Canadian Environmental Assessment Agency

Agence canadienne d'évaluation environnementale

Comprehensive Study Report

Extension of Route 167 North to the Otish Mountains

Canadian Environmental Assessment Agency

March 2012

Canada

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Executive Summary

The Quebec Department of Transportation (the proponent) is proposing to extend Route 167 towards the Otish mountains, over a distance of 250 kilometres. This road construction project is part of Plan Nord and is intended to provide permanent access to the region and facilitate the development of mining, forestry, energy, and recreational tourism projects. The extension of Route 167 northward is also intended to meet the needs of Cree and Jamesian residents for access to the area.

The project is located entirely within the James Bay territory, which is subject to the *James Bay and Northern Quebec Agreement* (JBNQA). The first 140 kilometres northeast of Mistissini will be built in the same corridor as the existing winter road leading to Camp Matoush, and the remaining 100 kilometres will be built in a new corridor.

Fisheries and Oceans Canada and Transport Canada will have to issue authorizations and approvals under the *Fisheries Act* and the *Navigable Waters Protection Act* for the development of stream crossings. Under the *Canadian Environmental Assessment Act*, a comprehensive study of the project is required before these authorizations and approvals can be issued. The project also underwent a provincial environmental and social impact assessment under section 22 of the JBNQA.

The Canadian Environmental Assessment Agency conducted the comprehensive study in collaboration with the Federal Environmental Assessment Committee, which consists of representatives of Fisheries and Oceans Canada, Transport Canada, Environment Canada, and the Cree Regional Authority. Natural Resources Canada also provided advice related to its fields of expertise.

In the comprehensive study report, the Agency grouped the results of the analysis of the project's effects according to the following valued ecosystem components: plant species of interest; fish and fish habitat; terrestrial wildlife and its habitat; birds and their habitat; current use of land and resources for traditional and tourism purposes; and structure, site, or thing that has archaeological, heritage, or historical significance.

The Federal Environmental Assessment Committee assessed the effects of the project using the information provided by the proponent in its impact assessment report and in complementary documents, opinions from federal and provincial experts, and comments received from the Cree Nation of Mistissini and the public during the consultation phase.

During the consultation on the proponent's environmental impact statement, the Cree and the public expressed concerns about the following:

- uncertainty regarding limited knowledge of the area and of the resources affected by the project,
- the risks associated with the spread of contaminants,
- the maintenance of the woodland caribou population,
- the ecological integrity of the future Albanel-Témiscamie-Otish Park, and
- the opening up of the area and increased pressure on wildlife resources.

The proponent agreed to implement mitigation measures to reduce the effects that the project could have on the environment. For example, the proponent will include stream crossing design criteria and construction practices that reduce the disturbance of fish habitat; apply better management practices to control erosion and maintain natural hydrological conditions; limit work periods; and install wildlife crossings in

strategic locations. The proponent also plans to establish one or more monitoring committees to facilitate communication with land users; these committees will include regional stakeholders in the forestry, recreation, tourism, and mining sectors, land use managers, and representatives of the Council of the Cree Nation of Mistissini. In addition, the proponent plans to implement an environmental emergency program to respond to accidents and spills.

A follow-up program is required under the *Canadian Environmental Assessment Act* to verify the accuracy of the environmental assessment and to determine the effectiveness of the proposed mitigation measures. The follow-up program will focus on the revegetation of disturbed areas; the maintenance of the false mountain willow and the woodland caribou, two species at risk; the free movement of terrestrial and aquatic wildlife; and the performance of the fish habitat compensation program.

Given the implementation of the proposed mitigation measures and follow-up program, the Canadian Environmental Assessment Agency concludes that the project is not likely to cause significant adverse environmental effects.

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1. Introduction

1.1 Overview

The Quebec Department of Transportation (the proponent), is proposing to extend Route 167 North to the Otish Mountains, a distance of 250 kilometres (see Figure 1.1). Apart from certain variations, the alignment of the first 140 kilometres follows almost exactly the same route as the winter road leading to the Matoush camp. The southern part of the proposed road corridor runs through the territory of the future Albanel-Témiscamie-Otish Park for at least 70 kilometres. This project is located in the James Bay territory (Figure 1.1), which is entirely covered by the *James Bay and Northern Quebec Agreement* (JBNQA).

This new section of Route 167 is consistent with the approach of Plan Nord implemented by the Government of Quebec. The budget for construction of the road is estimated at $332 million.

1.2 Environmental Assessment Process

The *Canadian Environmental Assessment Act* (the Act) applies to federal authorities when they contemplate certain actions or decisions in relation to a project that would enable the project to proceed in whole or in part.

Under the *Fisheries Act* and the *Navigable Waters Protection Act*, a federal environmental assessment is required because Fisheries and Oceans Canada and Transport Canada will have to issue authorizations and approvals in relation to the Route 167 project.

Moreover, pursuant to paragraph 29(b) of the *Comprehensive Study List Regulations*, this project is subject to a comprehensive study environmental assessment under the Act.

This paragraph of the Regulations reads as follows: "*The proposed construction of ... an all-season public highway that will be more than 50 km in length and either will be located on a new right-of-way or will lead to a community that lacks all-season public highway access*."

The project was also the focus of a provincial environmental and social impact assessment under section 22 of the JBNQA.

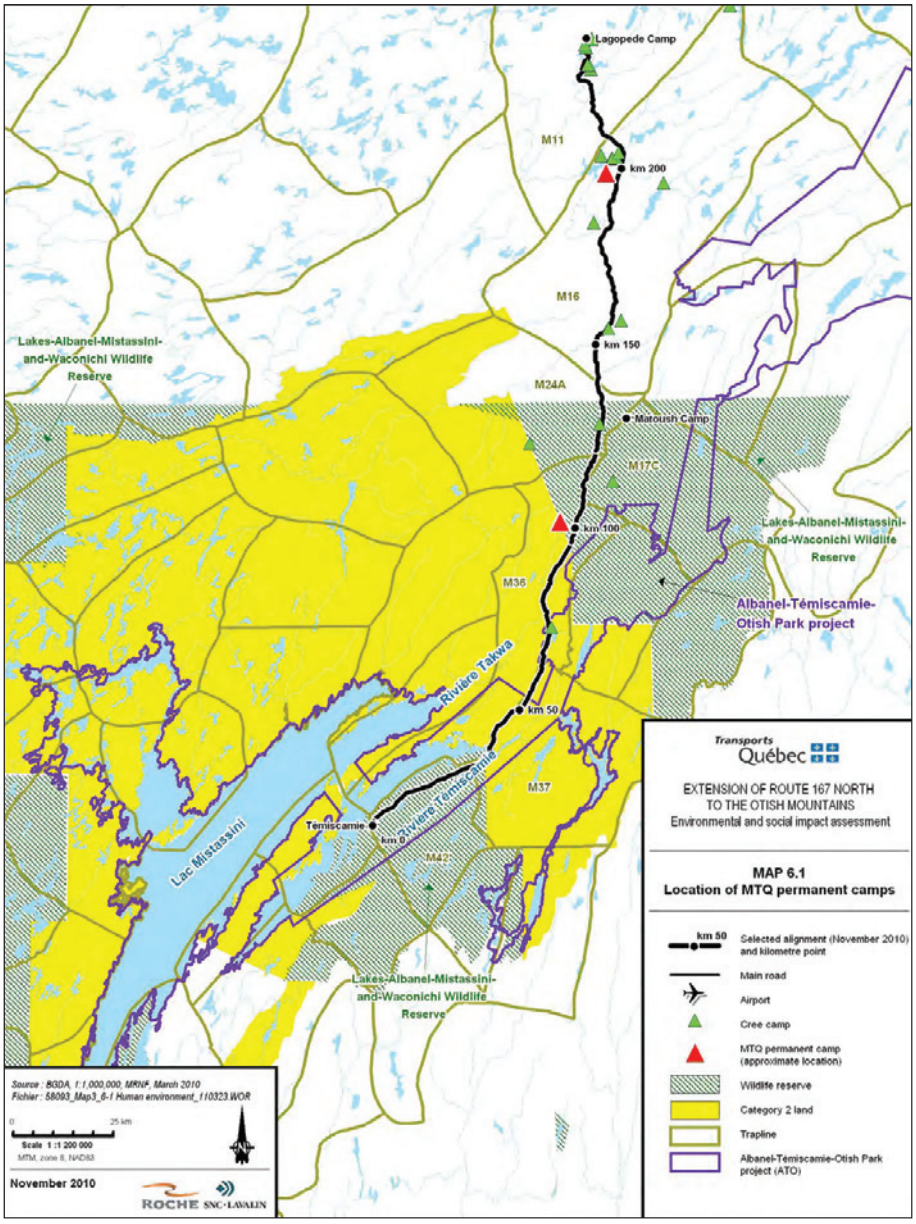
1.3 Purpose of the Comprehensive Study Report

This report presents the Canadian Environmental Assessment Agency's (Agency) analysis to determine whether the project is likely to cause significant adverse environmental effects.

The Agency prepared this comprehensive study report in collaboration with the Federal Environmental Assessment Committee composed of representatives of Fisheries and Oceans Canada, Transport Canada, Environment Canada, and the Cree Regional Authority. Natural Resources Canada also provided advice related to its areas of expertise. The conclusions of this report are based on the results of the review of the proponent's environmental and social impact assessment and on an assessment of the project's environmental effects.

The Minister of the Environment will review this report and comments received from the public and Aboriginal groups before making public his environmental assessment decision. Before announcing the environmental assessment decision, the Minister may request additional information or require public concerns to be addressed further. Following the announcement of the environmental assessment decision, the Minister will refer the project back to Fisheries and Oceans

Figure 1.1: Project Location



Source: Transports Québec (December 2010a)

Canada and Transport Canada, the responsible authorities for the project, for appropriate action under section 37 of the Act.

2. Scope of Project

For the purposes of a federal environmental assessment, the scope of the project includes physical works and activities associated with the construction, operation, and maintenance of the road as described in the following sections.

The Agency has not included the closure or decommissioning of the road because it will become part of the permanent infrastructure of the national highway system under the proponent's responsibility.

2.1 Components

The project includes the following works and structures:

- a 250-kilometre, local, low-volume (fewer than 500 vehicles per day), gravel, unpaved collector road, including the right-of-way and drainage ditches—right-of-way to be 35 metres wide and road surface to be 7 metres wide
- 152 stream and river crossing structures, including 18 bridges, the largest of which will be on the Takwa, Tichégami, Eastmain, Léran, Grand-Portage and Misask rivers
- related permanent structures necessary for infrastructure construction: protective riprap, armour rock, berms, etc.
- truck lay-by sites and parking areas for the tallymen
- waste areas for natural materials unsuitable for use in construction
- four temporary workers camps, two of which will become permanent
- Temporary structures or infrastructure required for the construction period: cofferdams, access roads, work areas, storage areas, etc.

2.2 Activities

The project includes the following activities:

During construction:

- forest clearing, grubbing, and removal of wood waste
- soil stripping, excavation, blasting, earthwork, and grading
- laying of the road bed
- culvert installation and bridge construction
- modification, moving, or removal of existing structures
- operation of borrow pits: two quarries and approximately 100 sand pits
- waste management and removal, including hazardous materials
- disposal of excavated material in the waste areas
- set up and dismantling of construction site equipment
- operation of landfill sites in remote areas for the disposal of solid waste from camps 2, 3 and 4
- restoration of river banks and shorelines, right-of-ways, work areas, borrow pits, and other areas temporarily affected by the work
- work relating to compensation of fish habitat loss
- winter road restoration work

During operation:

- maintenance of the road surface and ditches
- snow clearing and use of abrasives for de-icing the road
- vegetation control in the right-of-way
- maintenance or repair of stream and river crossings

2.3 Schedule

According to the proponent's schedule (Table 2.1), the project will be carried out from January 2012 to November 2015.

Table 2.1: Schedule

Contract	Plans and Specifications	Construction
A (kilometre 0 to 82)	September 2011	January 2012 to November 2013*
B (kilometre 82 to 142)	December 2011	January 2012 to November 2013
C (kilometre 142 to 195)	July 2012	November 2012 to November 2014
D (kilometre 195 to 240)	September 2012	November 2012 to November 2015

*Includes forest clearing of the entire corridor and installation of infrastructure (sanitary, water, waste) for the camps from kilometres 98 and 168

The proponent will adjust this timetable to consider the progress of the mining projects. The timetable for restoration of the winter road and the borrow pits as well as the timetable for the compensation for fish habitat losses are not included.

3. Scope of Environmental Assessment

The determination of the scope of the environmental assessment is an exercise by which the Agency establishes the framework and limits of its analysis.

3.1 Factors to be Considered

Pursuant to subsections 16(1) and 16(2) of the Act, the Agency has taken into consideration the following factors:

- need and purpose of the project
- alternative means of carrying out the project that are technically and economically feasible and the environmental effects of any such alternative means
- environmental effects of the project, including the environmental effects of malfunctions or accidents, and any cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out
- the capacity of renewable resources that are likely to be significantly affected by the project to meet the needs of the present and those of the future
- the significance of the environmental effects
- comments from the public that are received in accordance with the Act and the regulations
- measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the project
- the need for, and the requirements of, any follow-up program in respect of the project

An environmental effect, as defined in the Act, means any change that the project may cause in the environment; any effect of any such change on health and socioeconomic conditions, the current use of lands and resources for traditional purposes by Aboriginal persons, or any structure, site, or thing that is of historical, archaeological, paleontological, or architectural significance; or any change to the project that may be caused by the environment. This definition includes indirect economic and social changes that are caused by biophysical modifications of the environment. It does not include the direct economic and social effects of the project. For example, the Agency may examine the economic effects of a decline in commercial fishing success that is related to a loss of fish habitat, but it will not examine economic effects related to the construction of a road.

3.2 Scope of the Factors Considered and the Spatial Boundaries

As specified in the directive established by the Agency, the proponent was required to extend its analysis to environmental sectors and components with which the project could interact. After establishing the regional context for the project, the proponent identified the spatial components and boundaries selected for the assessment. These boundaries were modified following questions and comments from the Federal Environmental Assessment Committee. The adjusted list of components and boundaries is presented in Table 3.1.

3.3 Determination of Valued Ecosystem Components (VECs)

The Agency divided the environmental components the proponent had documented in its impact assessment into six valued ecosystem components (VECs):

- Plant species of interest: unique or rare forest stands, and special-status species
- Fish and its habitat: aquatic environment, including water quality, aquatic and riparian vegetation, and fish species

Table 3.1: Environmental Components and Spatial Boundaries

Environmental Components	Spatial Boundaries
• Climate	• James Bay sector
• Geology, geomorphology, and topography • Water quality • Soil quality • Noise environment • Vegetation • Herpetofauna (reptiles and amphibians) • Fur-bearing animals • Micromammals • Waterfowl • Forest birds • Visual environment • Archaeology	• 300 metres on either side of the right-of-way • Footprint of borrow pits
• Fish	• For fish habitat over which the road crosses, the upstream boundary is 200 metres and the downstream boundary is 300 metres on either side of the right-of-way
• Large wildlife	• 60 kilometres on either side of the right-of-way for woodland caribou • 2.5 kilometres on either side of the right-of-way for the rest of the large wildlife • Footprint of borrow pits
• Birds of prey	• 800 metres on either side of the right-of-way • Footprint of borrow pits
• Land use by Crees, including hunting, fishing, trapping, and boating	• Seven trapping areas used by the Cree Nation of Mistissini are affected by the project • Land use within 500 metres on either side of the right-of-way

- Terrestrial wildlife and its habitat: terrestrial vegetation and wetlands, herpetofauna, fur-bearing animals, micromammals, and large animals
- Birds and their habitat: terrestrial vegetation, wetlands and water bodies, waterfowl, aquatic birds, forest birds, and birds of prey
- Current use of land and resources for traditional and tourism purposes: recreational tourism activities, air quality, and boating
- Structure, site, or thing that is of archaeological, heritage, or historical significance: burial grounds and archaeological sites.

These components are valued because they include one or more of the following:

- habitats of importance for certain species
- migration or movement corridors
- a species protected under an act or regulation, for example, species at risk or special-status species and migratory birds
- a species or activity of economic or cultural interest
- species, activities, or elements of interest identified by the public and the Crees during consultations

3.4 Purpose and Need

The Quebec government has drawn up Plan Nord, a development program for northern Quebec. The vast size of this northern territory poses a major challenge to project proponents in

White-throated Sparrow in the project area

terms of access and transportation infrastructure. In response to this challenge, the proponent of this project is proposing to provide permanent access, with the aim of promoting the development of mining, forestry, energy, and recreational tourism projects. For the proponent, this project to extend Route 167 North is also a response to requests made by the main users of the territory, including the town of Chibougamau and the Cree community of Mistissini.

The proponent anticipates that without the extension of Route 167 North, the proponents of various resource development projects in the area would be forced to develop their own access infrastructure. This prospect has certain disadvantages, such as the potential of having multiple road and airport infrastructures. In addition, because of their location in the heart of JBNQA territory, many resource development projects would be impossible or only marginally viable if they depended solely on air access.

In addition, the Quebec Department of Sustainable Development, Environment and Parks (MDDEP) has included the road corridor in the master plan of the proposed Albanel-Témiscamie-Otish Park. From Chibougamau, only this new road would provide access to the park.

The groups and individuals who participated in the public consultations, in the context of this project's comprehensive study, agree that this is a worthwhile project. The Canadian Parks and Wilderness Society, Quebec Chapter (CPAWS-Quebec) has expressed certain concerns about industry arguments in favour of the project, namely the various cycles of the mining industry and the limitations of the forestry industry. On this point, the proponent anticipates that the project timetable could be revised in the event of delays in resource development projects.

4. Alternatives

The following sections describe the alternatives and alternative means analyzed, as well as the proponent's preferred alignment for the road.

4.1 Alternatives to the Project

Route 167 currently runs north of Chibougamau to Lake Albanel, and joins the road that leads to the community of Mistissini. From Lake Albanel, a winter road about 140 kilometres long and maintained by Strateco Resources Inc. extends Route 167 north to Camp Matoush. Access to the area is difficult outside the winter period.

The proponent examined a number of alternatives to the project, taking into account the requirements of local populations, which demand safe access to the area, and ensuring regional economic spinoffs. The alternatives considered were the status quo, a railway line, the extension of existing regional roads, and the construction of airstrips at various sites on the territory. The results of the proponent's analysis are presented in Appendix 1.

According to the proponent, only the construction of an all-season road in the heart of the James Bay and Northern territory, by means of the extension of Route 167, can fully meet the need to provide permanent access, which is the purpose of this project.

The proponent examined a number of alternatives to the project, taking into account the requirements of local populations, which demand safe access to the area…

4.2 Alternative Means of Carrying Out the Project

4.2.1 Description of alternative means

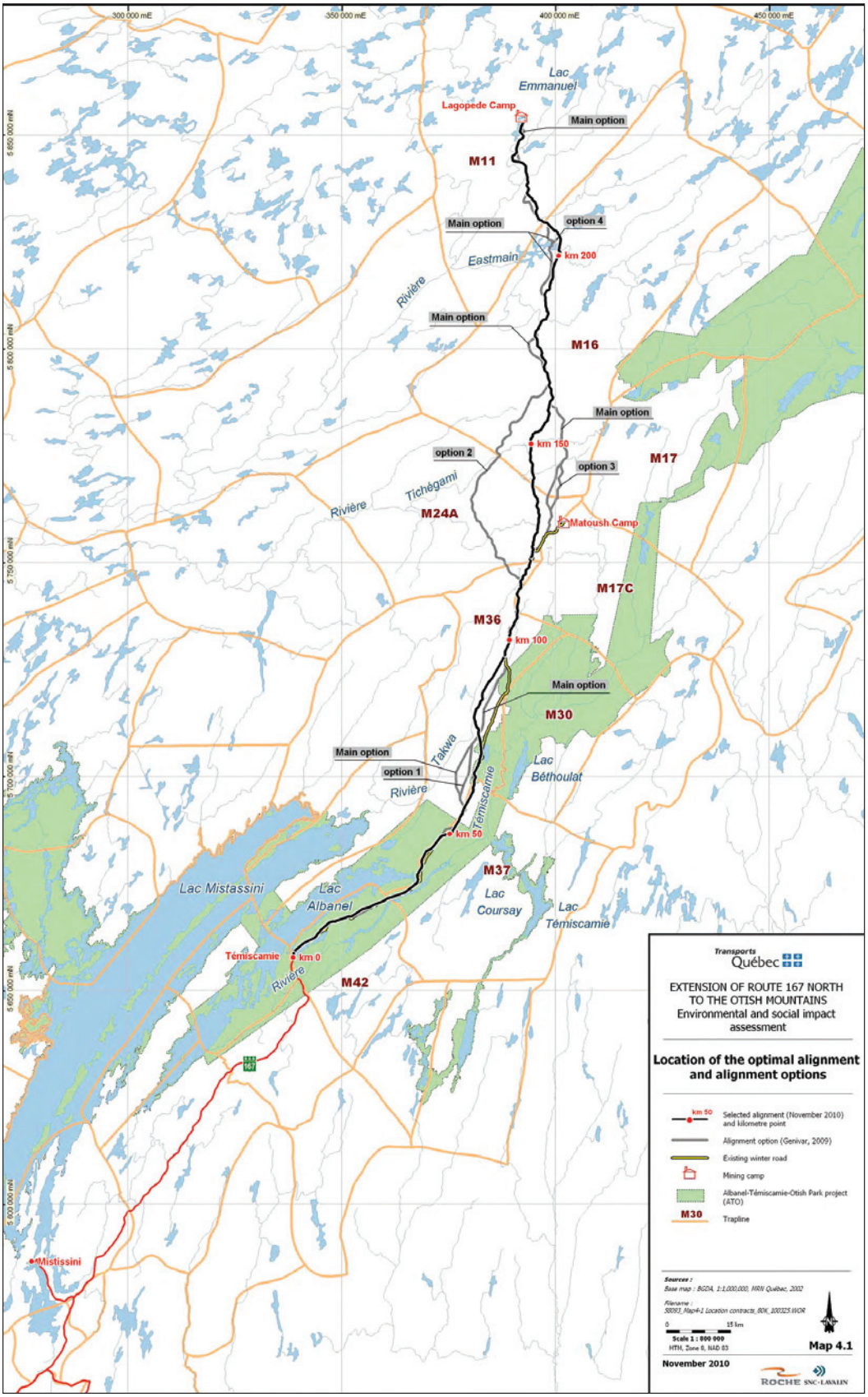
The proponent has examined various means of carrying out the project in an attempt to identify the method that would be the best alternative technically, economically, and environmentally.

First, the proponent established a corridor between the end of Route 167 and the Stornoway mining camp. A number of reasons made the establishment of this corridor unavoidable, including the need to use 140 kilometres of the existing winter road to limit the ecological footprint of this project, the need to find the shortest distance between the start and end points, and the desire to facilitate access to the future Albanel-Témiscamie-Otish Park. This last condition reflects an express request of the MDDEP, which will manage the park.

The proponent studied two alignments, known as the "primary alignment" and the "Poly-Géo alignment," within this corridor. For these two alignments, there are five options, which are deviations of varying lengths from the primary alignment. The two alignments and their options were established using environmental, socioeconomic, technical, and geomorphological criteria. The proponent sought to avoid wetlands, water bodies, and areas with problematic topography as much as possible. It also tried to minimize the distance between the road and the borrow pits, serve users adequately, limit cut and fill, and aim for soil with high bearing capacity. The alignments and options are shown in Appendix 2.

The proponent did not study any alternative means to the use of the borrow pits or to the location of the temporary or permanent camps. For the borrow pits, the proponent's rationale was that the sources of materials are believed to be rare in the region and that most of the borrow pits, the potential of which will have been confirmed by surveys, will be used for

Figure 4.1: Alternative Means Selected



Source: Transports Québec (December 2010a)

road building. For the camps, the proponent's rationale was that the location of the camps is related to contract splitting and the road-building schedule and, in the case of the permanent camps, to the winter maintenance radius. Because the four sites are located in areas already cleared of trees for a previous use of the territory, the impact on the natural environment will be minimized. However, the location of camp 4 was changed to avoid a burial ground identified by a Cree tallyman. A Cree tallyman is a person recognized by a Cree community as responsible for the supervision of the activities related to the exercising of the right to harvest on a Cree trapline. For the proponent, there are therefore no technically and economically feasible alternative means to the use of the borrow pits or to the location of the camps.

4.2.2 Comparative analysis of alternative means

To analyze the alternative means and select the best alignment, the proponent had surveys done to characterize the flora and fauna species associated with both alignments and the related options. The proponent then compared the two alignments (the primary alignment and the Poly-Géo alignment) using various technical, economic, and environmental criteria. These criteria and the comparative analysis are in Tables 2.1 and 2.2 in Appendix 2.

The proponent concluded that the Poly-Géo alternative was the best option (see Figure 4.1). This alternative differs from the others because of the quality of the profile and alignment and the more limited earthwork requirements.

4.3 Optimization of the Alternative Means Selected

The proponent submitted the selected alternative means to the officials responsible for the proposed Albanel-Témiscamie-Otish Park, the tallymen and the representatives of the Stornoway mining company. A few changes to the alignment were subsequently made to avoid two hunting grounds and to take into consideration the mining company's planned runway.

In consultations held by the Agency on the proponent's impact assessment, CPAWS-Quebec expressed concerns about the road alignment through the territory intended for the Albanel-Témiscamie-Otish Park. The organization suggested that it might have been better to use a corridor running south of the Témiscamie River, outside the park. The proponent evaluated this option. Its analysis found that, if the alignment ran south of the Témiscamie River, it would pass through large, still-intact forests that are inherently significant habitats for woodland caribou. To avoid additional disturbance of the environment, the proponent therefore chose to match the alignment to that of the winter road. The tallymen had expressed a preference for that option for the same reasons.

In its comments on the impact assessment, the Council of the Cree Nation of Mistissini reported that tallymen had noted the presence of moose and were concerned about the impact that the construction and use of the road could have on the moose. The tallymen had requested a change to the road alignment in two places, to take into account the presence of the moose: the Cree wanted the road to run west of Mont Norancon between kilometre 25 and kilometre 35, and to deviate to the west between kilometre 73 and kilometre 83.

The proponent decided it was preferable to stick with the selected best alternative so as to limit the environmental footprint of the work. Altering the alignment between kilometres 25 and 35 would in fact require the construction of an additional bridge, along with the blasting and stockpiling of large quantities of rock to avoid wetland areas. The hillier terrain, the presence of rock and fields of stone blocks, and the distance to borrow pits between kilometres 73 and 83 worked against the selection of the western alignment.

4.4 Agency's Assessment

The Agency is satisfied with the analysis produced by the proponent. For the proponent, the selected alternative means is the solution with the smallest environmental impact that meets the technical and economic criteria of a permanent road.

5. Consultations

The Agency, with the collaboration of the Federal Environmental Assessment Committee, held several public and Aboriginal consultation sessions to improve the quality of the environmental assessment.

5.1 Public Consultations

5.1.1 Agency consultations

The Act provides for three official phases in public participation. These three phases also apply to the interested Aboriginal groups. In the first consultation, the participants have an opportunity to comment on the project and the conduct of the comprehensive study. In the second consultation, interested people may participate in the comprehensive study. In the third, the participants have an opportunity to comment on the report on this comprehensive study.

The Agency administers the Participant Funding Program. The purpose of this program is to help interested individuals, non-profit organizations, and Aboriginal groups participate in federal environmental assessments. In connection with this comprehensive study, the Agency has allocated about $46,000.

For the first two consultation periods and to advertise the Participant Funding Program, the Agency posted the relevant documents on the Canadian Environmental Assessment Registry Internet site.[1] It placed the documents in the Chibougamau municipal library and in the office of the Council of the Cree Nation of Mistissini. The notices announcing the consultation periods were published on the Registry Internet site and in two local newspapers: La Sentinelle and The Nation. The Agency also broadcast these notices on Planète FM 93.5 and CINI-FM 95.3. The organizations receiving financial assistance received copies of the documents related to the environmental assessment.

The first consultation took place from November 10 to December 17, 2010, to discuss an information document including the project description, the scope of the environmental assessment, and the environmental assessment schedule.

The second phase of consultation took place from May 18 to August 8, 2011 and focused on the content of the proponent's impact statement. For this phase, the Agency held two consultation evenings, during which the public was invited to learn about this project and the proponent's impact statement, and to share its comments and concerns. These evenings took place in Chibougamau on June 21, 2011 and in Mistissini on July 19, 2011. Some 20 people participated in the Chibougamau session, and over 50 took part in the Mistissini session. Representatives of the Agency, Fisheries and Oceans Canada, Transport Canada, Environment Canada, the Cree Regional Authority, and the proponent were present to explain their roles and take note of the participants' comments and concerns.

In the third phase of consultation, the Agency invites the public to comment on the content, conclusions and recommendations of this comprehensive study report. The Agency will present the comments received to the Minister of the Environment to assist in the environmental assessment decision.

[1] www.ceaa-acee.gc.ca/050/index-fra.cfm; Project Reference Number: 10-03-54435.

5.1.2 Consultation activities conducted by the proponent

In June and July 2010, the proponent consulted groups interested in the project. This consultation was aimed at establishing a profile of the region and identifying the potential impacts of this project and the mitigation measures to reduce those impacts. The consultation was in the form of a discussion forum centred on four themes: economic development, workforce development, the environment, and health and road safety. The proponent also conducted one-on-one interviews to address certain subjects in more depth.

The proponent has committed to continue the dialogue with the James Bay area stakeholders during the construction and environmental monitoring phases.

5.2 Aboriginal Consultation

The Crown has a duty to consult Aboriginal groups and, if necessary, to accommodate them when its conduct is likely to have an adverse impact on their established or potential Aboriginal or treaty rights. Aboriginal consultation is also commonly used with a view to good governance and to develop appropriate policies and find informed solutions.

In addition to these general practices and obligations, the Act requires that federal environmental assessments take into consideration, among other things, the impact of any change that a project may cause in the environment, and the impact of that change on the current use of lands and resources for traditional purposes by Aboriginal persons.

5.2.1 Consultations conducted by the federal government

To meet the Crown's obligations with regard to consultations, the Agency conducted consultations with Aboriginal people in collaboration with the relevant federal authorities. Owing to the rights set out in the *James Bay and Northern Quebec Agreement* (JBNQA), the Agency, Fisheries and Oceans Canada, Transport Canada, Environment Canada, the Cree Regional Authority, and the Council of the Cree Nation of Mistissini agreed on a consultation plan calling for three formal consultation sessions.

The Council of the Cree Nation of Mistissini, various community groups, and users of the territory as well as a few individuals submitted a number of comments to the federal government during this phase.

During the first consultation phase, the Council of the Cree Nation of Mistissini received a document summarizing the project and outlining the steps in the environmental assessment. In addition, the consultation period was announced in a local newspaper *The Nation*, on the CINI-FM 95.3 radio station, and on the Agency and Council of the Cree Nation of Mistissini Internet sites. During this phase, the Council of the Cree Nation of Mistissini did not submit any comments on the project.

In the second consultation phase, the federal government and the Council of the Cree Nation of Mistissini jointly organized three community meetings, during which the Cree community of Mistissini had the opportunity to discuss issues directly with federal representatives. The Council of the Cree Nation of Mistissini, various community groups, and users of the territory as well as a few individuals submitted a number of comments to the federal government during this phase.

If the environmental assessment decision is favourable, Fisheries and Oceans Canada and Transport Canada will consult the Cree Nation of Mistissini on the authorizations to be issued for the implementation of this project, as well as on the compensation program for fish habitat losses.

5.2.2 Consultation activities conducted by the proponent

The proponent indicated that, throughout the environmental assessment process, it made sure to consult the representatives of the Cree Nation of Mistissini. On different occasions, it met with the interested community members and tallymen so they might be informed of the project.

The Cree Nation had many discussions with the proponent when the latter was preparing its environmental impact statement. In June 2010, the proponent met with the director of community development, the elders' committee, the band council chief, the director of traditional activities, the tourism coordinator, and most of the tallymen directly affected by this project.

The proponent has committed to continue the dialogue with the Cree Nation of Mistissini stakeholders in the project planning, construction, and environmental monitoring phases.

5.3 Issues Raised

The Agency forwarded the concerns and comments from the public and Cree people to the proponent. The following subjects were raised by the participants:

- Uncertainty related to limited knowledge of the territory and of the resources affected by the project: CPAWS–Quebec was critical of the fact that the proponent's analysis of the project impacts was generally restricted to a 300-metre band on either side of the centre line of the road right-of-way. CPAWS–Quebec does not consider the spatial scope of the assessment appropriate for identifying the impacts on some species and the long-term impacts. The Cree Nation of Mistissini pointed out a few shortcomings with regard to the impact statement and said that some traditional knowledge had not been included in the analysis and that this limits knowledge of the territory and ressources affected by the project.
- Risks associated with the spread of contaminants: The Cree Nation of Mistissini is concerned about contamination of water and fish that would result from oxidation of the culverts that the proponent will use for stream crossings. The presence of iron-bearing rocks and their potential for acid leaching is another source of concern for a number of participants.
- Woodland caribou: A number of participants fear that the road and the projects that will be implemented thanks to it will compromise maintenance of the woodland caribou population, a species protected under the *Species at Risk Act* and Quebec's *Act respecting threatened or vulnerable species*.
- Planned Albanel-Témiscamie-Otish Park: CPAWS–Quebec is concerned about the fact that the road will pass through the Albanel-Témiscamie-Otish Park. It also has concerns about the proponent's plans to operate borrow pits there. In its view, the daily passing of heavy trucks could contribute to degrading the park's ecological integrity and adversely affect recreational tourism.
- Opening access to the territory: A number of stakeholders believe that access to the territory would contribute to increased hunting, fishing, and poaching, and thus increase pressure on wildlife.
- Climate change: The Cree Nation of Mistissini is concerned that the increasing precipitation observed in the territory will compromise the integrity of the culverts, something that could lead to adverse effects on fish habitat.

Section 7 presents the measures proposed to address the above concerns.

6. Profile of the Environment

6.1 Biophysical Context

Route 167 is located in the Canadian Shield where a number of mining companies have operations related to the wealth of diamonds, uranium, gold, copper, and zinc in the region.

The landscape of the area is the result of North America's last glaciation, which ended approximately 7,000 years ago. The study area is one of the last sectors in Quebec to be occupied by the Wisconsin glaciation before the glaciers receded. The landscape features till ridges and knolls intersected by lakes and channels, as well as mountains and proglacial outwash plains. In general, the topography is approximately 400 to 500 metres above mean sea level, except the portion south of the Otish Mountains, which gradually rises to close to 700 metres. The right-of-way of Route 167 North passes through six major watersheds, the largest of which are those of Lakes Albanel and Mistassini and of Eastmain River.

The study area has a subpolar continental climate characterized by a short growing season. It is located at the northern limit of the boreal forest. The southern portion of the area is part of the western black spruce-moss bioclimatic domain, and the northern portion is part of the black spruce-lichen domain. To a lesser extent, mixed stands of deciduous and coniferous trees also grow in this area. Fire is the key regulating factor in forest dynamics, and recent burns are visible in the area. Forestry activities occur in the southern portion of the area, below the northern limit for commercial forestry designated by the Quebec Department of Natural Resources and Wildlife (MRNF).

The forest-dwelling ecotype of woodland caribou[2] occurs regularly in the area, but the local population density seems to be low. The species is mainly found in mature and old-growth conifer stands, as well as in peatlands, habitats that are rarely used by other cervids.

Forest habitat in the project area

The habitats offered by black spruce stands are unsuitable for moose. Although the area's moose population density is the lowest in Quebec, the population remains stable. The black bear and grey wolf are also not common in the area.

[2] The woodland caribou (*Rangifer tarandus caribou*) is the only caribou subspecies found in Quebec. The forest-dwelling ecotype of woodland caribou lives in the boreal forest. In Quebec, there are two other caribou ecotypes: the barren-ground ecotype, which lives in the tundra and migrates long distances each year, and the mountain ecotype, which is found on certain mountain peaks on the Gaspé peninsula (MNRF, 2010). (Liste des espèces fauniques menacées ou vulnérables au Québec. Fact sheet.)

Although most of the land in the study area is covered in forest stands, wetlands and aquatic environments are key elements in habitat diversification and contribute to the ecological value of the region. Many species of mammals, birds, reptiles, and amphibians have significant populations in the study area and are dependent on the forests, lakes, rivers, and wetlands for their food supply and for breeding.

The road will cross over many watercourses. The most representative type of fish habitat in the study area is a channel with a substrate consisting of organic matter, sand, and some rocks. This type of habitat has little potential; it is used more for feeding and resting purposes. Five species are of interest for sport fishing and for the Cree people: walleye, lake whitefish (reserved for the exclusive use of Crees), northern pike, brook trout, and lake trout.

The road will pass through the Albanel-Mistassini-Waconichi Wildlife Reserve, which extends over a vast area. The reserve, which is administered by MRNF, is dedicated to the conservation, development, and harvesting of wildlife. In partnership with the Cree Nation of Mistissini, the Quebec government has suggested turning part of the reserve into the proposed Albanel-Témiscamie-Otish Park. The park will enhance the natural, cultural, and historical heritage of an area of more than 11,000 m^2 (Quebec Government, 2005).

6.2 Human Context

The James Bay region is occupied by Cree and Jamesian communities. The territorial organization and administrative structures that manage the region are numerous and were created under a number of acts and agreements. The extension of Route 167 North project is located near the Cree Nation of Mistissini and the town of Chibougamau, the populations of which are 3,500 and 7,500 respectively.

On the Jamesian side, the Municipality of James Bay and the Conférence régionale des élus de la Baie-James are the two organizations responsible for the management and development of the region.

Under the *Cree Villages and the Naskapi Village Act*, the Cree Nation of Mistissini is administered by a band council. Its role is simultaneously political and administrative and also includes the provision of services to the community. The Grand Council of the Crees (Eeyou Istchee) and the Cree Regional Authority are the two regional entities that represent the Crees. They have the power and authority to promote, coordinate, and administer programs to protect the traditional Cree lifestyle and culture and develop Cree communities.

The administrative structures shaping the Cree territory stem primarily from two agreements: the James Bay and Northern Quebec Agreement (JBNQA 1975) and the Agreement concerning a new Relationship between le Gouvernement du Québec and the Crees of Québec (Paix des Braves 2002).

The right-of-way of Route 167 North crosses through lands classified as Category II and III lands under the land tenure system set out in the JBNQA (1975). Category II lands are lands on which the Crees have exclusive rights to hunting, fishing, and trapping. Category III lands are public lands on which general access is allowed under the rights, conditions, and restrictions established by the JBNQA. The right-of-way of Route 167 North passes through seven Cree trapping areas. Each area is overseen by a tallyman who ensures the traditional ecological management and maintenance of the resources and harvesting activities. The sustainability of the Cree trapping area system is recognized in the JBNQA. Traditional hunting, fishing, and trapping activities mainly occur during two periods of the year, during Goose Break and Moose Break. Since there is no permanent road, residents travel by snowmobile, hydroplane and, more rarely, canoe.

Apart from any administrative or legal boundaries, the area is intimately bound up with the Cree identity (GCC(EI)-CRA 2008).

The Crees have a spiritual relationship with the Earth, the source of their knowledge, skills, customs, and values. The traditional education of young Crees is steeped in this culture. Even today, the Crees continue to hold a number of ceremonies, such as canoe brigades and traditional gatherings, that are closely linked to nature and land use (GCC(EI)-CRA 2008).

Efforts are under way to modernize the governance structure. The Quebec government and the Crees signed a framework agreement in May 2011 concerning the governance of Eeyou Istchee-James Bay. It represents a first step towards the creation of a regional government made up of Cree and Jamesian representatives who will be responsible for implementing a shared vision of local resource development. Plan Nord will bring with it a wave of changes to the Eeyou Istchee-James Bay region.

The Crees have a spiritual relationship with the Earth, the source of their knowledge, skills, customs, and values.

7. Environmental Effects Assessment

7.1 Approach

In this section, the Agency provides a summary to help readers understand the steps in its analysis process. Readers who would like to have more detailed information can consult the series of documents relating to the environmental assessment of the project available on the Canadian Environmental Assessment Registry.

The Agency, in collaboration with the Federal Environmental Assessment Committee, identified and assessed potential adverse environmental impacts of the project on the basis of:

- the proponent's impact assessment, including the proponent's responses to the two series of questions and comments from the Federal Environmental Assessment Committee;
- the proponent's sectoral studies, such as the analysis of alternatives and survey results;
- the information obtained during public consultations; and,
- the expert opinions obtained from the federal and provincial government departments.

The method used by the proponent to assess the significance of the effects considers three criteria, which the proponent defined as follows:

- Magnitude of the impact: This refers to the relative importance of the project's consequences on a component of the environment. Assessment of magnitude takes into account the natural and social environment of which the component is a part. The magnitude may be low, moderate, or high.
- Geographical extent: This is defined as the spatial extent of the impact considered and/or the number of people affected by the impact. The geographical extent may be site-specific, local, or regional.
- Duration: The duration of the impact indicates its timeline. It expresses the period of time over which a change affects a component, as well as its frequency—continuous or discontinuous. The duration of the impact may be short, moderate, or long.

The proponent has identified mitigation measures intended to reduce the incidence of the project's potential adverse environmental effects. The proponent has incorporated or will incorporate these measures in the project design and in the project plans and specifications. After taking the mitigation measures into account, the proponent determined the significance of the residual effects.

7.2 Plant Components of Interest

This section deals with unique or rare forest patches and special-status species. The analysis

of the project's effects on the forest environment, wetlands, and other types of terrestrial vegetation is provided in section 7.4.

Forest patches
The forest stands in the study area of greatest ecological value, based on age and composition, are those of Mount Norancon located to the west of kilometres 29 and 32.

Special-status plant species
The false mountain willow is the only special-status vascular plant surveyed by this study. The false mountain willow is a species likely to be designated threatened or vulnerable in Quebec. This species is under the responsibility of the MDDEP and has no status under the federal *Species at Risk Act*.

This shrub grows in swamps and on rocky shores in the Abitibi and James Bay lowlands as well as in the Mistassini highlands. Approximately 50 false mountain willow specimens were counted on each side of the road alignment and along a secondary road, near kilometre 0.5.

7.2.1 Potential environmental effects
The alignment follows the same route as the existing winter road in this section of Mount Norancon and avoids encroachments into the forest patches in this area. There are no anticipated effects on these forest patches.

Even though every effort has been made to optimize the alignment, a dozen false mountain willow specimens will be destroyed during construction of the road. In addition, the other willows surveyed near the right-of-way could be threatened since this species is sensitive to trampling, changes in drainage conditions, and drying out of the soil that can be caused by the movement of machinery.

Since the false mountain willows in the study area grow within the current road right-of-way, there is no reason to believe that the operation of a new road will have adverse effects on this species. In addition, since this willow is a small species, it will not be affected by the proponent's maintenance program, which is designed to periodically eliminate forest species that can adversely affect road safety.

7.2.2 Mitigation measures and residual environmental effects
The application of mitigation measures identified in Appendix 3 should make it possible to preserve the population of false mountain willows in the study area. A follow-up program (Section 8) will be carried out, which will make it possible either to confirm this conclusion or to identify the need for additional corrective measures. In this context, there will be no residual effects.

7.2.3 Government, public, and Aboriginal comments and proponent's response
The Federal Environmental Assessment Committee did not receive any concerns regarding the plant components of interest.

The proponent has come to an agreement with the Ecological Heritage and Parks Branch of the MDDEP, concerning the mitigation measures to be implemented and the follow-up program (Section 8).

7.2.4 The Agency's conclusions on the significance of the residual environmental effects
Taking into account the implementation of the proposed mitigation measures (Appendix 3), the Agency concludes that the project is not likely to cause significant adverse environmental effects on the plant components of interest.

7.3 Fish and its Habitat

"Fish and fish habitat" means the aquatic environment, including water quality, aquatic and riparian vegetation, and fish species.

One hundred and twelve of the 152 watercourses that the road will cross constitute fish habitats. The most frequently occurring type of habitat is the channel type with a substrate composed of organic matter, sand, and boulders. Many

watercourses with this type of habitat are less than 2 metres wide at bankfull discharge,[3] but are very wide at the ordinary high water mark since they generally follow a sinuous path through peatlands. Shallow lakes are another frequently observed habitat in the study area. The road will affect a few habitats with a more dynamic flow facies and regime, such as riffles and rapids. In fact, the proponent has chosen a road alignment that passes through low-slope areas. The road alignment runs through six major watersheds, the largest being the lakes Albanel andMistassini watershed and the Eastmain River watershed. The main characteristics of these watersheds are described in Appendix 4. There are no fish species at risk or threatened species in the chosen alignment.

7.3.1 Potential environmental effects

The following environmental effects on fish and fish habitat during construction and operation are anticipated:

- habitat encroachment and dewatering of habitat by bridges and culverts, diversion of sections of watercourses and construction of embankments
- restriction of the free passage of fish upstream caused by the installation of crossings
- suspension and deposition of fine particulate matter in the habitat

Encroachment and dewatering of fish habitat

The construction of watercourse crossings, the permanent diversion of sections of watercourses and construction of embankments within certain water bodies are likely to cause harmful alteration, disruption, or destruction of 18,000 square kilometres of diversified fish habitats for brook trout, northern pike, walleye, lake whitefish, white sucker, and longnose sucker.

Bridges and culverts

None of the bridges to be built, except the Eastmain River bridge, will have pillars in the stream bed. Some of the bridges to be built may be clear-span bridges. Some abutments and riprap could encroach slightly on the upper margin of fish habitat, that is, in the occasional floodplain. The proponent therefore anticipates maximum habitat destruction of about 40 square metres per bridge, and cumulative habitat destruction of 960 square metres for the 24 bridges to be built. The proponent is planning to build cofferdams for the construction of abutments in the dry, totalling about 60 square metres of habitat destruction per bridge and cumulative habitat destruction of 1,440 square metres for all 24 bridges to be built.

Given the considerable width of the Eastmain River (130 m), the bridge will include one pillar with a reduced area of 60 square metres. Building the Eastmain River bridge will require the installation of a temporary 325-square metre jetty to access the construction site.

As for the 86 culverts to be installed, the proponent anticipates cumulative destruction of 13,200 m^2 of fish habitat.

To access the various borrow pits, the proponent may install a number of temporary culverts. During the phase of temporary restoration of certain sections of the winter road that currently disturb aquatic environments, the proponent could also install or reconfigure certain temporary culverts of 25 metres or less and certain winter crossings. The exact stream crossing sites will be specified in the plans and specifications. In view of the proponent's commitment to comply with the recommendations of Fisheries and Oceans Canada regarding the design of the structures and the mitigation of adverse environmental effects (Appendix 3), the short period of use (generally two years or less), and the planned site restoration following the removal of the temporary structures, there will be no significant habitat disturbance.

[3] The maximum flow that a stream bed can contain before it flows over into the floodplain.

Permanent diversion of watercourse sections
The proponent is planning two stream diversions at kilometre 129+824[4] and kilometre 140+758. At kilometre 129+824, a watercourse section will be permanently diverted into an adjacent watercourse at kilometre 129+748, over a distance of 90 metres. This diverted section is located near the end of the watercourse, a short distance from its point of confluence with the lake into which it flows. Since this watercourse section will be dewatered several times in the course of the work, this will result in the destruction of 900 square metres of low-quality fish habitat.

At kilometre 140+758, a 20-metre long section of watercourse along the road right-of-way will be permanently diverted into the road drainage ditch. The proponent anticipates that this will result in the destruction of 70 square metres of fish habitat.

Construction of embankments
Destruction of fish habitat will occur in certain riparian sections of water bodies owing to the construction of embankments for the planned road. The encroachments will total a cumulative habitat area of 1,200 square metres for all the water bodies affected.

Restriction of the free passage of fish upstream at the stream crossing sites
The construction or repair of stream crossings is likely to create flow conditions unfavourable to fish movements. These restrictions to free passage could partially or completely impede fish access to upstream habitats and isolate fish populations. According to available information, the free passage of fish must be ensured for about 80 permanent crossings.

Suspension of fine particulate matter in fish habitat (construction phase)
Many construction activities, such as the removal of riparian vegetation, grading operations, earthwork, and the construction of crossings could result in the deposition of a certain quantity of sediments into the aquatic environments close to the work sites and thus affect the quality of habitats downstream. However, given the anticipated work methods and the application of the mitigation measures, Fisheries and Oceans Canada considers that the risk of impacts associated with the deposition of sediments into the water will be minimized.

7.3.2 Mitigation measures and residual environmental effects
The proponent's general specifications include a number of mitigation measures aimed at protecting fish habitat. In addition to those measures, the proponent is commited to applying additional measures identified in Appendix 3 to mitigate impacts of construction activities and ensure control of erosion and impact of suspended matter. The increase in fishing caused by access to the territory is discussed in section 7.6.

7.3.3 Government, public, and Aboriginal comments and proponent's response
The Council of the Cree Nation of Mistissini points out that the tallymen and the community are concerned about oxidation of the culverts. They commented that many culverts on the winter road are rusted and indicated their concern about the potential health effects of rust. The iron particles from culvert oxidation can change the taste and colour of the water. However, this form of iron is not absorbed by the body. Nevertheless, the proponent undertakes to use aluminized culverts to prevent this oxidation. In peatlands, the proponent will use high-density polyethylene pipes.

CPAWS-Quebec pointed out that one of the borrow pits is located near a jaspilite iron formation. This formation may contain ferruginous rocks that can produce acid leachates, a source of pollution for watercourses. According to Natural Resources

[4] The first number represents the kilometre mark and the second, the number of metres past this mark.

Canada, the jaspilite iron formation should not produce acid drainage since the iron present in jaspilite is usually already oxidized.

Fisheries and Oceans Canada considers that the proponent has properly documented the project's effects on fish and fish habitat and that these effects are acceptable and can be compensated for the following reasons:

- The design of the crossing structures permits the free passage of fish when necessary.
- The design of the crossing structures limits encroachments into fish habitat.
- The proponent will implement appropriate mitigation measures.
- The proponent will take corrective action during the construction and operation phases, based on the results of the project's follow-up program.

Fisheries and Oceans Canada considers that the compensation project outlined by the proponent is adequate. For Fisheries and Oceans Canada authorizations, the proponent will provide more details on this compensation project, including information on the exact number of sites to be developed, site design, objectives set, and follow-up arrangements.

Taking into account the implementation of the proposed mitigation measures (Appendix 3) and the compensation for habitat loss, the Agency concludes that the project is not likely to cause significant adverse environmental effects to fish and fish habitat.

The Council of the Cree Nation of Mistissini pointed out that the tallymen would like to be consulted on the proponent's compensation project, and the proponent has undertaken to consult them once it has all the details.

7.3.4 The Agency's conclusions on the significance of the residual environmental effects

Taking into account the implementation of the proposed mitigation measures (Appendix 3) and the compensation for habitat loss, the Agency concludes that the project is not likely to cause significant adverse environmental effects to fish and fish habitat.

7.4 Terrestrial Wildlife and its Habitat

Terrestrial wildlife and its habitat refers to terrestrial vegetation and wetlands that constitute habitats and also herpetofauna, fur-bearing animals, micromammals, and large mammals.

Herpetofauna

Amphibians and reptiles in the study area have been less well studied than other categories of wildlife. The proponent used recent surveys conducted in connection with the analysis of the project alternatives and a study on herpetofauna conducted on the territory of the Albanel-Témiscamie-Otish Park, and supplemented these data with a survey over the entire road alignment. Based on this work, eight species were identified: four anuran species, three species of salamanders, and one reptile species. None of these species has special protection status. The most frequently observed species are the wood frog, the northern spring peeper, the American toad, and the northern two-lined salamander.

The number of species observed declines according to a latitudinal gradient, from eight species in the southern part of the study area to only five species in the northern part. Similarly, the number of species surveyed decreases with altitude, from eight species at elevations below 500 metres to five species at elevations above 500 metres.

Fur-bearing animals

Fur-bearing animals include the species listed in Schedule 1 of the Quebec *Regulation respecting trapping activities and the fur trade*. Of the animals on this list, 14 may be present in the

study area if we consider their known range. The proponent also considered the presence of other species of small animals that are not listed in Schedule 1 but whose range overlaps the study area, such as the snowshoe hare, groundhog, striped skunk, northern flying squirrel, eastern chipmunk, and American porcupine. The report includes data obtained from surveys, harvest statistics, and traditional knowledge and provides a detailed description of this resource.

The proponent's report indicates that only two species of fur-bearing animals with special status potentially are found in the area, the least weasel and the wolverine. However, although some studies claim that the distribution of these two species overlaps the study area, there is no recent scientific information to confirm this. Neither of these two species is currently harvested by the Cree. The accounts of wolverines in traditional knowledge frequently refer to observations of signs of their presence dating from 50 years or more ago, a period when the wolverine was still present in Quebec. Current consensus is that the species no longer exists in Quebec.

Micromammals
The authors of the impact assessment pointed out the lack of basic information on micromammals in this region. Cree traditional knowledge does not distinguish the species, and there are few available published references. The proponent carried out a survey to support its analysis. The scientific data and references are deemed to be adequate and sufficient for this assessment.

Although 16 species of micromammals may potentially be present in this area, the survey conducted as part of the impact assessment confirmed the presence of a dozen species. Two species likely to be designated threatened or vulnerable are found in the study area: the southern bog lemming and the rock vole.

Large mammals
The large mammal population of the study area includes three species: woodland caribou, moose, and black bear. The black bear is also considered a fur-bearing animal. Based on information from four sources, i.e., harvest statistics, traditional knowledge collection, the results of previous studies carried out in the study area, and the woodland caribou and moose winter aerial survey, the proponent was able to provide a general overview of the large mammals. According to the proponent's report, specialists from the MRNF validated the methodology of the aerial survey.

According to traditional knowledge and survey data, moose are present in the entire study area. The tallymen have observed certain moose yards throughout the road alignment, and the aerial surveys identified others. However, considering the habitats found in the study area, this area does not appear to be suitable for maintaining a large moose population. The most important characteristic of habitat that is highly suitable for moose is an abundant food supply, in the form of deciduous species.

The black bear frequents a variety of habitats, including mainly wetlands, intolerant deciduous stands, old-growth tolerant deciduous forests, and various disturbed environments such as cutovers. Because the aerial survey was carried out in winter, it was not possible to identify sites specifically frequented by this species. The proponent suggests that the black bears are present, but that the density is low, which is corroborated by traditional knowledge about this species. Although information on this resource is limited, it is sufficient in the context of the analysis of the project's effects.

The woodland caribou is designated "vulnerable" under the *Act respecting threatened or vulnerable species* and has the status of threatened species under the federal *Species at Risk Act*. In March 2008, the Quebec government released its woodland caribou recovery program Environment Canada is preparing its recovery strategy for the boreal population of the woodland caribou.

To fully understand the situation of the woodland caribou in the project area, the

Federal Environmental Assessment Committee asked the proponent to expand the analysis of the territorial occupation of this species. The proponent retained the services of an expert to interpret the results of interviews with trappers and data from the winter aerial survey and the telemetry surveys of woodland caribou fitted with radio collars provided by the MRNF. The analysis covers an area extending more than 60 kilometres on either side of the road alignment.

The distribution of the points of occurrence of caribou fitted with radio collars shows two distribution trends associated with groups of woodland caribou (herds) from this local population: the Témiscamie herd, southeast of the existing Route 167, and the Assinica herd, to the east of the first 100 kilometres of the winter road. This information suggests that the areas of interest for the woodland caribou are just over 20 kilometres from Route 167 and the winter road. For the calving period, however, a potential confinement area was identified within a 5 kilometre radius in the southern part of the alignment below kilometre 100. Beyond kilometre 100, the woodland caribou is less densely populated. It should be pointed out that the data are limited and that the caribou captured and fitted with collars were not selected by the MRNF specifically for the purpose of documenting the project's impacts on this species.

7.4.1 Potential environmental effects

The Federal Environmental Assessment Committee studied the project's effects on wildlife and wildlife habitat from the perspective of three issues of concern:

- habitat loss (construction and presence of the road)
- barrier effect and fragmentation (presence of the road)
- mortality (construction and operation of the road, increase in hunting pressure)

Habitat loss

The road will cause a total permanent loss of nearly 700 hectares (7 square kilometres) of habitat, consisting primarily of softwood or softwood dominant stands (63%). The rest consists of regenerating forest areas (18%), dry barrens (7%), wetlands (6%) or anthropogenic areas (6%). It will be recalled that this includes a 35-metre-wide right-of-way stretching for 250 kilometres with existing sections on the winter road.

If the proponent uses all the areas identified, the opening of the borrow pits will involve the temporary loss of 2,900 hectares (29 km^2) of habitat. More than 70 percent of this area is colonized by coniferous stands. The habitat losses associated with the temporary access roads to the borrow pits have not been estimated. This work is the contractor's responsibility, and its scope has not yet been determined. However, the proponent plans to implement measures to minimize the effects on the environment (see Appendix 3). The wetlands present in borrow pits will be excluded from development.

The impact of these temporary or permanent losses for local wildlife is expected to be marginal, since there is no logging over most of the road alignment and given the very small proportion of the area subject to natural and anthropogenic disturbances. Habitat availability is not a limiting factor for most of the terrestrial wildlife species in the area.

For the woodland caribou, the magnitude of the effects of a road in terms of habitat loss and alteration varies depending on the availability of habitats required to meet the needs of the population over its life cycle. Only 8 percent of the points of occurrence of caribou, obtained by telemetry, are located within a 20-kilometre radius on each side of Route 167, current or proposed. According to the proponent's expert, the study area does not represent preferential habitat for this population of woodland caribou. In addition, the road corridor is located outside the forest patches essential to maintenance of the populations, as

identified by the MRNF. This situation generally minimizes the potential effect of the Route 167 extension project on the habitat of this caribou population, during both the construction and operation periods. The proposed alignment thus appears to be located in one of the least sensitive areas for this species. However, prudence is called for since a potential calving yard is located within a 5-kilometre radius, to the north of kilometre 50. Given the low recruitment rate of the area's herds, the risks of disturbance during the calving period must be reduced.

Barrier effect and fragmentation
The loss of forest habitat and noise from traffic as a result of construction of the new Route 167 may contribute to a phenomenon known as the "filter effect" or "semi-permeable barrier effect." The noise of passing vehicles as well as the opening created by the right-of-way will limit to some extent the use of habitats adjacent to the road by some species and may restrict movements and interchanges between the populations located on either side of the road.

In the case of the woodland caribou, the barrier effect of a road is proportional to the volume of traffic on the road. According to the experts quoted in the proponent's impact assessment, in the short term, it is the construction of the road and the traffic on the road, rather than the actual physical structure of the road, that would have adverse effects on the caribou. These adverse effects would be manifested particularly during the crucial phases of the caribou's life cycle, i.e. winter and calving.

In light of the data examined by the proponent's expert, it appears that Route 167—between the branch to Mistissini and the point where the new road begins—does not limit the caribou's ability to disperse by confining them to only one side of the road. This observation also applies to the winter road beyond kilometre 35. From kilometre 0 to kilometre 35, the Mistassini and Albanel lakes represent natural barriers that fragment caribou habitat. The fact that the first section of the extension of Route 167 runs along Lake Albanel likely makes this route a good choice for limiting the fragmentation effect. In addition, the section from kilometre 35 to kilometre 70 represents a transition corridor for the caribou in the Assinica herd. Efforts to minimize the project's effects on the woodland caribou will have to concentrate in this section, particularly during the calving period. In addition, the road will be built outside the forest patches identified by the MRNF.

Mortality
Low-traffic roads can sometimes be used as caribou migration corridors. The proponent's analysis based on the points of occurrence of the woodland caribou shows that the right-of-way of the winter road is not used by the caribou as a movement corridor. Rather, the road is apparently crossed perpendicularly. The proponent maintains that the extension of Route 167 should not cause any major change in this behaviour.

The road could also cause problems such as an increase in predation by wolves, collisions with vehicles, traditional hunting and poaching and, consequently, contribute to an increase in the wildlife mortality rate.

Moose are attracted by deciduous trees, and roadsides, which are environments conducive to the proliferation of deciduous species, could become feeding grounds. Consequently, the increase in the area of habitats suitable for moose could increase the wolf population, a predator of the woodland caribou. The increase in feeding areas for moose along roadsides could also increase the risks of collisions with vehicles. However, according to the proponent, the northern location of the road, in the spruce-moss and spruce-lichen bioclimatic domains, helps limit the establishment of deciduous trees compared to the sectors further south.

7.4.2 Mitigation measures and residual environmental effects

The proponent is committed to applying the mitigation measures identified in Appendix 3. The aim of these measures is to limit the project effects

on terrestrial wildlife and its habitat by minimizing habitat loss, the barrier effect and fragmentation, and mortality. Despite the mitigation measures, a minor residual effect is still likely because 7 square kilometres of habitat will be permanently lost. Caribou is the species that is the most likely to be effected by this loss in habitat.

7.4.3 Government, public, and Aboriginal comments and proponent's response

The proponent's conclusion that the extension of Route 167 will have negligible effects on wildlife appears to be defensible and supported by the evidence. In the view of the Federal Environmental Assessment Committee and many of the participants who took part in the public consultations, the main concern remains the status of the woodland caribou. The Committee acknowledges that the proponent's more detailed analyses provide a better picture of the trends on use of the project area and help to more effectively determine the effects of the project. However, these trends are based on limited data. Monitoring and follow-up measures are necessary to confirm anticipated environmental effects. The monitoring and follow-up program (Section 8) will be carried out under the supervision of the MRNF, which is responsible for the protection of woodland caribou.

…the proponent undertakes to construct wildlife crossings and, where conditions permit, to give priority to planting conifers, forest species representative of the natural environment.

From a sustainable development perspective, as well as in the context of preservation of forest ecosystems and wetlands, the proponent undertakes to construct wildlife crossings and, where conditions permit, to give priority to planting conifers, forest species representative of the natural environment. The proponent has undertaken to restore sections of the winter road to reduce permanent wildlife habitat losses.

At the request of the Council of the Cree Nation of Mistissini in August 2011, the proponent undertook to minimize the construction of embankments near kilometre 200 so as not to interfere with the passage of migratory caribou.

A special committee on the woodland caribou was also established in February. This committee is composed of representatives of the MRNF, the Cree Regional Authority, and research chairholders of the CRSNG-UQAT-UQAM industrial chair in sustainable forest management. The committee will prepare a state of knowledge report on the status of the woodland caribou in the project area and formulate recommendations on appropriate measures for ensuring the recovery and conservation of the species. Once they are available, the proponent will be required to incorporate these recommendations.

7.4.4 The Agency's conclusions on the significance of the residual environmental effects

In light of current data and taking into account the implementation of the proposed mitigation measures (Appendix 3), the Agency concludes that the project is not likely to cause significant adverse environmental effects on wildlife and wildlife habitat.

7.5 Birds and their Habitat

This component includes forest birds, birds of prey, and water birds. It also includes their habitat: forests, open wetlands, and water bodies.

Due to the inaccessibility of the area, there is relatively little information on the bird fauna of the Otish Mountains. The proponent reports that most of the historic records for the region are limited to the southern part of the study area, near Lake Albanel and Camp Tournemine, located approximately 25 kilometres south of kilometre 0. The proponent carried out surveys to draw up a list of bird species

that frequent the study area during the breeding season, determine their abundance, and locate their habitat and nesting structures. The proponent relied on methodologies developed by Environment Canada and consulted the SOS-POP databases.[5] To supplement these surveys, the proponent consulted the survey results from the small number of available reports and the databases of the *Étude sur les populations d'Oiseaux du Québec* (2010).

The proponent surveyed 62 species of forest birds. This group includes woodpeckers, passerine birds, and Tetraonidae. The proponent can confirm that nearly half of the species are breeders. The most abundant species are the white-throated sparrow, the dark-eyed junco, and the ruby-crowned kinglet. Of the species that frequent the project area, the common nighthawk, the olive-sided flycatcher, and the rusty blackbird are three forest bird species at risk under the *Species at Risk1 Act*.

For birds of prey, the proponent determined that the following species were present in the area: osprey, bald eagle, northern harrier, red-tailed hawk, golden eagle, merlin, and great gray owl. Of these species, three are confirmed breeders: osprey, northern harrier, and red-tailed hawk. It is possible that other species of birds of prey, such as the great horned owl, the northern hawk-owl, and the boreal owl, frequent the study area. The bald eagle and the golden eagle are species protected under the Quebec *Act respecting threatened or vulnerable species*.

During breeding, the Barrow's goldeneye uses small water bodies located at higher elevation and in rugged terrain.

In the group of water birds, which includes waterfowl, the proponent identified 31 species. Four species are confirmed breeders through observation of clutches: Canada goose, American black duck, northern pintail, and green-winged teal. The surveys show that the most used habitats are small lakes and ponds. These habitats are scattered along the road between kilometres 59 and 63, kilometres 79 and 86, as well as kilometres 108 and 130. The tallymen also identified water bird staging areas in the vicinity of kilometres 205, 232, and 234. The waterfowl species of particular interest to the Cree are the Canada goose and the American black duck.

The harlequin duck and the Barrow's goldeneye are species of special concern under the *Species at Risk Act* that may be present in the study area during the breeding season. The harlequin duck was sighted, but there are no reports of the Barrow's goldeneye for the entire sector covering the east and northeast of Lake Mistassini. During breeding, the Barrow's goldeneye uses small water bodies located at higher elevation and in rugged terrain. It reportedly nests in cavities of rotting trees.

7.5.1 Potential environmental effects

The Federal Environmental Assessment Committee examined the project's effects according to three issues:

- habitat loss caused by the construction and presence of the road
- the barrier effect and fragmentation due to the presence of the road
- mortality caused by the construction and operation of the road and by the increase in hunting pressure

Habitat loss

Tree clearing and grubbing of the road right-of-way and the surfaces used as borrow pits will cause habitat losses for bird fauna. These activities will cause the loss of terrestrial and wetland environments that forest birds use

[5] *Suivi de l'occupation des stations de nidification, population d'oiseaux en péril.* Regroupement Québec-Oiseaux and Canadian Wildlife Service.

during the breeding season. Waterfowl that nest on the ground in the forest environment, such as the surf scoter, as well as tree-nesting species could be affected. For these species, the losses will be concentrated in the sections along the water bodies and wetlands.

The presence of the road represents a permanent loss of nearly 700 hectares of habitats suitable for breeding. The project will cause the loss of habitats potentially used by the common nighthawk, the olive-sided flycatcher, and the rusty blackbird, three species of forest birds at risk. The proponent points out that the area of habitat lost for these species represents a small proportion, i.e., less than 10 percent of the total habitat in the study area.

There is little risk that the work will cause the destruction of raptor nests. Since the osprey and northern harrier nests observed were at least 400 metres from the chosen alignment, the risks of destruction are minimal. Since no nests of the bald eagle or golden eagle, two special-status species, were observed less than 700 metres from the road or the borrow pits that will potentially be used, construction of the road should not adversely affect the nesting of these species. However, the proponent estimates a loss of 440 hectares of habitat that could be potential nesting areas for the raptors that use the forest.

The approximately 40 hectares of wetlands and water bodies that constitute suitable habitats for water birds represent about 3 percent of this type of habitat for the entire study area. The loss is therefore marginal.

The harlequin duck may use rivers that will be crossed by the road. During the work, these rivers could be degraded as a result of silting. In the vicinity of the road, near kilometre 95, the proponent identified a lake that may be suitable for the goldeneye. There are apparently seven lakes with potential for this species within or near borrow pits between kilometres 117 and 209. Tree clearing and grubbing near these lakes could eliminate tree cavities that constitute nesting sites for the Barrow's goldeneye. Females could be forced to nest further from water bodies, thus exposing the young to greater predation when they leave the nest.

Habitat fragmentation

Monitoring activities have demonstrated that the presence of a new road right-of-way tends to favour species such as the common yellowthroat and the Tennessee warbler that frequent forest edges. Species that prefer the forest travel further away from the edge. According to the proponent, for some forest species, the decrease in habitat quality and in the availability and diversity of food in the first 100 to 150 metres of the road right-of-way could affect the density and even breeding success of certain species. Conversely, certain birds of prey might benefit from the presence of wildlife that will colonize the vegetation at the edge of the new right-of-way.

Disturbance and mortality

The noise caused by road traffic can disturb birds up to a perpendicular distance of 2 kilometres and degrade the habitat adjacent to the road. By hindering song detection, noise adversely affects breeding activities. The proponent points out that because of the low traffic-related noise load, Route 167 will have virtually no impact on breeding birds along the roads.

Traffic on the new road could be a cause of mortality of birds in the vicinity of the right-of-way, particularly during the breeding season for forest birds. Birds that do not fly much, such as the Tetraonidae, are likely to be more affected. The proponent anticipates that reducing the speed limit will minimize the number of collisions with birds. Since the daily volume of traffic on the road is relatively low, the probabilities of collision are reduced.

The road will give hunters greater access to the area, which could increase pressure on waterfowl. During construction, the movement

of machinery will generate noise levels that will disturb wildlife, which could cause the displacement of breeding pairs or nest abandonment. Similarly, the installation of stream-crossing structures could disturb species that breed on the edges of these watercourses.

7.5.2 Mitigation measures and residual environmental effects

The proponent is committed to applying the mitigation measures identified in Appendix 3 to limit the project's effects on birds and their habitat. Despite the implementation of these mitigation measures, a minor residual effect is still likely since 7 square kilometres of habitat will be permanently lost. However, this habitat loss will not have any impact on bird fauna because of the abundance and availability of habitats.

7.5.3 Government, public, and Aboriginal comments and proponent's response

Environment Canada noted that the survey methods used were not adapted to aquatic species and that the inventory periods and frequencies could result in a slight underevaluation of the number of nesting pairs and the presence of certain species. However, Environment Canada concluded that a satisfactory amount of information was gathered for assessing the effects.

Environment Canada believes that the construction methods and the implementation of the mitigation measures (Appendix 3) specified by the proponent will reduce habitat loss and fragmentation.

7.5.4 The Agency's conclusions on the significance of residual environmental effects

Taking into account the implementation of the mitigation measures (Appendix 3), the Agency concludes that the project is not likely to cause significant adverse environmental effects on birds and their habitat.

Ruby-crowned Kinglet in the project area

7.6 Current use of Lands and Resources for Traditional and Tourism Purposes

This section deals with the project's effects on the use of the territory by the Cree of Mistissini, in particular the effects on the seven traplines for the following components: hunting, fishing, trapping, gathering, recreational tourism activities, air quality, and travel by water.

The road alignment is located on Category II and Category III[6] lands and, in part, within the

[6] Category II lands are lands on which the Crees have exclusive rights to hunting, fishing and trapping, whereas Category III lands are public lands on which general access is allowed under the rights, conditions and restrictions established by the Agreement (JBNQA 1975).

Albanel-Mistassini-and-Waconichi Wildlife Sanctuary and the future Albanel-Témiscamie-Otish Park. Recreational tourism use of the study area is currently limited to the activities offered in the wildlife reserve and by several outfitters in the vicinity of Lake Mistassini.

Hunting, fishing, and trapping, as well as the gathering of berries and medicinal plants are activities regularly carried out. Through discussions with the tallymen and certain main users of the territory, the proponent has identified within 500 metres on either side of the road alignment the presence of a canoe and portage route, snowmobile trails, other trails, and permanent and temporary camps. According to the information collected by the proponent, in summer the Cree travel essentially by float plane to access remote hunting grounds.

There are 14 navigable waterways protected by the *Navigable Waters Protection Act* located in the road corridor (see Appendix 5). These watercourses are used primarily for travel by the tallymen on their traplines. There are no precise data on the frequency or period of use of these watercourses.

The environment of the project area is in the natural state. There are very few human activities that cause polluting emissions. It can therefore be said that the air quality in the study area is generally excellent.

7.6.1 Potential environmental effects

Mitigation measures (Appendix 3) will help reduce the project's environmental effects on aquatic, terrestrial, and bird fauna, and on habitats. No permanent loss of biological productivity is anticipated. Consequently, there will be no residual effect on hunting, fishing, and trapping. However, the annual cycle of land and resource use will be temporarily affected by the road construction work.

Wildlife harvesting activities will be taken into consideration during planning of the construction work. Most of the contracts will be carried out outside the Goose Break, but will not avoid the summer fishing season or the fall moose-hunting season. The work carried out in winter will have an effect on the trapping of fur-bearing animals by the Cree, even though this activity is carried out less intensively than hunting and fishing. The proponent also points out that some users plan to reorganize their trapping activities by shifting their efforts to areas further away from the construction work. Other users plan to avoid using the area until the project has been completed. According to the proponent, the surveys show that on the seven traplines, the areas located within 500 metres on either side of the road alignment are generally used less intensively by the main users.

Moreover, the permanent access created by the road will facilitate access for the tallymen and their families. The tallymen consulted by the proponent believe that opening up the area will facilitate their efforts to preserve and transmit Cree values and traditions to young people. However, the increase in human use of the territory could place pressure on the terrestrial, bird, and aquatic fauna due to the increase in hunting, fishing, and trapping efforts. This situation could be amplified by the presence of large numbers of workers. The proliferation of cottage leases could also cause an increase in hunting and fishing activities.

The bridges and culverts to be installed on watercourses identified as navigable under the *Navigable Waters Act* shall meet the standards set out in the Act and its regulations to ensure their navigability. No effect on navigation is anticipated.

7.6.2 Mitigation measures and residual environmental effects

To minimize the impacts on lands and resources for traditional and tourism purposes, the proponent is committed to applying the mitigation measures identified in Appendix 3 and to consult the tallymen and keep them

informed during the course of the project. No residual effect is anticipated.

7.6.3 Government, public and Aboriginal comments and proponent's response

The community of Mistissini and CPAWS-Quebec are greatly concerned about the probable increase in human use of the territory and the potential impact this will have on conservation of the territory, wildlife management, poaching, and illegal fishing. These stakeholders suggest that the proponent install a barrier at the entrance to the road that will control access at all times. The proponent prefers to install such a barrier only during construction. The proponent is also working with the MDDEP to implement measures to control access to the area.

In the judgement of the Federal Environmental Assessment Committee, construction of the road will have only a minor residual impact on the current use of lands and resources for traditional and tourism purposes. However, the Committee does not share the proponent's conclusion concerning the road's operation phase. The proponent considers that the residual impact will be very positive for the Cree as well as for the other users. Although the Committee recognizes the positive impacts that this project may have on the use of the territory, it considers the possibility of adverse effects caused by an increase in legal or illegal hunting and fishing. Setting up one or more follow-up committees comprising regional stakeholders, land managers, and representatives of the Council of the Cree Nation of Mistissini would mitigate these adverse effects.

The Mistissini community would like the proponent to develop a long-term solution concerning safety, wildlife protection, and protection of the traditional use of the territory. This solution would help maintain good relations between Aboriginals and non-Aboriginals and should involve the proponent as well as representatives of the MRNF and the Cree Nation.

…setting up a follow-up committee of regional stakeholders, land managers—including the manager of the Albanel-Témiscamie-Otish Park—and representatives of the Council of the Cree Nation of Mistissini would adequately address the problems associated with the road and its effects on the use of the territory.

The tallymen identified 13 watercourses that they use to move from place to place for hunting, fishing, and cultural activities and that would be crossed by the road. The proponent has guaranteed that bridges are planned for all these crossings, with the exception of the structure at kilometre 69+223. During a meeting in Mistissini on October 20, 2011, the proponent presented this decision to the trappers who have this concern. The tallymen did not object to this decision.

CPAWS-Quebec is concerned about maintaining the ecological integrity of the future Albanel-Témiscamie-Otish Park and pointed out that a recent study has shown that the presence of roads in a park, particularly multi-use roads, contributes to degradation of the ecological integrity of the park. In addition, daily trips by heavy trucks transporting ore could adversely affect tourism. According to the proponent, the provisional plan for the future Albanel-Témiscamie-Otish Park prepared by the MDDEP already includes a multi-use road in the Lake Albanel area, parallel to the Témiscamie River. This will promote access and permit recreational activities such as canoe camping.

The Federal Environmental Assessment Committee believes that setting up a follow-up

committee of regional stakeholders, land managers—including the manager of the Albanel-Témiscamie-Otish Park—and representatives of the Council of the Cree Nation of Mistissini would adequately address the problems associated with the road and its effects on the use of the territory.

7.6.4 The Agency's conclusions concerning the significance of the residual environmental effects

Taking into account the implementation of the mitigation measures (Appendix 3) by the proponent, the Agency concludes that the project is not likely to have significant adverse environmental effects on the current use of the lands and resources for traditional and tourism purposes.

7.7 Structures, Sites, or Things of Archaeological, Heritage, or Historical Significance

This component includes burial grounds and archaeological remains.

The proponent's analysis is based on separate but complementary methods: environmental inferences, archival research, and data from the tallymen. The proponent consulted sources such as the *Inventaire des sites archéologiques du Québec*, the *Répertoire des biens culturels et arrondissements du Québec*, the *Répertoire québécois des études de potentiel archéologique*, as well as the various reports and publications available for the study area.

The proponent identified 169 areas of archaeological potential, 140 of which are associated with the road right-of-way and 29 with the borrow pits. These areas range in size from 1 hectare to more than 100 hectares, the largest corresponding to a possible source of lithic materials, near the Témiscamie River.

During the consultations held by the Agency, the Cree also mentioned the existence of burial grounds. They were unable to identify precise sites, with the exception of one site in the area of the fourth workers camp.

7.7.1 Potential environmental effects

Implementation of the project could result in the loss and destruction of archaeological remains and burial grounds.

7.7.2 Mitigation measures and residual environmental effects

Taking into account the implementation of the mitigation measures as described in Appendix 3, there will be no residual effects on a structure, site, or thing of archaeological, heritage, or historical significance.

7.7.3 Government, public and Aboriginal comments and proponent's response

The Council of the Cree Nation of Mistissini brought to the attention of the Federal Environmental Assessment Committee the community's strong concerns about the potential destruction of burial ground sites.

The proponent undertakes to comply with the requirements of the *Cultural Property Act*, such as providing prompt isolation of the distinctive area to preserve the sites discovered and to inform the monitoring committee, which will include representatives of the Council of the Cree Nation of Mistissini. The proponent has indicated that it has considered many of the concerns raised by the tallymen and the Cree community representatives. For example, the proponent relocated camp 4 to safeguard an existing burial ground site.

7.7.4 The Agency's conclusions on the significance of the residual environmental effects

Taking into account the implementation of the proposed mitigation measures (Appendix 3), the Agency concludes that the project is not likely to cause significant adverse environmental effects on structures, sites, or things of archaeological, heritage, or historical significance.

7.8 Cumulative Environmental Effects

Cumulative environmental effects are defined as the effects that are likely to result from a project when a residual effect combines with the effects of other projects or human activities that have been or will be carried out. This assessment of cumulative effects is based on the Canadian Environmental Assessment Agency's *Operational Policy Statement* (Agency 2007), the *Cumulative Effects Assessment Practitioners Guide* (Agency 1999), and the proponent's analyses. The evaluation of cumulative effects aims to identify to what extent the project being evaluated contributes to overall human impacts on valued ecosystem components.

7.8.1 Scope

Potential residual effects are anticipated for only the "terrestrial wildlife and its habitat" and "birds and their habitat." Of these components, the woodland caribou is the species most likely to be subject to cumulative effects. The woodland caribou is a vulnerable species whose survival is closely tied to the quantity and quality of its habitat. This component was a focus of the analysis because of its precarious situation and the concern expressed by the public. The other components were not selected because the anticipated residual effects, including cumulative effects, will not have a significant impact on wildlife populations.

The study area selected for the analysis of cumulative effects on the biophysical environment includes a 70-kilometre corridor on either side of the Otish Mountain Road alignment. This spatial scope is based on a home range for caribou that can be as extensive as 3,000 square kilometres. The corridor includes all the former and future mine sites in the area along with their access roads. The study area also includes the corridor for the 150-kilometre power transmission line linking the LG-4 power station with the Renard mine site.

The proponent made an inventory of the following projects in the study area:

Past or current projects and activities

- the Eastmain mine project and its access road which was used for exploration work (current winter road)
- Copper Rand and Principale mines near Chibougamau. These mines are now inactive and in the restoration phase
- the Troïlus mine
- development work at the Renard and MacLeod Lake mine sites
- preliminary exploration work at the Eastmain, Éclat, Pacific Bay and Mistissini, Strategis and Otish Uranium, Epsilon and Hotish mine sites
- Chantiers Chibougamau forestry operations (FMU 026-61 and 026-62)

Future projects and activities

- construction at the Renard mine site and a planned power transmission line from the LG-4 power station along a corridor about 150 kilometres in length
- construction of the Matoush mine site
- construction of the MacLeod mine site, and construction of a 70-kilometre access road from the Otish Mountain Road
- development work at the Eastmain, Éclat, Pacific Bay and Mistissini, Strategis and Otish Uranium, Lavoie, Epsilon and Hotish mine sites
- continuation of Chantiers Chibougamau forestry operations on forest management units (FMU 026-61 and 026-62)
- increase in existing outfitters' operations
- opening of Albanel-Témiscamie-Otish Park

7.8.2 Potential cumulative effects

On the basis of several scientific research projects, Environment Canada established that the degradation of caribou habitat represents the main threat to the species. According to its recovery program, a minimum of 65 percent of undisturbed habitat is required for a local woodland caribou population to be self-sufficient (Environment Canada 2011).

The cumulative effects study area consists of a 70-kilopmetre corridor on either side of the road, giving a total area of 46,730 square kilometres.

According to the document *Anthropogenic disturbance footprint within boreal caribou ranges across Canada* issued by Environment Canada, the current anthropogenic footprint in this area amounts to about 3,720 square kilometres, or 8 percent of the area. This footprint is largely connected with forestry operations and is in the south. Moreover, it includes the winter road on which Route 167 will be built.

If a 5-kilometre buffer strip[7] on either side of the road is applied, the anthropogenic disturbance associated with the buffer would amount to 2,305 square kilometres, or 5 percent of the study area. If the buffer is increased to 10 kilometres, the area would be 5,080 square kilometres, or 11 percent of the study area.

If the road-related disturbance is combined with the current anthropogenic footprint, the overall footprint would range from 6,000 to 8,800 square kilometres, amounting to 13 to 19 percent of the disturbance. Disturbances associated with future activities noted in the previous section are estimated to be less than 1,000 kilometres, or 2 percent of the disturbance. It is therefore estimated that current and future cumulative anthropogenic disturbances could affect from 15 to 21 percent of the total area, leaving 79 to 85 percent of wildlife habitat undisturbed by human activities.

7.8.3 Mitigation measures and residual environmental effects

The mitigation measures (Appendix 3) applicable for terrestrial wildlife and habitats as presented in Appendix 3 and the recommendations outlined in section 7.11 would limit the cumulative effects of the project, specifically for woodland caribou.

The road project will increase anthropogenic disturbances on the study area defined as a 70-kilometre corridor on either side of the alignment. The road will account for more than half the disturbed areas, which means the status of the study area will come close to the critical threshold at which a local population could become non-self-sufficient.

7.8.4 Government, public and Aboriginal comments and proponent's response

The stakeholders who participated in the public consultations were very concerned about the situation of the woodland caribou. The Agency believes that the recommendations of the special committee on the woodland caribou (see Section 7.4.3) would strengthen the conditions for the recovery and conservation of the species. Moreover, the alignment, including the 5 and 10 kilometre buffer zones, will avoid the forest patches that MRNF identified as the preferred woodland caribou habitats.

7.8.5 The Agency's conclusions on the significance of the residual environmental effects

Taking into account the implementation of the mitigation measures, the Agency concludes that this project is unlikely to cause significant adverse cumulative environmental effects on the woodland caribou.

7.9 Effects of the Environment on the Project

This section addresses potential effects of the environment on the project. The proponent examined these effects and proposed mitigation measures for the road construction and operation phases.

[7] Buffer strip: A number of studies indicate that, for woodland caribou, the effects of a road can be felt a number of kilometres beyond its physical footprint.

7.9.1 Potential effects

The potential effects of the environment on the project are associated with natural events, such as floods and earthquakes. To assess the probability of heavy rain at the project site, and because of the lack of a weather station in the study area, the proponent used data from five weather stations: Nitchequon, Bonnard, Chapais, La Grande Rivière, and Fermont. These stations are located at latitudes similar to the southern and northern limits of the planned road. The proponent considers that the risk of flooding due to heavy precipitation will be fairly low, particularly because the abundance of wetlands bordering the planned road serve as water retention areas.

The project is located in an area of low seismic activity. On the basis of data from Natural Resources Canada, the proponent estimates that the probability of a major earthquake is very low or even nil.

7.9.2 Residual environmental effects

The proponent considers that heavy rain events and seismic activity will not cause significant damage to the road.

7.9.3 Government, public, and Aboriginal comments and proponent's response

In its comments on the impact assessment in August 2011, the Council of the Cree Nation of Mistissini indicated that it was concerned about the flow measurements used in designing the bridges and culverts for Route 167. The Cree have observed increasingly heavy floods. They have also seen floods rip out several culverts on the Eastmain winter road.

The proponent pointed out that the winter road culverts were not designed to withstand heavy floods and that their installation is less "permanent" than the installation of the culverts for the proposed road. The proponent undertakes to regularly monitor the condition of the infrastructure of the new road to ensure its integrity and to take any necessary corrective action.

7.9.4 The Agency's conclusions on the significance of the residual environmental effects

Taking into account the implementation of the mitigation measures (Appendix 3), the Agency concludes that environmental conditions are not likely to adversely affect the project.

7.10 Effects of Potential Accidents or Malfunctions

The environmental effects caused by accidents or malfunctions are among the factors to be examined pursuant to the Act. The proponent identified the activities most likely to cause accidents or malfunctions during the road construction and operation phases, their potential adverse environmental effects, and also the planned emergency response measures.

7.10.1 Potential effects

The proponent identified contaminant spills (fuels, oils, paints, solvents, etc.) as the main risk of accidents and malfunctions. The transfer of petroleum products from tanker truck to tank, the maintenance of equipment and vehicles, and the operation of heavy machinery could cause an accidental contaminant spill. Depending on the type, extent, and location of the spill, the magnitude of the effects on the environment could be significant. However, the proponent considers that the risk of accidental spills, leaks, or losses will be restricted to a small area and will be of short duration.

7.10.2 Residual environmental effects

Taking into account the implementation of the mitigation measures (Appendix 3), the proponent does not anticipate any major residual effects associated with accidents or malfunctions. In addition, considering the communication and emergency management mechanisms, the proponent estimates that there is a low probability of major spills.

7.10.3 Government, public and Aboriginal comments and proponent's response

The Cree Nation of Mistissini has indicated that it is concerned about accidental hydrocarbon spills and their effects on the quality of water, soil, and wildlife habitats. The Federal Environmental Assessment Committee has noted that the preventive measures proposed by the proponent, such as safe storage of tanks, partially address this concern by reducing the probability that such events will occur. In addition, in the event of an accidental spill, the emergency measures and responses will reduce the effects on the environment.

7.10.4 The Agency's conclusions concerning the significance of the residual environmental effects

The Agency concludes that potential accidents and malfunctions associated with the project are not likely to have significant adverse environmental effects if the proponent applies the proposed accidental spill emergency response and prevention measures.

7.11 Effects on the Capacity of Renewable Resources

In accordance with the requirements of subsection 16(2) of the Act, the Agency must consider the capacity of renewable resources likely to be significantly affected by the project to meet the needs of the present without compromising the possibility for future generations to meet their needs. In order to assess whether the capacity of a renewable resource would be adversely affected, the Agency determined that the residual adverse effects on the resources would have to be significant enough in the project area to threaten the integrity of the ecosystem or resources in question. In the case of this project, the Agency concluded after its assessment that none of the residual adverse effects of the project had these characteristics.

The Agency also observed that government efforts aimed at protecting the northern territory are under way. Concurrent with these initiatives, several industrial and transportation infrastructure projects will be carried out in the area, some of which are located near existing or planned conservation areas. As CPAWS-Quebec pointed out, Route 167 could become a factor in the long-term degradation of the integrity of the Albanel-Témiscamie-Otish Park, whose boundaries have been adjusted to allow the passage of the future road. CPAWS-Quebec is concerned about the borrow pits required for construction of the road, in particular site D-22, which is located within the proposed park, south of Lake Albanel. This organization would have liked the proponent to describe the options concerning protection of the visual quality of the Témiscamie River and Lake Albanel during operation of the borrow pits. CPAWS-Quebec is requesting that the proponent pay particular attention to this issue. In this regard, the Agency is confident that the MDDEP will ensure that the park's conservation objectives are respected. Moreover, as the proponent pointed out, the primary advantage of the option of building a permanent road may be that it will prevent the multiplication of secondary roads and thus reduce the infrastructure's overall footprint on ecosystems and renewable resources.

The increase in hunting and fishing on the traditional territories could affect the resources and harvesting activities of the tallymen, undoubtedly over an area wider than the 500 metre corridor studied by the proponent. The proponent has undertaken to establish one or more monitoring committees that include regional stakeholders in the forestry, recreation, tourism, and mining sectors; land use managers; and representatives of the Council of the Cree Nation of Mistissini. The purpose of these committees will be to give Cree users opportunities to make known their complaints and suggestions concerning the road and its effects on use of the territory. The Agency supports the establishment of such committees.

The Agency also supports the suggestions received during its public consultations. Specifically, in conjunction with the government departments concerned, the Grand Council of the Cree, and the Hunting, Fishing and Trapping Joint Committee, the proponent will undertake the following:

- Implement a mechanism for controlling access to Route 167, possibly at the entrance to the future Albanel-Témiscamie-Otish Park.
- Ensure the presence of a sufficient number of wildlife protection officers.
- Create a special fishing and hunting zone in the area affected by the project, as provided for in section 24.8.11 of the JBNQA. The creation of this zone will make it possible to supervise the hunting and fishing activities of workers on Category III lands.

8. Follow-up Program Under the *Canadian Environmental Assessment Act*

The purpose of a follow-up program is to verify the accuracy of the environmental assessment of a project and to determine the effectiveness of any measures taken to mitigate the adverse environmental effects of the project. The results of a follow-up program will also support the implementation of adaptive management measures to address previously unanticipated adverse environmental effects or to modify existing measures.

The results of a follow-up program will also support the implementation of adaptive management measures to address previously unanticipated adverse environmental effects or to modify existing measures.

Fisheries and Oceans Canada and Transport Canada will be responsible for the follow-up program and, with the support of the relevant federal and provincial authorities, will ensure that the proponent designs and implements a detailed program.

The table in Appendix 6 outlines the requirements and the objectives the proponent will use to develop the follow-up program pertaining to the revegetation of disturbed sites, maintaining the false mountain willow and the woodland caribou, terrestrial wildlife, and fish habitat (including compensation structures and free passage of fish). The program will take into account the conditions of the federal and provincial authorizations and approvals required for the implementation of the project, as well as changes in environmental conditions and the observation of environmental effects that may arise while the project is being carried out.

As part of the follow-up program, the proponent must produce reports describing the results, their interpretation, and any necessary corrective measures. The proponent will submit the reports to Fisheries and Oceans Canada and Transport Canada, as well as to the relevant monitoring committees. The results of the follow-up program will be made publicly available on the Canadian Environmental Assessment Registry.

9. Benefits of Environmental Assessment

The comprehensive study process gave the Canadian public and Aboriginal groups opportunities to participate in improving the project during its design phase, and thus help reduce the environmental effects of its construction and operation. As a result, the design, construction, and operation of the project are not based solely on technical or economic criteria, but also incorporate environmental criteria that promote a balanced approach in keeping with the principles of sustainable

development. From the outset, the proponent designed the road to minimize its ecological footprint by using the winter road corridor for the first 140 kilometres. In addition, the chosen alignment was selected because it reduces encroachment on sensitive areas. The proponent selected the route that would have the smallest impact and could best meet its technical and economic criteria.

During this evaluation, modifications were made in response to comments received from the public and Aboriginal groups. Fisheries and Oceans Canada and Transport Canada also helped the proponent ensure that stream crossings were designed to reduce fish habitat loss and disturbance and maintain navigability where necessary.

The environmental assessment helped reduce the terrestrial and aquatic ecological footprint of the project by proposing a restoration program for segments of the winter road that will become obsolete once the project is implemented. At the request of the Federal Environmental Assessment Committee, the proponent agreed to install terrestrial wildlife crossings, as necessary to minimize the obstruction created by the road.

The comprehensive study process gave the Canadian public and Aboriginal groups opportunities to participate in improving the project during its design phase, and thus help reduce the environmental effects of its construction and operation.

The environmental assessment enabled the proponent to develop surveillance and monitoring plans for protecting the environment during the construction and operation of the road. The surveillance of the presence of caribou during the road construction phase will enable the proponent to adjust its work plan in such a way to limit the disturbance to caribou during the critical calving and winter feeding periods.

10. Conclusion of the Agency

To reach a conclusion on the environmental effects of the project, the Agency took the following elements into account in its analysis:

- the documentation submitted by the proponent;
- the analysis and findings of this report;
- the opinions and comments of the public, federal and provincial expert departments, and Aboriginal groups;
- the obligations of the proponent, as described in the authorization certified issued under the Quebec *Environment Quality Act* on December 1, 2011;
- the obligation to obtain authorization under subsection 35(2) of the *Fisheries Act* to cross watercourses that may have an impact on fish and fish habitat;
- the approval required under subsections 5(1) and 5(3) of the *Navigable Waters Protection Act*.

Given the implementation of the proposed mitigation measures and the commitments made by the proponent, the Agency concludes that the project is not likely to cause significant adverse environmental effects. The proponent will need to implement a follow-up program and share the results with the federal authorities and the follow-up committees that are to be established by the proponent.

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Appendices

Appendix 1: Results of the Analysis of Alternatives

Alternatives	
Status quo—no extension of Route 167	Constraints
	Proponents of projects for the development of mining resources, recreational tourism, forest resources, and wind farms would be required to construct their own infrastructure to access their facilities. This infrastructure, probably roads, would proliferate needlessly, with neither cohesion nor a guiding plan.
	Conclusions
	This is a less-than-desirable prospect in a context of environmental protection and sound land management.
Railway	Constraints
	The proponent believes that the amount of ore to be extracted in the mining projects under development is insufficient to justify a railway.
	Conclusions
	This option is not flexible enough to meet all of the needs of the mining and recreational tourism industries and the local population.
Extension of existing regional roads: The proponent examined two options:	Constraints
	Construction of a road starting from the end of the Abitibi Bowater logging road located 350 kilometres north of Dolbeau-Mistassini. This alternative would require the construction of a new road more than 300 kilometres long to serve such facilities as the Stornoway mine. Construction of a 160-kilometre access road south from the Trans-Taiga Road, starting halfway between the La Grande-4 and Laforge-1 dams.
	Conclusions
	Neither alternative offers direct access to the entire area northeast of Lake Mistassini, where the economic potential to be developed is located. These alternatives only partially fulfill the desire of the local and regional communities, both Cree and Jamesian, for safe access to the heart of the James Bay area.
Construction of runways at various sites in the area	Constraints
	The amount of equipment and raw materials required for most mining, forestry, and wind projects exceeds the capacity of air transport.
	Conclusions
	Air access alone would not be enough for the development of mining resources, forest resources, or wind farms. It would also not facilitate access to the area for the Mistissini Cree.

Appendix 2: Variant Analysis

Table 2.1: Technical, Economic, and Environmental Criteria

Criteria	Description
Major constraints that may require the construction of structures or major alignment modifications	For example, river crossings that require the construction of bridges, the location of a runway planned by the Stornoway Diamond Corporation, and hunting grounds identified by tallymen.
Quality of the horizontal and vertical alignment profiles	In compliance with the applicable design standards and criteria, both environmental (Fisheries and Oceans Canada, MDDEP) and technical (MTQ). To limit fish habitat losses, for example, the alignment must cross watercourses at a right angle and at the watercourse's narrowest point. Furthermore, the curvature, slope, and width of the driving surface must be compatible with the posted speed limit to ensure user comfort and safety.
Extent of earthwork requirements	Minimize the amount of material required from quarries and sand pits, avoiding sectors with high-organic-content soils or with a large difference in elevation.
Avoidance of sensitive environments	Includes wetlands (swamps, marshes, peatlands, and ponds); watercourses and lakes; erosion-sensitive areas; significant wildlife habitats identified in the field campaign (moose yards, spawning grounds, breeding grounds, etc.); areas where special-status species are present; and sites of interest identified by the Cree and by land users (hunting grounds, fishing grounds, trapping grounds, trails, traditional, and archaeological sites, etc).
Proximity of potential sources of road-building materials	Preference given to borrow pits in the vicinity of the road to reduce the overall length of temporary access roads and to minimize project costs as well as its environmental footprint.
Length of the road to be built	The costs associated with the project and its ecological footprint are directly proportional to the length of the road to be built.

Figure 2.1: Alignments and Options

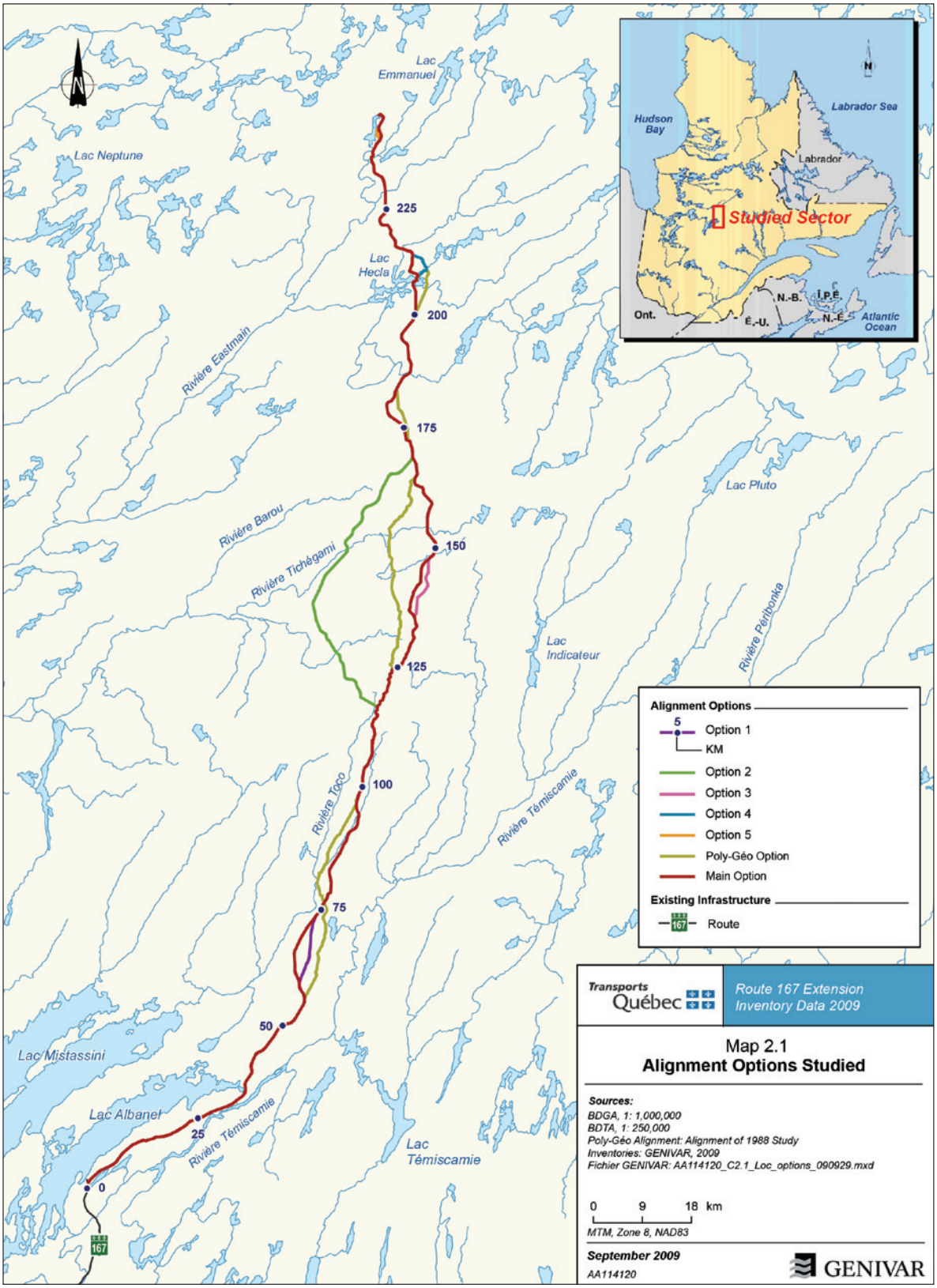

Table 2.2: Comparative Analysis of Alternatives

	Genivar Alignment	Poly-Geo Alignment	Weighting %	Genivar	Poly-Geo
0+000 to 70+000	In this section, the two alignments overlap, so there is no difference in choosing one over the other. Given the immovable aspect of the southern extremity (point of connection with the existing road), this alignment is the only logical option, as it generally follows a straight line along the existing winter road. Also, this alignment is located within the corridor set aside by the MTQ within at ATO Park boundaries.				
• major constraints potentially involving the construction of structures (bridges);	4	4	20%	0.8	0.8
• profile and alignment quality;	4	4	25%	1	1
• extent of earthwork required;	4	4	10%	0.4	0.4
• avoidance of sensitive environments (i.e.: lakes, bogs, erosion prone areas, etc.);	3	3	15%	0.45	0.45
• proximity to potential sources of road building materials;	2	2	10%	0.2	0.2
• length of road to be built, i.e. total distance to be covered.	3	3	20%	0.6	0.6
			Total	3.45	3.45
70+000 to 75+000	The Genivar alignment cannot be chosen as it does not connect with the preceding section (0+000 à 70+000)	The Poly-Géo alignment connects with the preceding section.			
• major constraints potentially involving the construction of structures (bridges);	4	4	20%	0.8	0.8
• profile and alignment quality;	1	4	25%	0.25	1
• extent of earthwork required;	4	4	10%	0.4	0.4
• avoidance of sensitive environments (i.e.: lakes, bogs, erosion prone areas, etc.);	3	3	15%	0.45	0.45
• proximity to potential sources of road building materials;	2	2	10%	0.2	0.2
• length of road to be built, i.e. total distance to be covered.	3	3	20%	0.6	0.6
			Total	2.7	3.45

Table 2.2: Comparative Analysis of Alternatives (cont'd)

	Genivar Alignment	Poly-Geo Alignment	Weighting %	Genivar	Poly-Geo
75+000 to 96+000	This alignment requires larger volumes of excavation and backfilling.	This alignment requires smaller volumes of excavation and backfilling.			
• major constraints potentially involving the construction of structures (bridges);	3	3	20%	0.6	0.6
• profile and alignment quality;	3	3	25%	0.75	0.75
• extent of earthwork required;	1	4	10%	0.75	0.4
• avoidance of sensitive environments (i.e.: lakes, bogs, erosion prone areas, etc.);	3	3	15%	0.45	0.45
• proximity to potential sources of road building materials;	4	4	10%	0.4	0.4
• length of road to be built, i.e. total distance to be covered.	3	3	20%	0.6	0.6
			Total	2.9	3.2
96+000 to 115+000	In this section, both alignments overlap, and thus present the same advantages and disadvantages.				
• major constraints potentially involving the construction of structures (bridges);	3	3	20%	0.6	0.6
• profile and alignment quality;	4	4	25%	1	1
• extent of earthwork required;	3	3	10%	0.3	0.3
• avoidance of sensitive environments (i.e.: lakes, bogs, erosion prone areas, etc.);	3	3	15%	0.45	0.45
• proximity to potential sources of road building materials;	4	4	10%	0.4	0.4
• length of road to be built, i.e. total distance to be covered.	3	3	20%	0.6	0.6
			Total	3.35	3.35

Table 2.2: Comparative Analysis of Alternatives (cont'd)

	Genivar Alignment	Poly-Geo Alignment	Weighting %	Genivar	Poly-Geo
115+000 to 170+000	This alignment follows quite rugged terrain, which would result in a road with steep slopes, higher risks of erosion, larger volumes of excavation and backfilling and less energy-efficient for users.	This alignment follows less rugged terrain, with shorter, smoother slopes. As a result, it is less erosion-prone, requires less excavation and backfilling and is more energy efficient.			
• major constraints potentially involving the construction of structures (bridges);	3	3	20%	0.6	0.6
• profile and alignment quality;	1	4	25%	0.25	1
• extent of earthwork required;	1	4	10%	0.1	0.4
• avoidance of sensitive environments (i.e.: lakes, bogs, erosion prone areas, etc.);	4	3	15%	0.6	0.45
• proximity to potential sources of road building materials;	3	4	10%	0.3	0.4
• length of road to be built, i.e. total distance to be covered.	2	3	20%	0.4	0.6
			Total	2.25	3.45
170+000 to 184+000	This alignment is longer as it includes a sharp curve.	This alignment is straighter, therefore shorter. It will result in reduced construction costs.			
• major constraints potentially involving the construction of structures (bridges);	3	3	20%	0.6	0.6
• profile and alignment quality;	4	4	25%	1	1
• extent of earthwork required;	4	4	10%	0.4	0.4
• avoidance of sensitive environments (i.e.: lakes, bogs, erosion prone areas, etc.);	3	3	15%	0.45	0.45
• proximity to potential sources of road building materials;	3	3	10%	0.3	0.3
• length of road to be built, i.e. total distance to be covered.	3	3	20%	0.6	0.6
			Total	3.35	3.35

Table 2.2: Comparative Analysis of Alternatives (cont'd)

	Genivar Alignment	Poly-Geo Alignment	Weighting %	Genivar	Poly-Geo
184+000 to 194+000	In this section, both alignments overlap, and thus present the same advantages and disadvantages.				
• major constraints potentially involving the construction of structures (bridges);	3	3	20%	0.6	0.6
• profile and alignment quality;	4	4	25%	1	1
• extent of earthwork required;	4	4	10%	0.4	0.4
• avoidance of sensitive environments (i.e.: lakes, bogs, erosion prone areas, etc.);	3	3	15%	0.45	0.45
• proximity to potential sources of road building materials;	3	3	10%	0.3	0.3
• length of road to be built, i.e. total distance to be covered.	3	3	20%	0.6	0.6
			Total	3.35	3.35
194+000 to 212+000	This alignment requires crossing Lake Hécla (backfilling in the lake).	This alignment circumvents Lake Hécla (no backfilling in the lake).			
• major constraints potentially involving the construction of structures (bridges);	2	4	20%	0.4	0.8
• profile and alignment quality;	3	3	25%	0.75	0.75
• extent of earthwork required;	3	3	10%	0.3	0.3
• avoidance of sensitive environments (i.e.: lakes, bogs, erosion prone areas, etc.);	2	3	15%	0.3	0.45
• proximity to potential sources of road building materials;	2	3	10%	0.2	0.3
• length of road to be built, i.e. total distance to be covered.	3	3	20%	0.6	0.6
			Total	2.55	3.2

Table 2.2: Comparative Analysis of Alternatives (cont'd)

	Genivar Alignment	Poly-Geo Alignment	Weighting %	Genivar	Poly-Geo
212+000 to 2 9+240	In this section, both alignments overlap, and thus present the same advantages and disadvantages.				
• major constraints potentially involving the construction of structures (bridges);	3	3	20%	0.6	0.6
• profile and alignment quality;	3	3	25%	0.75	0.75
• extent of earthwork required;	3	3	10%	0.3	0.3
• avoidance of sensitive environments (i.e.: lakes, bogs, erosion prone areas, etc.);	4	4	15%	0.6	0.6
• proximity to potential sources of road building materials;	3	3	10%	0.3	0.3
• length of road to be built, i.e. total distance to be covered.	3	3	20%	0.6	0.6
			Total	3.15	3.15

1 = bad
2 = poor
3 = moderate
4 = good
5 = excellent
Source: Transports Québec (2010a)

Appendix 3: Mitigation Measures

This appendix outlines the mitigation measures that will be implemented to limit the effects of the project. The information is organized under the same subheadings as those in section 7 on the assessment of environmental effects of the project.

1. Plant species of interest
To promote the survival of the false mountain willow plants that can be spared and to replace those that will be destroyed, the proponent undertakes to implement the following measures:

- Mark with tape each false mountain willow specimen surveyed.
- Forward to the *Centre de données sur le patrimoine naturel du Québec* the locations of the willows to be protected.
- Prohibit all movement of machinery within a 15-metre radius of a plant. This protection radius will be marked by fencing or another method designed to protect the area.
- Correct any alterations to drainage conditions caused by ruts and channels or disturbance of surfaces in order to restore the original hydrological conditions.
- Since willows are known to propagate easily by cuttings, take cuttings from the condemned willows and transplant them, after completion of the work, in the road right-of-way, under conditions essential to their survival.
- To ensure the success of this operation, plant at least twice as many cuttings as plants lost, in various drainage and slope conditions.
- Have the work performed by a botanist or horticulturist.

2. Fish and its habitat
The proponent's general specifications include a number of general mitigation measures aimed at protecting fish habitat. In addition to those measures, the proponent undertakes to:

- prohibit all quarries, sand pits, and waste or disposal sites within 20 metres of the ordinary high water mark of all watercourses; and
- ensure that their presence does not have adverse effects on fish habitat (input of suspended matter, changes in drainage, etc.).

Measures applicable to culverts
- Install culverts in the dry to reduce the risk of sediment input downstream.
- Provide justification beforehand for each case where implementation of this mitigation measure would be impossible or, in the opinion of the proponent, unjustified. Where applicable, this justification will have to be accompanied by an action plan outlining the mitigation measures adapted to the period of the year.
- In authorization requests pursuant to section 35(2) of the *Fisheries Act* for the construction of bridges, promote the measures set out in Fisheries and Oceans Canada's Operational Statement *Clear Span Bridges*.
- Restore the sites to their original condition after the jetty required for building the Eastmain River Bridge is dismantled.
- Apply culvert design measures that minimize encroachments, and prevent the installation of culverts in sensitive fish habitat: spawning grounds, floodplains of interest, and weed beds. If it is not feasible to avoid sensitive habitats, use arch culverts or clear span bridges.
- In the case of winter crossings, comply with Fisheries and Oceans Canada's operational statements on *Ice Bridges and Snow Fills* and *Temporary Stream Crossings*.
- If adjustments to small sections of watercourses are required where culverts are installed, the adjustments should be made over the shortest possible distance, in compliance with the mitigation measures specified in this appendix and in Fisheries and Oceans Canada operational statements.

Sensitive periods
- From September 1 to October 31, the period of the fall upstream migration of brook trout, lake trout, and lake whitefish, ensure the free passage of fish at the required locations, including temporary diversion channels.

- Between April 15 and June 15, prohibit all in-water work for all crossings to avoid the floods that could damage the temporary structures. Among other things, this measure will help protect the upstream migration of walleye and northern pike.
- Present justification beforehand for each case where implementation of this mitigation measure would be impossible or, in the opinion of the proponent, unjustified. Where applicable, this justification will have to be accompanied by an action plan outlining the mitigation measures adapted to the period of the year that will help ensure the stability of the temporary structures and fish passage.

Local restoration of stream sections near the stream crossings

- If necessary, plan the reprofiling of bank slopes to ensure stability.
- Select the proper substrate for the stream bed to ensure optimal flow above the substrate by minimizing interstitial flow, i.e., minimize water loss through the substrate.
- Restore the surface substrate (armouring) of the stream bed while respecting the natural particle size distribution. Plan a preferential flow path (thalweg) in the stream bed.
- Ensure the free passage of fish by avoiding excessive slopes and impassable barriers.

Temporary structures

- Ensure, at all times, the free circulation of water and a sufficient volume of water to maintain fish habitat functions (feeding, nursery, spawning, and migration) downstream of the work area. Take the necessary measures to prevent impacts such as flooding, dewatering, suspended matter, and erosion upstream and downstream of the work area.
- Give preference to the types of cofferdams that minimize encroachments into fish habitat.
- If stone cofferdams are necessary, use clean granular material for construction and, wherever possible, use a membrane to ensure that the structure is watertight.
- Stabilize the temporary structures by protecting them, for example, with a suitable geotextile membrane or riprap. In addition, these works must be designed to withstand the flooding that may occur during the work.

Free fish passage

- Submit to Fisheries and Oceans Canada for validation all cases where the proponent believes the free passage of fish is not necessary.
- Implement the mitigation measures in this appendix, the decision diagram developed as part of the impact assessment, and the design criteria recommended by Fisheries and Oceans Canada for stream crossings related to the road, temporary roads, and the rehabilitation of some sections of the winter road, specifically, where fish habitats are present and the free passage of fish is an issue.
- Comply with Fisheries and Oceans Canada's *Bonnes pratiques pour la conception et l'installation de ponceaux de moins de 25 metres* [best management practice for the design and construction of permanent culverts less than 25 metres] and *Recommandations pour la conception des traversées de cours d'eau où le libre passage du poisson doit être assuré—projets routiers et autoroutiers* [recommendations for design of stream crossings where the free passage of fish is required—road and highway projects].

Temporary stream diversion

- Ensure the free passage of fish in the temporary diversion channels located on the watercourse sections that require the free passage of fish.
- Stabilize the bed of diversion channels and their banks by means of non-erodible riprap or by a geotextile or impermeable membrane. This stabilization must be effective at all times.

Control of erosion and sediment resuspension

- Take all necessary precautions to prevent any deposition of fine particulate matter into the aquatic environment beyond the immediate work area.
- Construct ditches along the temporary roads and work areas to direct runoff to sediment capture structures.

- Install a sufficient number of berms, sediment barriers, sediment retention ponds, or sediment traps in the work areas to prevent the transport of sediments into the water. Outside the work area, none of these structures must be installed in fish habitat. These structures must be functional at all times.
- Channel drainage ditches toward areas of stable vegetation to prevent sediments from being transported into the aquatic environment. If it is impossible to divert the ditches, devise a suitable system to control the leaching of sediments from the structures.
- Avoid leaving reconfigured and denuded areas without erosion control measures, particularly on slopes. If a period of time is required for permanent stabilization, erosion control measures must remain in place to prevent erosion and to capture any eroded material.
- Do not carry out any earthwork or excavation work near watercourses during flood periods or during heavy rains.
- During temporary closings of the work site, i.e., evenings, weekends, and holidays, plan appropriate sediment control measures by taking weather forecasts into consideration.

Blasting

- Blasting work must comply with the guidelines for the use of explosives in or near Canadian fisheries waters (*Canadian Technical Report of Fisheries and Aquatic Sciences 2107*, Wright & Hopky, 1998). If unable to comply with these guidelines, the proponent will have to apply for authorization under section 32 of the *Fisheries Act.*

Site restoration

- Restore ditches damaged by machinery, such as damage to gradient and embankment shoulders.
- Restore banks using recognized techniques of stabilization through planting, taking into account stability, propensity to erosion, slope, and height of embankment. Replanting must be done as soon as possible after grading work is complete, with preference given to indigenous species.
- After the diversion channels have been filled in, restore them to their original state.
- Limit riprap on banks of watercourses to the ordinary high water mark, and replant starting at the edge of the riprap, which shall be composed of clean stones free of fine materials.
- After the temporary structures (jetties, cofferdams, and culverts) have been dismantled, restore the stream banks and stream bed to their original state, respecting the particle size distribution, stream bed profile, etc.

Operation of the road

- Place pits to capture fine sediment all along the drainage ditches; sedimentation pits must be functional at all times.
- Limit drainage ditch maintenance to the lower third of the embankment slopes to maintain the stability of the replanted slopes.

Compensation for habitat loss

- Carry out a project to compensate for cumulative fish habitat losses and disturbances of 18,000 square metres that will persist after the implementation of the mitigation measures. This would allow the proponent to comply with Fisheries and Oceans Canada's fish habitat management policy, which targets no net loss of fish habitat.
- Correct a number of problems identified on the 140 kilometres of winter road that require rehabilitation work. About 30 sites offer excellent potential for fish habitat development. The planned measures include removal or repair of culverts that hamper the free circulation of fish because they are undersized, sunken, or shifted, or their invert is not buried, or they create a waterfall downstream. These measures will counter the fragmentation of fish habitat by restoring the access of fish to sections of the hydrographical networks that stretch for dozens of kilometres.
- Implement measures to stabilize certain road embankments and culverts that are causing the deposition of sediments into aquatic environments.

- Remove sections of road embankments that are encroaching upon some 20 water bodies and watercourses. The areas of fish habitat enhanced or improved could range from 50 to 3,800 square kilometres. Following removal of the winter road infrastructure, restore stream sections, taking into account the following recommendations:
  - The restoration work in these stream sections will have to be carried out in a manner that provides diversified and quality fish habitat, including feeding grounds, nursery areas, shelter and spawning grounds that meet the needs of the fish species in this environment, by reproducing insofar as possible the natural characteristics of this stream (natural banks with indigenous plant species, particle size distribution, different types of flow, gradient and width).
  - The restored stream profile will have to be stable and ensure a sufficient flow of water above the substrate by minimizing interstitial flow (water losses through the substrate) and by concentrating the flow during the low-flow period by including a thalweg or minor bed.
  - The surface substrate (armouring) of the stream bed will be composed of a natural granular covering.
  - The restored stream profile will have to ensure the free passage of fish while avoiding excessive slopes and impassable barriers.
  - The reprofiling of the bank slope will be planned so as to ensure bank stability, with an emphasis on overhanging vegetation.
  - To optimize habitat suitability, utilize bio-engineering techniques wherever possible, using indigenous shrub and herbaceous strata. When riprap must be used, minimize its height as much as possible and plant a riparian strip from the edge of the riprap using indigenous and overhanging herbaceous and woody plants.

3. Terrestrial wildlife and its habitat

To minimize the project's effect on wildlife and wildlife habitat, the proponent undertakes to implement the following measures:

Habitat loss

- From mid-May to mid-July, limit construction work in the vicinity of the calving areas identified by the follow-up activities. The proponent will work in collaboration with the MRNF to determine the necessary protection measures.
- Limit tree clearing to the width of the right-of-way, i.e., from 30 to 35 metres, and restrict machinery movements to the areas that are to be cleared.
- Carry out selective cutting within the last 3-metre strip inside the right-of-way to prevent windfall. Movements of machinery will not be permitted in this strip.
- Maintain the forest edge intact between the edge of the right-of-way and a stream or lake. To this end, identify the edge of the right-of-way in the field by visible markers.
- Install balanced culverts to ensure proper drainage of wetlands. In addition to ensuring water drainage, in some instances these culverts will also ensure a supply of nutrients for fens. An example of such a situation occurs between kilometre 29 and kilometre 32, where a peatland of approximately 40 hectares is fed primarily by groundwater and surface flows loaded with nutrients coming from Mount Noracon, located north of the proposed road.
- For all borrow pits and quarries, maintain a 75-metre buffer strip from adjacent watercourses and water bodies, from the ordinary high water mark (OHWM). If this requirement cannot be met, the proponent will have to obtain a certificate of authorization from MDDEP.
- Construct a single access road to a borrow site, crushing site, waste area, construction site office, or any other site necessary to carry out the work.
- The maximum width of the access roads is 2.5 times the width of the largest vehicle using it. Tree clearing for this purpose may not exceed the width including the roadbed, road embankments, and ditches.

- Access roads must be located in accordance with the same criteria used by the proponent for its analysis of project alternatives, including the avoidance of sensitive environments.
- After use, close all temporary access roads to limit access, as specified in the Quebec woodland caribou recovery program (2008).
- Restore the borrow pits and their access roads, in accordance with the Quebec *Regulation respecting standards of forest management for forests in the public domain*, and *Regulation on quarries and sand pits* under MDDEP responsibility.
- Obtain a certificate of authorization from the MDDEP to operate the natural material waste disposal sites.
- Dispose of excess natural materials in accordance with the Quebec Protection Policy for Lakeshores, Riverbanks, Littoral Zones and Floodplains, as well as the Quebec *Forest Act* (forests in the public domain).
- In accordance with the agreements between the proponent and the MDDEP, restore a section of the winter road in the sector of the future Albanel-Témiscamie-Otish Park.
- Seed denuded soil in the road right-of-way and work areas. When possible, preference should be given to planting softwood species representative of woodland caribou habitat.
- Incorporate the recommendations of the special committee on the woodland caribou composed of representatives of the MRNF, the Cree Regional Authority, and the research chairholders of the CRSNG-UQAT-UQAM industrial chair in sustainable forest management.
- Monitor the regeneration of coniferous habitats and, if necessary, take steps to control the development of deciduous species.
- For the winter road and borrow pit restoration work, where soil conditions permit, the proponent shall give priority to planting softwood species representative of woodland caribou habitat.
- Do not use de-icing salt.

Barrier effects and fragmentation

- Use the road right-of-way as an access road to the work sites to minimize encroachments into natural habitats.
- Restrict the construction of embankments to south of kilometre 200 so as not to disrupt the passage of migratory caribou.
- Install wildlife crossings (dry crossings) under the bridges in order to maintain the connectivity of habitats for wildlife and minimize mortalities due to collisions.
- Identify wildlife crossing corridors and construct wildlife crossings at strategic locations. An amount of $300,000 has been earmarked for the construction of this type of infrastructure.

Mortality

- Favour tree-clearing operations in the fall and winter to avoid interfering with wildlife breeding and rearing periods.
- Prohibit tree-clearing operations between May 1 and August 15 to protect wildlife.
- Raise awareness among the public and Aboriginals about the effects of harvesting, poaching, accidental kills, and the disturbance of woodland caribou and any other species. In collaboration with the MRNF, the proponent will ensure that a protection program is implemented.
- Implement a wildlife protection program in cooperation with the MRNF and with the participation of the Crees.
- In collaboration with the MRNF, inform workers about applicable hunting and fishing regulations in the area.
- In collaboration with the MRNF, inform workers and tallymen of the hunting ban within a 2-kilometre radius of the work site.
- Through posters and information sessions, ask work site personnel not to feed the animals and not to leave food lying around so as not to attract animals to the work areas and camps.
- Install road signage to alert road users of the hunting and fishing regulations, conservation areas, and the presence of wildlife.

- Cut vegetation in road curves so that drivers can clearly see animals near the road.
- With the collaboration of the MRNF, forestry and mining companies, and the tallymen, implement measures to manage the moose population and moose habitat. The purpose of this action is to maintain a low density of moose, in effort to prevent an increase in the wolf population as they are predators of caribou.

4. Birds and their habitat

To minimize the project's effects on birds and their habitat, the proponent undertakes the following measures:

- Implement the measures set out in sections 7.3 and 7.4, which appear to be relevant since bird fauna share the same habitats as fish and terrestrial wildlife.
- Avoid carrying out potentially habitat-destroying activities during key periods so as to reduce the risk of nest destruction. The key period for the study area is May 1 to August 15 and would apply to most bird groups.
- Barrow's goldeneye
  - During the breeding season for this species, avoid tree clearing and any other disturbance near the eight lakes with potential. The breeding season for the species is mid-May to late September.
  - Maintain adequately sized buffer strips around the lakes, and preserve the snags and dead trees in these strips that could be used for nesting. To this end, the proponent plans not to use certain potential borrow pit areas.
  - Maintain the hydrological characteristics of these lakes to avoid any changes in water levels.

Pursuant to section 6 of the Migratory Birds Regulations, no person shall disturb, destroy or take a nest, egg or nest shelter of a migratory bird or have in his possession a live migratory bird, or a carcass, skin, nest or egg of a migratory bird except under authority of a permit thereof. The proponent must therefore be vigilant to comply at all times with these Regulations. Environment Canada points out that the purpose of identifying the key periods, from May 1 to August 15 and from mid-May to late September for the Barrow's goldeneye, is to reduce the risk of destruction of the nests of migratory birds during a period when the risk of incidental take[8] is particularly high. The key breeding periods are presented for guidance only, and are intended to help the proponent determine the period when the risk is particularly high. This is not a "restriction period," just as there is no "authorized period." Environment Canada therefore cannot guarantee the proponent protection against any recourse or remedy under the *Migratory Birds Convention Act*, 1994, regardless of the scope of a given activity, the significance of the potential impacts on bird populations, or the nature of the mitigation measures taken.

5. Current use of lands and resources for traditional and tourism purposes

The proponent undertakes to implement the following measures, many of which were established with input from tallymen:

- In collaboration with the Council of the Cree Nation of Mistissini, inform the Cree users concerned of the timetable and nature of the work so they can plan their activities taking into account work at the construction site.
- Establish one or more coordinating and monitoring committees whose members include regional stakeholders in the forestry, recreation, tourism, and mining sectors, and land use managers and representatives of the Council of the Cree Nation of Mistissini. The focus of these committees will be to examine and address project-related issues, including the project's effect on land use, and also to inform Cree users of the work.

[8] Incidental take means inadvertent harm to migratory birds by the disturbance or destruction of their nests or eggs.

- Consult the tallymen regarding the location of the temporary and permanent workers camps.
- In collaboration with the MRNF, inform the tallymen and workers about the hunting, fishing, and trapping regulations in effect during the work, such as the hunting ban within a two-kilometre radius of the work site.
- Construct and maintain roadside parking areas.
- Reduce the slope in certain areas where the road alignment intersects with snowmobile and portage trails.
- If necessary, use environmentally friendly methods to control dust emissions.
- Carry out right-of-way clearing by taking into account the applicable forest management standards and the presence of travel corridors, such as portages and snowmobile trails.
- In collaboration with the users concerned, install road signage in the areas where the road alignment crosses snowmobile trails.
- At the side of the road and at a location that will remain accessible once construction is completed, make available to the tallymen the wood harvested in areas not subject to Timber Supply and Forest Management Agreements.
- Post signs to indicate the proximity of Cree camps. These signs will include the hunting and fishing regulations. The tallymen have suggested that these signs be installed 2 kilometres from the camps.
- Post lower speed limit signs at certain locations, such as near camps, portages, and snowmobile crossings.
- For navigable waterway crossings, ensure that the structure has a vertical clearance of at least 1.5 metres relative to the ordinary high water mark, which should permit all-season clearance for most vessels.
- Submit the plans of crossing structures for the navigable waterways to Transport Canada for approval.

6. Structure, sites, or things of archaeological, heritage, or historical significance

The proponent undertakes to implement the following measures:

- Prior to implementation of the work, carry out archaeological surveys within the boundaries of the road right-of-way.
- If the surveys lead to the discovery of archaeological sites, establish protection measures or conduct excavations.
- Inform the Mistissini monitoring committee of the survey results and discoveries and advise them immediately of the discovery of burial sites.
- Have all archaeological investigations carried out by archaeologists, under the direct responsibility of the proponent.
- Inform the contractor of its obligations to suspend work at the site of a discovery until it has been fully assessed by archaeologists.
- If archaeological sites are discovered during the work, follow the requirements of the Quebec *Cultural Property Act*, which call for temporary protection measures, assessment of the discoveries and, if applicable, archaeological excavations.
- Apply the same precautions to burial grounds discovered as for archaeological discoveries.

7. Effects of the environment on the project

The proponent is proposing several measures aimed at reducing the environmental effects related to erosion which could be associated with periods of heavy rain.

- Limit tree clearing in the right-of-way of the road and ditches.
- Locate access roads outside the riparian zone and wetlands.
- Revegetate the temporary access roads.
- In designing its culverts, the proponent also considered the 50-year flood, and the design flows were increased by 10 percent.

8. Effects of potential accidents or malfunctions

To mitigate the effects of accidental spills, the proponent undertakes to implement the following measures:

- Ensure the maintenance, repair, and cleaning of machinery at facilities constructed for this purpose.

- Regularly and systematically inspect machinery and document the results of these inspections.
- Safely store all tanks and containers of gasoline, oil, and chemicals. For example, a leak-proof membrane could be used under tanks and containers when they are stored within 60 metres of a watercourse.
- Ensure that an emergency petroleum products spill kit is kept on hand at all times. Workers must know where this kit is kept, and it should be easily accessible.
- Install floating booms on watercourses, downstream of the work area.

In addition to the above measures, the proponent is proposing to implement an environmental emergency program and documented procedures applicable to accidents and spills. This program will detail the planned response measures in the event of accidental spills, structure failure, or major events such as a forest fire. The emergency procedures, roles, and responsibilities of the parties responsible for implementing the response plan and the communication mechanisms will also be detailed.

A key element of the proponent's emergency program is developing communication mechanisms for the public, to ensure that nearby communities and local stakeholders are adequately informed in a timely manner of emergencies or spills that may affect users. The Agency considers that the proponent should discuss its emergency management program with the monitoring committee whose members include regional stakeholders and the Council of the Cree Nation of Mistissini.

Appendix 4: Watershed Characteristics

Lakes Albanel and Mistassini watershed
In this watershed, the road will cross 15 watercourses, 10 of which constitute fish habitats. The fish- spawning potential of these watercourses ranges from low to nil. Certain sections are primarily feeding grounds. The following species are present within the watershed: brook trout, pearl dace, longnose dace, white sucker, lake chub, and slimy sculpin.

Témiscamie River watershed
The road will cross 22 watercourses in this watershed, 16 of which constitute fish habitats and are generally less than 2 metres wide. They are characterized by a channel flow facies with a substrate composed of organic matter and a few boulders or cobbles. These watercourses constitute are primarily feeding grounds. The spawning potential ranges from moderate for lithophilous and phytolithophilous fish species in lentic environments, to low or nil for the other groups. The following species are found within the watershed: brook trout, walleye, northern pike, lake whitefish, burbot, lake chub, white sucker, and lake trout. The latter species is primarily associated with lakes and larger watercourses.

Takwa River watershed
The road will cross 38 watercourses, 23 of which contain various types of fish habitat. The Takwa River is the main watercourse of the watershed crossed by the road. At the planned bridge site, there are several flow facies, including rapids. The species likely to be found in the Takwa River at the crossing point are brook trout, northern pike, white sucker, and pearl dace.

In the southern portion of the watershed, the watercourses are generally small streams with slow flow facies of the channel type with a few riffles. The substrates are primarily composed of organic matter, sand, and boulders. The spawning potential of these watercourses varies from low to moderate for phytophilous and phytolithophilous fish species in lentic environments. The southern portion of the watershed appears to support only a few species, with northern pike and burbot being the only species surveyed there.

In the northern portion of the watershed, several shallow lakes are connected by small streams with heterogeneous flow facies that regularly include gravel and cobble substrates. This sector is believed to have strong spawning potential for brook trout. These streams frequently represent important migration habitats for these systems. The following fish species are found in the northern portion of the watershed: brook trout, northern pike, burbot, white sucker, longnose sucker, pearl dace, and slimy sculpin.

Tichégami River watershed
The road will cross 30 watercourses in this watershed, 25 of which contain various types of fish habitat. The Tichégami River is the largest watercourse of the watershed crossed by the road. The slopes and velocities of the watercourses are accentuated by the area's mountainous relief. These watercourses are characterized by numerous impassable barriers to fish passage. On the whole, these watercourses exhibit a high degree of heterogeneity of flow facies and substrates such as boulders, cobbles, and gravel. All of these watercourses have very good habitat potential, especially for spawning and particularly for brook trout. Other fish species found in the watershed include lake whitefish, burbot, lake chub, white sucker, longnose sucker, longnose dace, and pearl dace.

Eastmain River watershed
The road will cross 36 watercourses in this watershed, 30 of which contain various types of fish habitat. The road will cross several large watercourses, including the Eastmain, Grand-Portage and Léran rivers. The alignment includes numerous small streams less than 2 metres wide. The fish habitats identified, the flow facies, and

the types of substrate are heterogeneous. On the whole, habitat suitability, particularly for spawning, is considered very good. There are very few barriers to the free passage of fish on the watercourses. The following fish species are likely to be found in the various watercourses of this watershed: walleye, northern pike, brook trout, lake whitefish, burbot, slimy sculpin, ninespine stickleback, lake chub, white sucker, longnose sucker, longnose dace, and pearl dace.

Misask River watershed
The road will cross 11 watercourses with fish habitats. There are two large rivers in this sector, i.e., the Misask and Nerveuse rivers. The slopes and flow velocities of the watercourses are accentuated by the area's mountainous relief. The fish habitats identified, the flow facies, and the types of substrate are heterogeneous. On the whole, habitat suitability, particularly for spawning, is very good. The following fish species are likely to be found in the watershed's various watercourses: lake trout, walleye, northern pike, brook trout, lake whitefish, burbot, slimy sculpin, lake chub, white sucker, longnose sucker, longnose dace, pearl dace, and yellow perch.

Appendix 5: Crossing Points of Navigable Waterways

Table 2.1: Calender

Crossing point (kilometre chainage)	Watercourse	Latitude	Longitude
KM 81+195	Takwa	51°34'11.4"	72°23'43.4"
KM 142+453	Tichégami	52°03'50.0"	72°11'18.6"
KM 161+496	unnamed stream	52°12'50.6"	72°07'33.8"
KM 169+559	unnamed stream	52°16'48.8"	72°08'19.7"
KM 176+670	unnamed stream	52°20'13.4"	72°09'52.7"
KM 177+554	unnamed stream	52°20'41.8"	72°09'54.9"
KM 184+038	Eastmain River	52°23'30.5"	72°07'53.8"
KM 187+473	unnamed stream (tributary stream of Eastmain River)	52°25'15.2"	72°08'03.2"
KM 201+011	Léran Creek	52°31'56.3"	72°04'59.6"
KM 204+508	unnamed stream	52°33'46.0"	72°04'52.5"
KM 210+611	Grand Portage Creek	52°35'51.7"	72°08'43.0"
KM 216+775	unnamed stream	52°38'41.8"	72°10'31.4"
KM 222+540	unnamed stream (tributary stream of Misask River)	52°41'25.1"	72°11'23.0"
KM 231+200	Misask River	52°44'43.3"	72°13'29.4"

Appendix 6: Focus of the Follow-up Program

Element	Objectives and Requirements	Frequency and Duration*
Revegetation of disturbed areas	• Ensure the survival and normal growth of vegetation planted along stream banks, borrow pits, temporary staging areas at work sites, waste disposal areas, and certain sectors of the winter road in order to stabilize the soil and prevent erosion • Ensure that disturbed areas return to their natural state • Inspect and count the number of plants and assess their health • Inspect the plant cover produced by means of hydroseeding • Implement corrective measures depending on the results of the follow-up	Twice a year (spring and late summer) for two years after construction
Maintenance of the false mountain willow	• Ensure the survival and growth of false mountain willow plants that are present in the road right-of-way and are not touched by the work, as well as transplanted cuttings • Inspect and count the number of plants and assess their health • Implement corrective measures depending on the results of the follow-up, which should include the planting of new cuttings	Twice a year (spring and late summer) for two years after construction
Maintenance of woodland caribou	• Identify calving grounds and restrict certain construction work to limit disturbance • Identify work-avoidance behaviours during calving and winter feeding • Conduct an aerial survey of the study area, fit caribou with radio collars, and use telemetry for daily tracking of the location of the collars • Implement corrective measures depending on the results of the follow-up	During the construction period Note: The MRNF is responsible for conducting a regular knowledge-acquisition and follow-up program after construction
Terrestrial wildlife	• Ensure that small animals can move freely on both sides of the road • Implement corrective measures depending on the results of the follow-up, which may include the installation of wildlife crossings	Twice a year (spring and late summer) for two years after construction
Fish habitat (compensation works)	• Confirm the integrity and effectiveness of the compensation works • Implement corrective measures depending on the results of the follow-up	Will be defined in the conditions of the permit issued by Fisheries and Oceans Canada
Fish habitat (free fish passage)	• Assess the maintenance of conditions for free passage of fish upstream of the culverts to be installed on Route 167, the paths leading to the borrow pits, and the temporary overwintering grounds • Implement corrective measures depending on the results of the follow-up	Will be defined in the conditions of the permit issued by Fisheries and Oceans Canada

*Depending on the results, the proponent may extend the duration.