are expected to occur.
  - site-specific: environmental effects confined to the Project footprint
  - local: environmental effects confined to the Assessment Area
  - regional: environmental effects occur throughout the Assessment Area and beyond
- duration: the period of time the environmental effect will occur.
  - short term: less than one generation
  - medium term: one or two generations
  - long term: occurring over several generations
  - permanent
- frequency: the number of times the Project will have an environmental effect.
  - occurs once
  - occurs sporadically at irregular intervals
  - occurs on a regular basis and at regular intervals
  - continuous
  - not likely to occur
- reversibility: whether the adverse environmental effects are reversible or irreversible.
  - reversible
  - irreversible
- ecological context: the general characteristics of the area with respect to existing levels of human activity in the Assessment Area.
  - undisturbed: area relatively or not adversely affected by human activity
  - developed (disturbed): area has been previously disturbed by human development or human development is still present

- level and degree of certainty of knowledge.
  - low: low level of certainty
  - high: high level of certainty
- likelihood.
  - unlikely: significant adverse residual environmental effect not likely to occur
  - likely: significant adverse residual environmental effect likely to occur

Amphibians – Summary of Cumulative Environmental Effects				
Description of Environmental Effect	**Contributing Projects**	**Proposed Effects Management (Mitigation measures)**	**Cumulative Residual Environmental Effect**	**Compensation Measure**
Terrestrial Environment: Amphibians				
Construction				
Change in Habitat	Commercial Forestry	Strict adherence to the mitigation in FMD 19A Management Plan Provincial and Federal regulations.	Nature: Adverse Magnitude: High Geographic Extent: Regional Duration/Frequency: Long Term/Continuous Reversibility: Reversible Ecological Context: Developed Level and Degree of Certainty of Knowledge: High	Not Applicable
Change in Habitat	TLH Upgrades	Provincial and Federal regulations. Project EA	Nature: Adverse Magnitude: Low Geographic Extent: Regional Duration/Frequency: Long Term/Continuous Reversibility: Reversible Ecological Context: Developed Level and Degree of Certainty of Knowledge: High	Not Applicable
Change in Habitat	Additional Transmission	Provincial and Federal regulations. Project EA	Nature: Adverse Magnitude: Low Geographic Extent: Regional Duration/Frequency: Long Term/Continuous Reversibility: Reversible Ecological Context: Developed Level and Degree of Certainty of Knowledge: High	Not Applicable
Change in Health	NATO Special Forces Training	Federal regulations.	Nature: Adverse Magnitude: Low Geographic Extent: Regional Duration/Frequency: Long Term/Occurs sporadically at irregular intervals Reversibility: Reversible Ecological Context: Developed Level and Degree of Certainty of Knowledge: High	Not Applicable

Amphibians – Summary of Cumulative Environmental Effects				
Description of Environmental Effect	**Contributing Projects**	**Proposed Effects Management (Mitigation measures)**	**Cumulative Residual Environmental Effect**	**Compensation Measure**
Mortality	TLH Upgrades	Provincial and Federal regulations. Project EA	Nature: Adverse Magnitude: Low Geographic Extent: Regional Duration/Frequency: Long Term/Continuous Reversibility: Reversible Ecological Context: Developed Level and Degree of Certainty of Knowledge: High	Not Applicable
Assessment of Cumulative Residual Environmental Effect for Construction: Adverse, Not significant				
Terrestrial Environment: Amphibians				
Operation and Maintenance				
Change in Habitat	TLH Upgrades	Provincial and Federal regulations. Project EA	Nature: Adverse and Positive Magnitude: Low Geographic Extent Duration/Frequency: Long Term/Continuous Reversibility: Reversible Ecological Context: Developed Level and Degree of Certainty of Knowledge: High	Not Applicable
Change in Habitat	Additional Transmission	Provincial and Federal regulations. Project EA	Nature: Adverse and Positive Magnitude: Low Geographic Extent Duration/Frequency: Long Term/Continuous Reversibility: Reversible Ecological Context: Developed Level and Degree of Certainty of Knowledge: High	Not Applicable
Change in Health	NATO Special Forces Training	Federal regulations	Nature: Adverse and Positive Magnitude: Low Geographic Extent Duration/Frequency: Long Term/Occurs sporadically at irregular intervals Reversibility: Reversible Ecological Context: Developed Level and Degree of Certainty of Knowledge: High	Not Applicable

Amphibians – Summary of Cumulative Environmental Effects				
Description of Environmental Effect	**Contributing Projects**	**Proposed Effects Management (Mitigation measures)**	**Cumulative Residual Environmental Effect**	**Compensation Measure**
Mortality	TLH Upgrades	Provincial and Federal regulations. Project EA	Nature: Adverse Magnitude: Low Geographic Extent: Regional Duration/Frequency: Long Term/Continuous Reversibility: Reversible Ecological Context: Developed Level and Degree of Certainty of Knowledge: High	Not Applicable
Assessment of Cumulative Residual Environmental Effect for Operation and Maintenance: Adverse (some aspects are positive), Not significant				

Legend/Key:

- nature: the long term environmental effects of the Project on the KI
  - adverse
  - positive
  - neutral
- magnitude: the extent of change from the baseline state.
  - for Caribou:
  - low: no measurable change in habitat availability or population size relative to baseline conditions
  - moderate: measurable change in habitat availability or population size relative to baseline conditions that does not cause management concern
  - high: measurable change in habitat availability or population size relative to baseline conditions that does cause management concern
  - for other KIs:
  - low: <five percent of Assessment Area population or habitat will be exposed to the effect
  - moderate: five to 25 percent of Assessment Area population or habitat will be exposed to the effect
  - high: >25 percent of Assessment Area population or habitat will be exposed to the effect
- geographic extent: the physical area within which interactions are expected to occur.
  - site-specific: environmental effects confined to the Project footprint
  - local: environmental effects confined to the Assessment Area
  - regional: environmental effects occur throughout the Assessment Area and beyond
- duration: the period of time the environmental effect will occur.
  - short term: less than one generation
  - medium term: one or two generations
  - long term: occurring over several generations
  - permanent
- frequency: the number of times the Project will have an environmental effect.
  - occurs once
  - occurs sporadically at irregular intervals
  - occurs on a regular basis and at regular intervals
  - continuous
  - not likely to occur
- reversibility: whether the adverse environmental effects are reversible or irreversible.
  - reversible
  - irreversible
- ecological context: the general characteristics of the area with respect to existing levels of human activity in the Assessment Area.
  - undisturbed: area relatively or not adversely affected by human activity
  - developed (disturbed): area has been previously disturbed by human development or human development is still present

- level and degree of certainty of knowledge.
  - low: low level of certainty
  - high: high level of certainty
- likelihood.
  - unlikely: significant adverse residual environmental effect not likely to occur
  - likely: significant adverse residual environmental effect likely to occur

Information Request Number: JRP.11

Socio-Economic Modelling

Requesting Organization – Joint Review Panel **Information Request No.: JRP.11**

Subject - Socio-Economic Modelling

References:

EIS, Volume IA, Section 4.10 (Project Description – Expenditures) & Volume III, Section 3.0 (Environmental Assessment of Socio-Economic Effects – Economy, Employment and Business).

Rationale:

The EIS states that "The estimated capital cost for Gull Island including the transmission line to Churchill Falls is approximately $4.3 billion in 2008 Canadian dollars. Muskrat Falls and the associated transmission line to Gull Island are estimated at $2.2 billion in 2008 Canadian dollars" (Volume IA, p. 4-80). The total estimated capital cost in 2008 Canadian dollars is therefore $6.5 billion.

However, the EIS mentions that "the economic modelling for predicting the socio-economic effects of the Project is based on Project expenditures of $4.8 billion (in 2006 dollars), based on earlier estimates" (Volume III, p. 3-1).

Requesting Organization – Joint Review Panel **Information Request No.: JRP.11**

Information Requested

While, as stated in the EIS, revised Project costs may cause proportional changes to either adverse or positive socio-economic effects without modifying significance determinations, the Proponent is asked to re-run its economic modelling based on its most current estimates of Project costs and update the following tables and figures found in the EIS (Volume III):

- **Table 3-6 (Project Employment Effects – Construction Phase)**
- **Table 3-7 (Labrador Employment Effects – Construction Phase)**
- **Table 3-10 (Project Construction Expenditures)**
- **Figure 3-2 (Composition of Provincial Income (Construction) – CAPEX)**
- **Figure 3-4 (Composition of Labrador Income from Gull Island and Muskrat Falls (Construction) – CAPEX)**
- **Figure 3-6 (Composition of Project-related Tax Revenues from Gull Island and Muskrat Falls – Construction)**

Response:

The updated tables based on the re-run of the economic impact model for the Lower Churchill Project's updated capital costs are provided below:

Table 3-6 Project Employment Effects – Construction Phase (Updated June 2009)

Category	Gull Island (person-years)	Muskrat Falls (person-years)	Total Lower Churchill (person-years)
Direct Project employment	11,063	4,469	15,532
Direct NL employment	7,231	2,922	10,154
Indirect NL employment	2,806	1,628	4,434
Induced NL employment	5,144	2,578	7,722
Total NL employment	15,181	7,128	22,310
NL = Newfoundland and Labrador Notes: Columns and rows may not balance because of rounding errors Based on total capital expenditures during the construction phase			

Table 3-7 Labrador Employment Effects – Construction Phase (Updated June 2009)

Category	Gull Island (person-years)	Muskrat Falls (person-years)	Total Lower Churchill (person-years)
Direct Project employment	11,063	4,469	15,532
Direct NL employment	7,231	2,922	10,154
Direct Lab employment	6,112	2,471	8,584
Indirect Lab employment	923	873	1,796
Induced Lab employment	1,623	843	2,464
Total Lab employment	8,658	4,187	12,844

NL = Newfoundland and Labrador
Notes:
Columns and rows may not balance because of rounding errors
Based on total capital expenditures during the construction phase

Table 3-10 Project Construction Expenditures (Updated June 2009)

Parameter	Gull Island ($ million)	Muskrat Falls ($ million)	Total ($ million)
Total Civil Works Costs	1,725	841	**2,566**
Total Electrical and Mechanical Works Costs	1,031	595	**1,626**
Total Construction Facilities and Support Costs	456	251	**707**
Total Transmission Costs	215	83	**297**
Total Management, Engineering and Other Costs	854	441	**1,295**
Totals	**4,280**	**2,210**	**6,490**
Composition of Capital Expenditures			
Labour	1,764	852	**2,617**
Materials	1,703	1,077	**2,780**
Equipment	813	281	**1,093**

Figure 3-2 Composition of Provincial Income (Construction) – CAPEX (Updated June 2009)

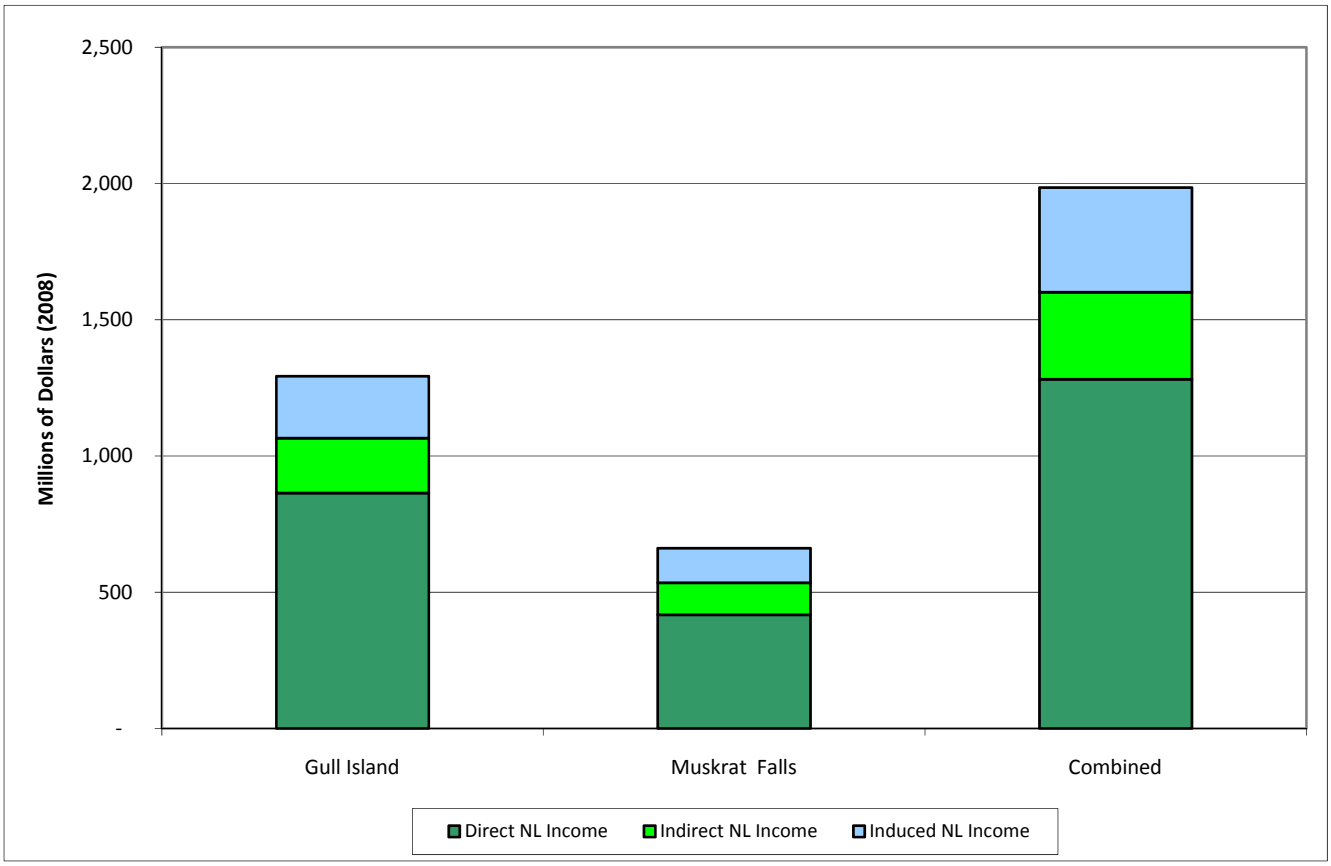


Figure 3-4 Composition of Labrador Income from Gull Island and Muskrat Falls (Construction) – CAPEX (Updated June 2009)

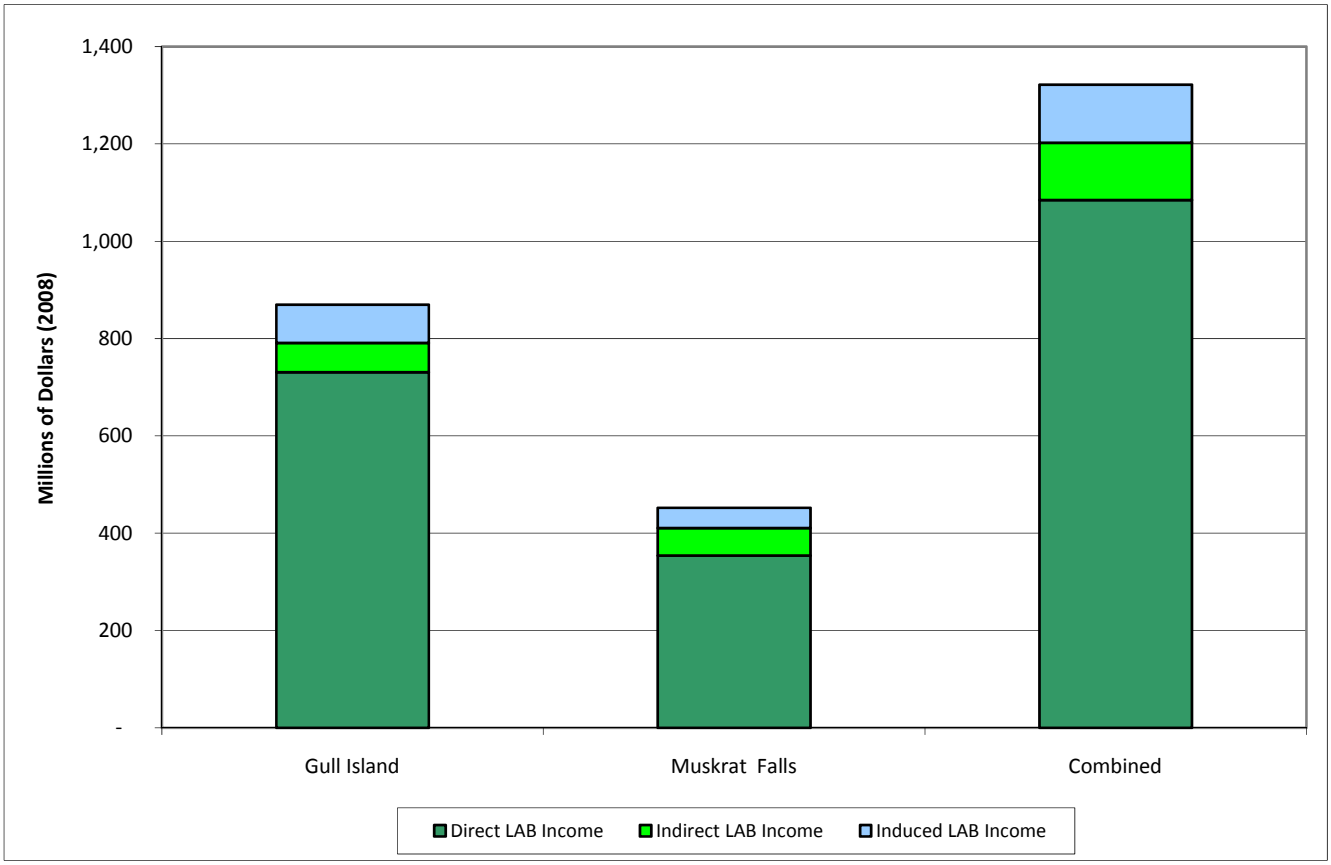
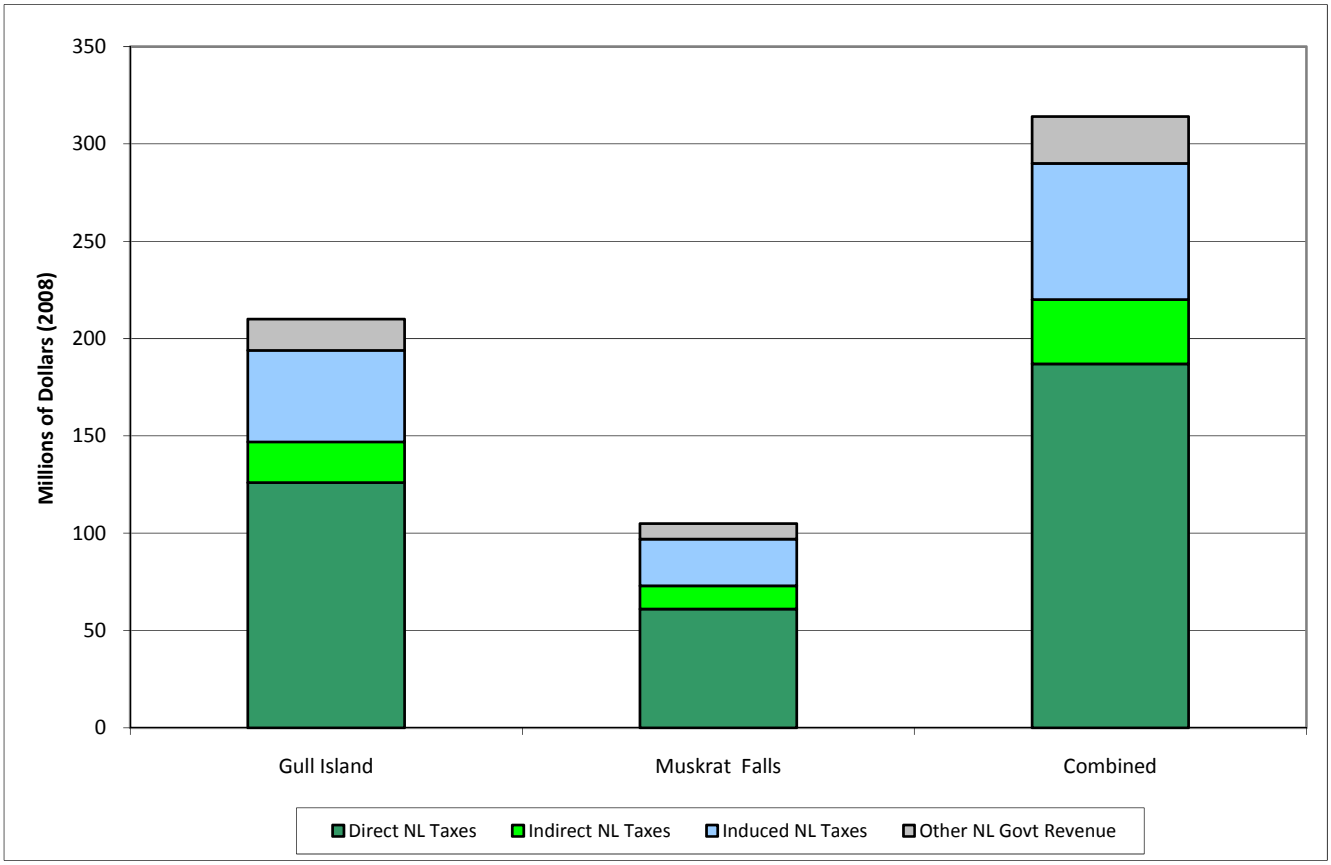


Figure 3-6 Composition of Project-related Tax Revenues from Gull Island and Muskrat Falls – Construction (Updated June 2009)



References:

Strategic Concepts, Inc. Updated economic impact model for Lower Churchill Project generation project, based on the costs as provided to SCI and summarized in Table 3-10.

Strategic Concepts, Inc. Updated costs for Gull Island from Gate 2a Estimate Report (GEN-PJ-009), December 2008 (20% contingency added).

Strategic Concepts, Inc. Updated costs for Muskrat Falls from June 2008 cost estimate (25% contingency added) prepared for EIS modelling.

Information Request Number: JRP.12

Economy, Employment & Business – Study Area and Data

Requesting Organization – Joint Review Panel **Information Request No.: JRP.12**

Subject - Economy, Employment & Business – Study Area and Data

References:

EIS Guidelines, Section 4.4.2 (Study Areas); Section 4.4.4 (Existing Environment) & Section 4.5.1 (Environmental Effects – General).

EIS, Volume III, Section 2.3.1 (Economy – Environmental Assessment Boundaries); Section 2.4 (Existing Environment – Employment and Business) & Section 3.0 (Environmental Assessment of Socio-Economic Effects – Economy, Employment and Business).

Rationale:

Baseline Data for the Economy, Employment and Business VEC

The EIS Guidelines require that "Using qualitative and quantitative surveys, the EIS shall describe the components of the biophysical and human environments likely to be affected by the Project." (p. 25) (emphasis added). The EIS Guidelines further require that "Predicted environmental effects (positive and negative, direct and indirect, short and long-term) shall be defined quantitatively and qualitatively for each project alternative and for each VEC" (p. 32) (emphasis added). Data presented on the Economy, Employment and Business VEC are in aggregate form (with the exception of Tables 2-3 to 2-6 in Volume III) and do not adequately describe local employment and business opportunities and impacts or training needs.

Assessment Area

For the Economy, Employment & Business VEC, the Assessment Area is defined as "the Upper Lake Melville area because this is the area within which most Project activity interactions will occur" (Volume III, p. 2-8 and 2-16). However, Project effects for this VEC go beyond the Upper Lake Melville area, which the EIS acknowledges: "The focus of this assessment is the Province, Labrador and Upper Lake Melville" (Volume III, p. 2-9). The Assessment Area for this VEC needs to be clarified and adequate corresponding baseline data needs to be provided (i.e. quantified and disaggregated data for each of the Upper Lake Melville, Labrador and Province geographical units).

Employment & Business Opportunities

The EIS states that "Nalcor Energy will focus attention on building business opportunities in Labrador and qualified labour in Labrador will have priority for employment" (Volume III, p. 2- 9). Hiring and training policies/commitments are described for the Operation and Maintenance phase of the Project (Volume III, Section 3.6.5.2). Clarification is needed on whether these policies would also apply during the Construction phase.

The EIS also states that "Nalcor Energy will establish a collective agreement with an employee's association that will see its members, acting through their unions, supplying skilled trades to construction workers. This may include a commitment for construction contractors to employ qualified local people" (p. 3-25) (emphasis added). Clarification is needed on these possible commitments.

Finally, the EIS commits to the monitoring of Project expenditures and employment (Volume III, p. 3-37 to 2-38).

Requesting Organization – Joint Review Panel **Information Request No.: JRP.12**

Information Request:

a. **The Proponent is asked to clarify the extent of the Assessment Area for the Economy, Employment & Business VEC.**

Response:

Section 2.3.1.1 of Volume 3 of the EIS states the assessment area for the Economy is the Upper Lake Melville area.

Section 2.4.1 of Volume 3 of the EIS states the assessment area for Employment and Business is the same as for Economy.

Requesting Organization – Joint Review Panel **Information Request No.: JRP.12**

Information Request:

b. In order for the Panel to assess local employment/business opportunities/impacts and training needs, the Proponent is asked to quantify and provide disaggregated data for the following, for each of the Upper Lake Melville, Labrador and Province geographical units:

- **Skilled and unskilled labour supply and availability;**
- **Business capacity;**
- **Existing training gaps;**
- **Effects on skilled labour availability as a result of the current recession, compared to that described in the EIS;**
- **Table 3-11 (Services Required by the Project); and**
- **Table 3-12 (Commodities Required by the Project).**

Response:

- Skilled and Unskilled Labour Availability

The following tables summarize the labour supply by Major National Occupational Classification (NOC) code from the 2006 Census as well as the total number of persons from each occupational category who received EI benefits at some point during the year for Upper Lake Melville (ULM), Labrador and Newfoundland and Labrador. While data is available by NOC code, it is not available in terms of skilled and unskilled labor categories.

Upper Lake Melville

NOC Code	Occupation Group	2006 Census	2006 EI Beneficiaries	% LF Receiving EI Benefits
A	Management	475	45	9%
B	Business, finance and administrative	935	135	14%
C	Natural and applied sciences and related	310	65	21%
D	Health	200	30	15%
E	Social science, education, government and religion	560	105	19%
F	Art, culture, recreation and sport	90	15	17%
G	Sales and service occupations	1,695	305	18%
H	Trades, transport and equipment operator	1,050	535	51%
I	Primary industry	155	75	48%
J	Manufacturing and processing	65	40	62%

Labrador

NOC Code	Occupation Group	2006 Census	2006 EI Beneficiaries	% LF Receiving EI Benefits
A	Management	1,190	130	11%
B	Business, finance and administrative	1,870	380	20%
C	Natural and applied sciences and related	880	180	20%
D	Health	505	55	11%
E	Social science, education, government and religion	1,240	245	20%
F	Art, culture, recreation and sport	290	45	16%
G	Sales and service occupations	4,250	965	23%
H	Trades, transport and equipment operator	3,595	1,665	46%
I	Primary industry	1,195	645	54%
J	Manufacturing and processing	1,010	485	48%

Newfoundland and Labrador

NOC Code	Occupation Group	2006 Census	2006 EI Beneficiaries	% LF Receiving EI Benefits
A	Management	19,740	2,245	11%
B	Business, finance and administrative	38,485	7,565	20%
C	Natural and applied sciences and related	14,940	3,170	21%
D	Health	15,970	1,420	9%
E	Social science, education, government and religion	19,600	3,025	15%
F	Art, culture, recreation and sport	5,700	780	14%
G	Sales and service occupations	70,470	18,060	26%
H	Trades, transport and equipment operator	44,305	32,240	73%
I	Primary industry	20,415	16,945	83%
J	Manufacturing and processing	17,540	12,575	72%

As these tables indicate, a considerable portion of the labour force in each of the regions receives EI benefits at some point during the year. This is particularly true for the Trades occupations, of which over 70% of the labour force in the province as a whole receives EI benefits at some point during the year. This is partly a function of the seasonal nature of the construction industry in the province and partly due to the limited year-round economic opportunities available to construction workers in Newfoundland and Labrador.

- Business Capacity

At this time, the Proponent has not disaggregated the business capacity any further than stated in table 2.5 in Volume 3 of the EIS. As planning for the project progresses, information sessions (supplier workshops) will be held throughout the province to further explain project requirements and meet with vendors to discuss their capabilities.

- Existing Training Gaps

The following is a list of skills that have been identified as potential shortages by the Skills Task Force for the Lower Churchill Project. The availability of training for each occupation in the Province, Labrador, and the Upper Lake Melville area is also indicated. The data was sourced from the list of registered training institutes on the Provincial Government website and program offerings by Memorial University and College of the North Atlantic.

Occupation	Training Available in:		
	Province	Labrador	Upper Lake Melville
Heavy Equipment Operator	√		
Ironworker	√		
Truck Drivers	√		
Carpenters	√	√	√
Heavy Duty Equipment Mechanics	√	√	√
Industrial Electricians	√	√	√
Electrical Power line and Cable Workers	√		
Drillers and Blasters	√		
Land Survey Technologists and Technicians	√		
Construction Millwrights	√	√	√
Construction Trades Helpers and Labourers	N/A	N/A	N/A
Crane operators	√		

In addition to these core programs offered by training institutes in the area, the Labrador institute in Happy Valley – Goose Bay offers custom courses in conjunction with community partners when the need arises.

Training gaps have also been identified in aboriginal communities. Nalcor Energy is currently partnering with Innu Nation, Labrador Metis Nation and the Nunatsiavut Government to develop a training strategy.

- Effects on skilled labour availability as a result of the current recession, compared to that described in the EIS;

The effect of the current recession on future labour availability cannot be predicted. The duration and depth of the recession, as well as the industries that are affected, may affect availability of labour. Within the Province, the schedules for major projects have not materially changed since the EIS was prepared. The recession may have an impact on projects in other regions, so the availability of personnel resident in the Province but otherwise working elsewhere may increase.

If the recession continues, investment in major infrastructure projects such as the Lower Churchill may be justified as a mechanism to maintain employment levels.

- Table 3-11 (Services Required by the Project); and Table 3-12 (Commodities Required by the Project.

The information provided in the EIS represents the level of detail currently available. Further information will be provided to the business community through supplier development sessions as planning for the Project progresses.

References:

"Forecasted Labour resource requirements by National Occupation Classification" Socio-economic Component Study Lower Churchill Project.

2006 Census Data & Community Accounts.

Skills task force report: "all the skills to succeed".

Requesting Organization – Joint Review Panel **Information Request No.: JRP.12**

Information Request:

c. Of the estimated 65% of direct labour during construction expected to involve workers from Newfoundland and Labrador (Volume III, Section 3.8.2), what would be the proportion of labour expected to come from Upper Lake Melville, Labrador and the Island respectively?

Response:

The proportion of the direct labour required during construction expected to come from Upper Lake Melville, Labrador and the Island is summarized in the table below.

Area	Share (% of total Direct)	Share (% of total NL)
Newfoundland and Labrador	65%	100%
Island	40%	62%
Other Labrador	12.5%	19%
ULM	12.5%	19%

Requesting Organization – Joint Review Panel **Information Request No.: JRP.12**

Information Request:

d. The Proponent is asked to identify any circumstances that may cause any individual community in Labrador (both within and outside the Proponent's Assessment Area) to be uniquely affected by the Project in terms of Economy, Employment and Business.

Response:

Local Demand Resulting from Construction of the Lower Churchill Project

The construction activities discussed in sections 2.5.2.2, 2.6.6.1, 3.6.5.1 (construction Labour Supply), and 4.5.4 of the EIS could cause the following affects in the adjacent communities:

- Movement of personnel and some materials through the airport in Happy Valley – Goose Bay may exceed the airport's current capacity resulting in congestion in the present facility.
- Large volumes of freight, including construction and building materials, food and beverages moved by ferry and ship from the Island to Labrador may require an increased port capacity in the area of Happy Valley – Goose Bay.
- Movement of personnel, materials and equipment by road (Trans Labrador Highway) may increase traffic on this road.
- There may be increased use of and demand for commercial and industrial land in Happy Valley – Goose Bay to support activities relating to the project.
- There may be increased demand on physical and social infrastructure in Happy Valley – Goose Bay due to possible in migration.
- An increase in housing demand is possible during construction activities for those who live off site. The 2.5 percent vacancy rate for rental accommodations at present is also lower than usual for the Assessment Area, and increased demand may further increase the problem of available housing.
- There may be a movement of workers to the Project from business, government agencies and aboriginal groups within the assessment area leaving employment vacancies that would be difficult to fill from the local labour market.

Ice Conditions in Churchill River below Muskrat Falls

During the freeze up and break up periods of each year after impoundment, the ice conditions in the Churchill River downstream of Muskrat Falls will differ from the present conditions. This change is subject to further investigation as a result of consultation with residents of Mud Lake.

The formation of ice in this area of the river has been modeled in the study "Ice Dynamics of the Lower Churchill River - October 17, 2007", a component study to the EIS. After consultation with the residents of Mud Lake, more data has been collected during breakup in 2009 and will be collected during freeze up in 2009. In addition radar satellite imagery will be obtained during the freeze up period in the fall of 2009. These new data will be used to refine the input data set for the Ice Dynamics Model and provide a clearer answer to the residents of Mud Lake on the fall ice conditions in the Churchill River downstream of Muskrat Falls in the post impoundment period. The new model predictions will be presented to the Mud Lake residents when they are available.

Increased Demand Associated with Training Institutions

As training in Labrador is currently undertaken in the communities of Happy Valley – Goose Bay and Labrador City, increased training activity may cause the following effects:

- Increased demand on physical facilities and training institution resources
- Increased demand for housing and other services associated with students who move to communities in order to access training
- Increased competition with programs that are not associated with the Project.

References:

EIS Volume III sections sections 2.5.2.2, 2.6.6.1, 3.6.5.1 (construction Labour Supply), 4.5.4, 3.1, 3.2.4, 3.6.5.2 (hiring and Training policies), 3.7.5.2, and 3.8.4.

Requesting Organization – Joint Review Panel **Information Request No.: JRP.12**

Information Request:

e. The Proponent is asked to clarify its intention regarding local hiring and training policies for unionized construction jobs. In doing so, the Proponent is asked to include lessons learnt or discuss best practices regarding hiring and training policies implemented for the Voisey's Bay Project.

Response:

First consideration for construction employment will be given to qualified, experienced personnel adjacent to the resource. Nalcor and its contractors will establish the qualifications and experience required for the Project. In addition to the commitment regarding aboriginal employment, an adjacency policy will be followed by the Proponent and its contractors. The hiring protocol for the project will be as follows:

- Qualified and experienced residents of Labrador
- Qualified and experienced residents of Newfoundland
- Qualified and experienced Canadians
- Qualified and experienced non-Canadians

In some cases, a candidate may have the qualifications but not the necessary work experience or the specialized expertise. In these incidences, safety of the workforce will be the determining factor. For longer term activities, an on the job training approach may be implemented where by those adjacent to the resource, who otherwise meet the qualifications, are given the opportunity to acquire the experience needed and eventually progress into the position. For short term activities this approach may not be feasible.

Nalcor acknowledges the importance of training. Training requirements for the Project cover a broad spectrum. Regulated health and safety requirements, work place protocol and skill development programs will be implemented. Nalcor has and will continue to work with Governments, aboriginal groups, women's organizations, training institutions, and labour organizations to discuss Project labour requirements, to identify existing or anticipated gaps in the labour supply pool, and to explore and discuss potential approaches for addressing potential gaps.

Nalcor has developed a resource demand profile at the National Occupational Code level. This data will be made available to all stakeholders in order to support the identification of gaps in supply and demand in order for agencies with jurisdiction in the training and education field to take the appropriate action.

Nalcor is committed to:

- Encouraging preconstruction training initiatives to ensure those adjacent to the resource can fully participate in the Project
- Working with successful contractors to ensure adequate workplace training is delivered to all employees. This training will include health and safety; cultural awareness; gender sensitivity; environmental awareness; respectful workplace; as well as specialized skill training
- Working with contractors who have the responsibility to develop and implement an apprenticeship program for the Project

- Working closely with training institutions and government agencies throughout the province to offer technical advice and expertise where appropriate and to assist in coordination of training with relevant stakeholders.

Training for the Project will not only benefit the individuals employed on the Project but will also provide communities adjacent to the resource with the skills needed to develop their own infrastructure and improve the standard of living for the entire community. The skills learned on this Project will be transferable to other projects within the province.

Nalcor Energy has had discussions with the Voisey's Bay Project as well as aboriginal and community groups in Labrador with regard to hiring and training policies for the construction phase of Voisey's Bay Mine. One of the lessons learned was that aboriginal training programs for the project must begin well in advance of construction. To this end, Nalcor Energy is currently partnering with Innu Nation, Labrador Metis Nation and the Nunatsiavut Government to develop a training plan to maximize aboriginal participation in the project. As well a benefits monitoring system will be implemented similar to that used by the Voisey's Bay Project

Requesting Organization – Joint Review Panel **Information Request No.: JRP.12**

Information Request:

f. The Proponent is asked to clarify whether monitoring results will be made public and what adaptive management strategies will be put in place in the event that Project expenditure and employment predictions do not materialize.

Response:

In order to ensure the processes outlined in the benefits plan are followed, a comprehensive reporting strategy will be implemented. Nalcor recognizes that it is important for governments and the public to know and understand the nature and level of local and provincial economic activity associated with the Project during the construction phase.

Nalcor will report on a semi-annual basis on the measured impacts of employment, training, and educational development. As well, information will be made available on the Project website and in public information material with regard to labour statistics, contract awards, and other economic contributions.

The Proponent will develop a benefits plan for the Project in compliance with the requirements and objectives of the Newfoundland and Labrador Energy Plan. This plan will include diversity, supplier development, and procurement plans, and also a benefits monitoring system. This plan will include adaptive management strategies to optimize benefits for Newfoundland and Labrador.

Information Request Number: JRP.13

Labour Requirements (Operation and Maintenance)

Requesting Organization – Joint Review Panel **Information Request No.: JRP.13**

Subject - Labour Requirements (Operation and Maintenance)

References:

EIS, Volume IA, Section 4.9.2 (Workforce – Operation) & Volume III, Section 3.6.5.2 (Socio-Economic Effects Analysis and Effects Management – Operation and Maintenance)

Rationale:

Labrador

In Volume IA, the EIS mentions that the Gull Island and Muskrat Falls operations will require 31 staff but that an additional workforce of 10 persons will be required to maintain the proposed transmission lines (p. 4-79 and 4-80).

In Volume III, the EIS mentions that "(…) there will be 31 direct person-years of employment in Labrador (….) Crews will be required to maintain both the generation facilities and the associated transmission lines" (p. 3-23 and 3-24). It is unclear whether the 31 direct person-years value is inclusive or exclusive of the workforce required for the transmission lines.

Island

The EIS mentions that "Seven (…) staff will be required for the [Energy Control Centre] in St. John's (…)." (Volume IA, p. 4-79)

The EIS also mentions that "(…) as a result, 47 person-years of direct operations employment will be on the Island." (Volume III, p. 3-23)

Requesting Organization – Joint review Panel **Information Request No.: JRP.13**

Information Request:

a. **The Proponent is asked to clarify the labour requirements in Labrador during the Operation and Maintenance phase of the Project, both in terms of generation facilities and transmission lines and in terms of staff number and number of person-years.**

Response:

Category	Generation Facilities	Transmission Lines	Total Staff Number
Person Years Labrador	30	11	41
Staff Numbers Labrador	30	11	41

Notes:
1. Staff will look after both Gull Island and Muskrat Falls plants
2. Maintenance and Operation Staff includes engineering and administration
3. Assumes remote operation from ECC in St. John's
4. Does not include contracts for security, road maintenance, snow clearing, janitorial, etc.
5. This staff is for day to day operation and maintenance only and does not include non-regular scheduled maintenance

References:

MSD-PM-007 "Lower Churchill Project – Preliminary occupations philosophy to support OPEX budget"

Requesting Organization – Joint review Panel **Information Request No.: JRP.13**

Information Request:

b. The Proponent is asked to clarify the labour requirements on the Island during the Operation and Maintenance phase of the Project, both in terms of staff number and number of person years.

Response:

Category	Generation Facilities	Transmission Lines	Total Staff Number
Person Years Island	22	0	22
Staff Numbers Island	22	0	22

Notes:

1. Staff will look after both Gull Island and Muskrat Falls plants
2. Maintenance and Operation Staff includes engineering and administration
3. Assumes remote operation from ECC in St. John's
4. Does not include contracts for security, road maintenance, snow clearing, janitorial, etc.
5. This staff is for day to day operation and maintenance only and does not include non-regular scheduled maintenance

References:

MSD-PM-007 "Lower Churchill Project – Preliminary occupations philosophy to support OPEX budget"