

**JACQUES WHITFORD PROJECT NO. NFS09308-0008
MINASKUAT PROJECT NO. M6-0008**

**ENVIRONMENTAL IMPACT STATEMENT AND
COMPREHENSIVE STUDY REPORT ADDENDUM
CARTWRIGHT JUNCTION TO HAPPY VALLEY-GOOSE BAY
TRANS LABRADOR HIGHWAY**

OCTOBER 2003



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PREPARED FOR:

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OCTOBER 6, 2003



EXECUTIVE SUMMARY

The Department of Works, Services and Transportation (WST) is proposing to construct a two-lane, all-season, gravel surface highway from Happy Valley-Goose Bay to Cartwright Junction. This highway is Phase III of the Trans Labrador Highway (TLH) and will link the existing TLH highway sections to the east (Phase II) and west (Phase I). The TLH - Phase III project is currently undergoing an environmental assessment under both the Newfoundland and Labrador *Environmental Protection Act* and *Canadian Environmental Assessment Act* (CEAA). As part of the environmental assessment, WST has been requested to provide further information and clarification on aspects of the environmental impact statement (EIS) and comprehensive study report (CSR) prepared for the TLH - Phase III project.

The additional information requirements for the EIS/CSR are divided as follows:

- Part I: Sections of the guidelines that have not been addressed or have not been adequately addressed.
- Part II: Sections of the EIS/CSR for which additional information and/or revisions or clarifications are required, and sections for which the analysis and/or interpretation is not correct.
- Editorial modifications and changes required to the EIS/CSR.

This addendum addresses questions and comments as outlined in the deficiency statement, presenting a response to each individual comment and question. Deficiency statement comments were addressed using in-house sources and data and, where necessary, communication/interviews with representatives from various resource management agencies. Additional information or clarification was provided on the following:

- alternative methods of carrying out the project;
- alternatives to the project;
- regulatory approval requirements;
- project construction;
- existing environment;
- environmental effects;
- mitigation;
- effects evaluation and selection of preferred alternative;
- watercourse crossings;
- design criteria for crossing structures;
- site rehabilitation and monitoring;
- effects of the environment on the project;
- environmental management planning and protection measures;



- environmental effects monitoring;
- rare and endangered vascular plant species;
- wildlife;
- freshwater environment;
- raptors;
- waterfowl;
- caribou;
- furbearers;
- fish and fish habitat;
- species at risk;
- geomorphology
- water resources;
- wetlands;
- resource use and users;
- Akamiuapishku/Mealy Mountains National Park;
- tourism and recreation; and
- mitigation measures.

The EIS/CSR for the outfitter route, which was determined to be a viable alternative to the preferred route, is appended to the addendum. The outfitter route EIS/CSR provides information on each VEC, as collected from existing literature and field studies, project-VEC interactions, environmental effects and mitigation measures.



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INNU-AIMUN VERSION OF EXECUTIVE SUMMARY

TO BE PROVIDED SEPARATELY



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1.0 INTRODUCTION

The Department of Works, Services and Transportation (WST) is proposing to construct a two-lane, all-season, gravel surface highway from Happy Valley-Goose Bay to Cartwright Junction. This highway is Phase III of the Trans Labrador Highway (TLH) project and will link the existing TLH highway sections to the east (Phase II) and west (Phase I). The TLH - Phase III project is currently undergoing an environmental assessment under both the Newfoundland and Labrador *Environmental Protection Act* and *Canadian Environmental Assessment Act* (CEAA). As part of the environmental assessment, WST has been requested to provide further information and clarification on aspects of the environmental impact statement (EIS) and comprehensive study report (CSR) prepared for the TLH - Phase III project.

1.1 Regulatory Framework

The proposed TLH - Phase III is subject to a cooperative environmental assessment that meets the requirements of the provincial environmental assessment process as outlined under the *Environmental Protection Act*, and the federal environmental assessment process as outlined by CEAA. Following release from the environmental process, the project will be subject to various environmental approvals.

The TLH - Phase III project was registered pursuant to the *Environmental Assessment Act, 2000* on April 3, 2002. This act was later repealed and its contents were incorporated into the *Environmental Protection Act*, which received royal assent on May 22, 2002. Following both government and public review, the Minister of Environment determined on June 19, 2002 that further environmental assessment (an EIS) was required for the proposed project. Consistent with subsection 52(1) of the *Environmental Protection Act*, the Minister appointed an Environmental Assessment Committee with representation from all relevant provincial and federal government departments and agencies to provide advice on scientific and technical matters related to the proposed undertaking.

The TLH - Phase III project is also subject to CEAA, the federal environmental assessment legislation. The Department of Fisheries and Oceans (DFO) is the lead Responsible Authority (RA) for the federal assessment, as there is a requirement for approvals under the *Navigable Waters Protection Act* (NWPA) and potential for issuance of authorizations under the *Fisheries Act*. Representatives from DFO, Environment Canada and Parks Canada have been included in the joint provincial/federal Environmental Assessment Committee appointed for the environmental assessment. DFO determined that a CSR must be prepared for the TLH - Phase III project.



At the provincial level, the environmental assessment is also subject to a Memorandum of Understanding (MOU) between Innu Nation and the Departments of Environment, and Labrador and Aboriginal Affairs.

As per Section 53 of the *Environmental Protection Act*, the Environmental Assessment Committee prepared guidelines for preparing the EIS/CSR for the TLH - Phase III project. Following a public review period and approval from the Minister of Environment, the guidelines were provided to the project proponent. The guidelines established the framework for preparing the EIS/CSR by outlining the format and information requirements, including requirements for component studies.

Following submission of the EIS/CSR and related studies to the Department of Environment, the EIS/CSR and related documentation was examined to determine whether it fulfilled the requirements of the guidelines. Before a final decision can be reached on the project, it was determined that further information and clarification is required on various aspects of the documentation provided. A deficiency statement outlining comments and requirements for further information on the EIS/CSR was provided to WST in April 2003. The deficiency statement is provided in Appendix A. Further editorial modifications and changes required to the EIS/CSR are outlined in a separate deficiency list provided to WST in May 2003 (Appendix B).

1.2 Environmental Impact Statement and Comprehensive Study Report Overview

Work on the EIS/CSR was conducted between August 2002 and January 2003, with the final report being submitted to the Department of Environment on January 31, 2003. The EIS/CSR focused on the preferred route identified for the TLH - Phase III. The report presented information about the project and the results of the environmental assessment conducted for the project. The proponent, EIS/CSR purpose and the regulatory framework for the environmental assessment were also identified.

1.2.1 The Proposed Undertaking

A detailed project description described all components of the project, including:

- project purpose, and rationale and need for the project;
- alternatives to the project and alternatives for carrying out the project;
- permits, approvals and authorizations that may be required for the project;
- physical features of the project;
- construction and operation phases;
- schedule for project design, construction and implementation;
- potential accidental or unplanned events;



- environmental protection measures, and emergency response and contingency measures; and
- environmental management planning.

1.2.2 Issue Scoping and Stakeholder Consultation

An issue scoping process was undertaken to identify the Valued Environmental Components (VECs), both biophysical and socio-economic, for the TLH - Phase III environmental assessment and the issues and concerns to be considered in the assessment. The issue scoping process involved:

- reviewing the guidelines issued by the Department of Environment for the assessment;
- consulting with the Innu, including meetings with Innu Nation, a consultation program on route selection, information leaflets, public meeting, presentation to high school students, radio announcements and interviews with elders and others familiar with the area (Innu Nation 2002);
- holding public information sessions in Happy Valley-Goose Bay, North West River, Cartwright and Port Hope Simpson between October 7 and 10, 2002;
- consulting with outfitters, municipalities, and economic development and tourism organizations;
- reviewing public submissions received during the public review period for the project registration, including submissions from the Labrador Métis Nation and outfitters;
- reviewing results of field and archival research undertaken in relation to the assessment; and
- reviewing reports and documents related to work undertaken on Phases I and II of the TLH.

Issues and concerns identified regarding the project included items relating to highway design and construction, highway operation and maintenance, biophysical environment, resource use and users, cultural and historic resources, tourism and recreation, Aboriginal way-of-life, culture and resource use, socio-economic environment, and aspects of environmental assessment and planning.

Through the issue scoping process, 16 VECs were identified. The environmental assessment focused on raptors, waterfowl and passerine birds, caribou, furbearers, fish and fish habitat, species at risk, geomorphology, water resources, wetlands, riparian habitat, historic resources, resource use and users, Akamiuapishku/Mealy Mountains National Park, tourism and recreation, employment and business, and community life. These VECs were considered in the environmental effects assessment.

1.2.3 Environmental Effects Assessment

This EIS/CSR fulfilled the cooperative environmental assessment requirements of both the provincial and federal environmental assessment processes, and presented information about the project and results of the environmental assessment. Information was presented on each of the 16 VECs as collected from existing



literature and database sources, interviews and field studies. A series of component studies was also prepared to support the environmental assessment by addressing gaps in information/data availability and quality. The studies covered raptors, waterfowl and passerine birds, caribou, fish and fish habitat, historic resources, resource use and users, tourism and recreation, and community life (employment and business). An additional study was also completed on Innu land and resource use. Armitage and Stopp (2003) provide detailed information on Innu land and resource use and discussion of potential environmental effects resulting from the project. As a result, Innu land and resource use were not considered in the environmental effects assessment.

The methods used for this environmental assessment were largely based on the work of Beanlands and Duinker (1983) and the Canadian Environmental Assessment Agency (1994; 1999). The approved guidelines for the EIS/CSR also shaped the strategy for the environmental assessment. Mitigation and monitoring/follow-up programs were identified. The assessment was conducted on a VEC-by-VEC basis, with each VEC being addressed in a single section. Specific steps for assessing each VEC were:

- determining assessment boundaries;
- describing the existing environment;
- identifying potential interactions between the project and VEC;
- identifying issues and concerns;
- presenting existing knowledge about the potential project-VEC interactions;
- identifying issues and concerns;
- identifying mitigation measures;
- assessing environmental effects;
- evaluating environmental effects significance;
- assessing and evaluating cumulative environmental effects; and
- identifying environmental monitoring and follow-up programs, if required.

Project-VEC interactions were analyzed to determine potential effects associated with project components and activities. The analysis for each VEC was carried out for each project phase and potential accidental and/or unplanned events. Potential accidental or unplanned events considered were highway failure, fires, fuel or chemical spills, vehicle and equipment accidents, and vehicle failure. The analysis used qualitative and, where possible, quantitative information available from existing knowledge and appropriate analytical tools, as well as considering identified mitigation measures. Residual environmental effects were predicted for VECs following the application of proposed mitigation measures.



The residual environmental effects of each project phase were evaluated as either significant (major or moderate), not significant (minor or negligible) or positive, based on the definitions of significance developed for each VEC. Specific definitions of significance were developed for each VEC. For any adverse significant effects identified, likelihood, level of confidence and the capacity of renewable resources (that are likely to be significantly affected by a project) to meet the needs of the present and those of the future, were also considered (as required by CEAA).

Although the proposed highway may result in adverse environmental effects, overall project construction and operation were determined not likely to result in significant adverse environmental effects on any of the VECs identified for the environmental assessment. However, the potential residual effects of accidental events, depending on the nature, timing and duration of the events, may range from negligible (not significant) to major (significant). As the proposed project is not likely to cause significant adverse environmental effects, there are not likely to be adverse effects on renewable resources.

1.2.4 Cumulative Environmental Effects

Cumulative environmental effects are the likely effects of the project on the environment combined with other past, existing and imminent projects and activities. Determining cumulative environmental effects of the TLH - Phase III project considered the following existing, planned or potential projects and activities:

- existing sections of the TLH (Phases I and II);
- other roads in central and southern Labrador;
- Akamiuapishku/Mealy Mountains National Park;
- hydro development, including transmission lines;
- forestry activities;
- tourism and recreation activities, including outfitting operations;
- land and resource use activities, including consideration of increased access, by Innu and other residents of Labrador;
- Voisey's Bay mine/mill development;
- mineral exploration; and
- low-level military flight training.

As the likelihood, nature, location and timing of any actions induced by the TLH - Phase III were not known and control of most potential induced actions and related effects was beyond the responsibility of WST, assumptions were made for assessing cumulative environmental effects of induced actions, including:



- other projects and activities will be subject to appropriate planning and management;
- other projects and activities will be subject to the appropriate government requirements (e.g., legislation, regulations and guidelines) for protecting crown resources;
- relevant government agencies will have adequate resources to effectively carry out their mandate with respect to enforcement;
- adherence to existing regulatory requirements will not measurably change; and
- the TLH - Phase III will be designated a protected road and subject to the *Protected Road Zoning Regulations* administered by the Department of Municipal and Provincial Affairs (MAPA).

No significant adverse cumulative environmental effects were identified for the TLH - Phase III project. While increased use of the area may result due to the improved access provided by the highway, the planning and control measures in place to govern other activities and development that may be carried out in the area act to reduce the potential for adverse cumulative effects.

1.2.5 Monitoring

WST will conduct environmental compliance monitoring throughout project construction to ensure that provisions of the environmental protection plan (EPP), permits, approvals and authorizations are followed. Prior to each construction season, a survey for active raptor nests (specifically osprey and bald eagle) will be completed within 800 m of the construction zone. Prior to the start of any construction on the TLH - Phase III, the following will be completed:

- breeding songbird surveys;
- study to further assess acid-generating rock potential;
- field investigations to assess geotechnical parameters of materials to be used for construction;
- study to further assess the potential for encountering rare plants; and
- historic resources survey.

WST will also support fish population studies to be completed during the construction phase. The protocols for these studies have been developed by the Inland Fish and Wildlife Division, who will take the lead in the survey. No environmental effects monitoring program is proposed for the TLH construction and operation.



1.3 Environmental Impact Statement and Comprehensive Study Report Addendum

On April 24, 2003, the Minister of Environment issued a statement regarding the EIS/CSR and related documentation prepared for the TLH - Phase III environmental assessment. Additional information and work was required on the EIS/CSR to make it acceptable. The additional work requirements are divided as follows:

- Part I: Sections of the guidelines that have not been addressed or have not been adequately addressed.
- Part II: Sections of the EIS/CSR for which additional information and/or revisions or clarifications are required, and sections for which the analysis and/or interpretation is not correct.
- Editorial modifications and changes required to the EIS/CSR.

The deficiency statement (Part I and II), as issued to WST and provided in Appendices A and B, outline the specific requirements for further information.

The addendum document is organized as follows:

- Section 1.0 Introduction to the addendum providing an overview of the process followed to date and approach taken in responding to the deficiency statements.
- Section 2.0 This section provides the responses (i.e., further elaboration or clarification) to comments in Part I of the deficiency statement, which are noted as sections of the guidelines that have not been addressed or have not been adequately addressed.
- Section 3.0 This section provides the responses to comments in Part II of the deficiency statement. Additional information and/or revisions or clarifications are provided as appropriate for comments.
- Section 4.0 This section addresses the editorial modifications and changes identified for the EIS/CSR. The comments and responses are presented in tabular form.
- Section 5.0 This section lists references used in the responses provided in the previous sections.



- Appendix A Contains the deficiency statement issued by the Minister of Environment.
- Appendix B Contains the list of editorial modifications and changes issued separately by the Minister of Environment.
- Appendix C Contains the environment assessment conducted for the outfitter route.
- Appendix D Contains the conclusions and recommendations from the Innu Land Use Component Study prepared by Armitage and Stopp (2003).
- Appendix E Provides a discussion on induced development and activities associated with the Trans Labrador Highway - Phase III and potential cumulative effects.
- Appendix F Provides a list of acronyms and definitions for the EIS/CSR.
- Appendix G Contains the caribou component study progress report prepared by the Science Division of the Department of Inland Fish and Wildlife.



2.0 RESPONSE TO PART 1 COMMENTS

2.1 Alternative Methods of Carrying Out the Project

Comment 1:

The Guidelines require discussion of the following alternative routing criteria: avoidance of wetland areas; avoidance of adverse effects and enhancement of benefits on existing or potential tourism operations; avoidance of environmentally sensitive areas; avoidance of additional stress on land and resources through increased access; avoidance or reduction of effects on Innu land use; avoidance or reduction of effects on the proposed Akamiuapishku/Mealy Mountain National Park; and, avoidance or reduction of effects on Woodland Caribou (Red Wine and Mealy Mountain herds). The EIS/CSR discussion provided is limited to minimization of construction and operating costs and provision of a direct and economical route for highway users, without consideration of the aforementioned criteria. It is also advised that the Guidelines require specific inclusion of each of two routes as one of the alternative methods of carrying out the undertaking: the route identified by Innu members and the route identified by the Newfoundland and Labrador Outfitters Association. Discussion of the alternative routing criteria identified above should be presented for at least each of these two routes. Specific considerations included in the criteria could include: the number of water crossings required by each alternative; the ability of either route to mitigate potential effects likely as a result of increased access to trophy trout lakes on the Eagle River Plateau and the area's salmon pools; the availability of either route to engage a variety of scenic vistas and/or natural tourist attractions which could increase automobile sightseeing touring and other tourism markets, etc. A rating table should be presented to show how the preferred route came to be so using the criteria identified.

Response 1:

Further details on the analysis of alternative methods of carrying out the project are provided in Chapter 2.0 of Appendix C.

2.2 Construction

Comment 2:

The Guidelines require discussion of stream crossing structures address a number of considerations, including any feasible alternatives to the proposed crossing structure, and information of any infilling required. The EIS/CSR does not provide any discussion of alternative crossing designs. The only infilling information provided is for the proposed causeway at the Churchill River crossing. However, there was no



ground habitat survey done at this site for the Fish and Fish Habitat Component Study, and no information on habitat characteristics, fish species present and any fishing activity in this area was provided. Considering the extent of infilling and depending on the nature of the habitat and its link to a fishery, Fisheries and Oceans Canada may determine that the Churchill River crossing would result in a harmful alteration, disruption or destruction of fish habitat. The Churchill River crossing design will need to incorporate fish habitat considerations, and in particular, it is important that hydraulic conditions in the vicinity not be significantly altered.

Response 2:

The project description provided in the EIS/CSR describes alternative crossing structures (i.e., pipe culverts, plate-arches, and bridge and bridge/causeway structures) in Section 2.4.4. Based on preliminary design information, minimum size structures have been assigned to various specific locations. These are minimum structures, and maybe this was not stated clearly enough. Only at final design stage (i.e., following route survey and identification of final proposed crossing locations), would the selection of structures be reviewed in light of additional information and any identified constraints, such as sensitive fish habitat or infilling requirements. This review will include consultation with DFO, at which time that agency can suggest alternative means of selecting or installing the crossing structures.

As discussed in the addendum to the fish and fish habitat component study (JW/MLP 2003a), the Churchill River crossing location has been revised to Type IV habitat, which does not require detailed ground survey and which is not considered productive habitat. The revision is based on sand substrate which extends across the entire wetted width at that crossing. The footprint of the proposed causeway will be in Type IV habitat and therefore unlikely to constitute a harmful alteration, disruption or destruction (HADD) under conventional definitions. Further, fish habitat considerations can be incorporated into the design of the causeway, such as the placement of rip-rap as armourstone on the sloping sides of the causeway. Such material would provide coarse substrate with voids that will provide feeding and cover for fish in the vicinity of the structure.

2.3 Existing Environment

Comment 3:

The Guidelines require a description of hydrological conditions consisting of hydrologic, hydraulic and design parameters and the methodologies used to determine the dimensions and capacities for all watercourse crossings. The Table of Concordance indicates that hydrological conditions, including



hydrologic, hydraulic and design parameters are included in Section 3.3.2. They are not included in that section nor do those characteristics appear to be included anywhere in the EIS/CSR.

Response 3:

Section 3.3.2 does contain a synopsis of hydrological conditions in the region as compiled from the limited existing information that is available for the region. However, reference to Section 2.4.4 should have also been noted, as this section deals with hydrologic, hydraulic and design parameters. Therefore, the Table of Concordance is amended to include reference to Section 2.4.4 in the “where addressed in the EIS/CSR” column.

Section 2.4.4 provides a detailed discussion on watercourse crossing structures, including the design criteria and methodologies to be used for determining the parameters for crossing structures. Watercourse crossings will be designed and constructed in consultation with the provincial Water Resources Division and with DFO to ensure that crossing structures are installed in a manner that minimizes effects on fish and fish habitat. WST will consult with provincial and federal government officials to ensure that the best available data are used for designing watercourse crossings. Construction details for each watercourse crossing (including bridge or culvert type, clearance from watercourse, height, width, length, diameter and other relevant information) will be submitted to the provincial Water Resources Division and DFO prior to construction. As well, all appropriate environmental authorizations will be obtained.

Watershed hydrological characteristics will be determined by WST prior to construction. While there are limited hydrological data available for Labrador in comparison to the island of Newfoundland, flow and other watercourse data are available and can be used to extrapolate from one area to another.

2.4 Environmental Effects

Comment 4:

The Guidelines require a comprehensive analysis of environmental effects of fish and fish habitat in accordance with the listed criteria. The analysis was not done for any alternative route(s), and the analysis of the preferred alternative is not addressed completely.

Response 4:

The environmental assessment of the outfitter route, including an analyses of the environmental effects of the project on fish and fish habitat, is presented in Appendix C of this addendum. The environmental effects



analysis for the preferred route was presented in Section 6.5 of JW/IELP (2003), the EIS/CSR prepared for the preferred route. The analysis was completed according to the guidelines issued for the EIS/CSR and subsequent discussion with regulatory agencies.

Comment 5:

Resource use and users are identified in the Guidelines as a VEC. Potential protected areas are required to be considered and the Eagle River has been identified as a potential candidate for designation under the Canadian Heritage Rivers System. There is no analysis of the predicted effects of each project alternative on the potential for designation of the Eagle River under the Canadian Heritage Rivers System.

Response 5:

Candidate rivers under the Canadian Heritage Rivers System (CHRS) must be identified through a systems study that documents various attributes of the rivers to determine if they warrant nomination to the CHRS. Aspects to be considered include natural heritage (geology, landforms, hydrology, vegetation, wildlife, and landscapes), recreational uses and human heritage.

Nomination of a river must be done by the government with jurisdiction over the river. Nomination documents must show that the river is of outstanding Canadian value (natural, cultural or recreational values) and that sufficient measures can be applied to maintain those values. Once a nomination has been accepted by the CHRS Board, a management plan must be prepared within three years by the nominating government. Public participation in the process is considered important (Parks Canada 2001) and the level of public support for nominations is a factor when submissions are reviewed (CHRS 2001). Management plans describe resource protection measures, including appropriate recreational uses, strategies to maintain ecological integrity, and monitoring. Once a management plan has been accepted, the river is considered designated as a Canadian Heritage River.

A number of select Canadian Heritage Rivers, the key attributes associated with their designation, current human use activities and the proximity of road(s) and/or networks to the river are listed in Table 2.1. A combination of features, such as unique flora, fauna, geology, geomorphology and human heritage, appear to support the designation of a river as a heritage river. Clearly, being a designated Canadian Heritage River does not preclude the river and land area surrounding it and within its watershed from human use. A range of commercial, industrial and recreational activities are carried out on or adjacent to several Canadian Heritage Rivers. As well, a number of roads and major highways are located near or cross heritage rivers, including the Dempster Highway, which passes by the mouth of the Arctic Red River.



Table 2.1 Select Canadian Heritage Rivers - Key Attributes, Human Use Activities and Road Networks

Heritage River (designation year)	Key Attributes for Designation	Human Use Activities	Road Networks
Fraser River , BC (1998)	<ul style="list-style-type: none"> Represents wide range of ecosystems. High diversity of flora and fauna. Fraser River delta largest wetland in BC. More salmon produced than any other river in the world. Centuries of habitation by First Nations. 	<ul style="list-style-type: none"> Fraser River Basin home to 2.4 million people and produces 80% of provincial gross domestic product. Agriculture. Mining. Sport and commercial fishing. Canoeing/kayaking, hiking, cross country skiing and snowmobiling. 	<ul style="list-style-type: none"> Number of major highways run parallel to or cross the Fraser River, including Yellowhead Highway (#16), Cariboo Highway (#97), Trans Canada Highway, and Highway #7 into Vancouver.
Humber River, ON (1999)	<ul style="list-style-type: none"> Human heritage features from Paleo-Indian sites through French occupation to 1793. Oak Ridge Moraine. Niagara Escarpment. Humber Marshes. High Park in Toronto containing 50 ha of one of the last Black Oak Savannnah habitats in southern Ontario. 	<ul style="list-style-type: none"> Humber River flows through the Greater Toronto area. Camping, hiking, boating/ canoeing, cross country skiing and fishing. 	<ul style="list-style-type: none"> Highways 401, 400 and 407 within Humber River watershed.
Grand River, ON (1994)	<ul style="list-style-type: none"> Historical significance - First Nations cultures through 19th century mills, foundries and factories. Luther Marsh and Grand River Marshes. Grand River Forest - one of last remaining Carolinian forests in Canada. Devil's Well - one of world's largest potholes. 	<ul style="list-style-type: none"> Agriculture (78% of watershed). The Grand River flows through numerous towns and cities, including Kitchener-Waterloo. Shand Dam built in 1942 History of channelization and locks. Hiking, fishing, hunting, canoeing, kayaking and boating. 	<ul style="list-style-type: none"> Numerous roads and highways adjacent to and crossing over Grand River.
South Nahanni River, NWT (1987)	<ul style="list-style-type: none"> Rabbitkettle Hotsprings - largest tufa mounds in Canada. Virginia Falls. Extensive rare orchid site near Virginia Falls. Representation of karst topography. Cave systems. Localized habitats supporting more than 40 flora species not found elsewhere in Mackenzie Mountains. 	<ul style="list-style-type: none"> Canoeing, kayaking, rafting, fishing, hiking and camping. 	<ul style="list-style-type: none"> Nearest road is 64 km away.



Heritage River (designation year)	Key Attributes for Designation	Human Use Activities	Road Networks
Thelon River, Nunavut Territory (1990)	<ul style="list-style-type: none"> History of occupation by Caribou Inuit including archaeological sites. Migration route for 330,000 caribou of Beverly Herd. One of few inland colonies of lesser snow geese. Breeding grounds for endangered species such as peregrine falcon and gyrfalcon. Extensive white sand flats. Aleksektok Rapids. 	<ul style="list-style-type: none"> Canoeing, fishing, camping and hiking. 	<ul style="list-style-type: none"> Nearest road is 450 km away.
Arctic Red River, NWT (1993)	<ul style="list-style-type: none"> Traditionally important to the Gwichya Gwich'in including archaeological sites. Examples of valley wall landslides and thermokarst erosion. River valley supports some of the oldest trees in Canadian boreal forest (white spruce >600 yrs old). Outstanding hydrological events during spring break-up. 	<ul style="list-style-type: none"> Canoeing, kayaking, boating and rafting. Hunting. 	<ul style="list-style-type: none"> Dempster Highway passes by the mouth of the Arctic Red River.

Source: CHRS 2003.

Heritage rivers and the CHRS was discussed in detail in JW (2003a), the land and resource use component study prepared in conjunction with the environmental assessment for the preferred route of the TLH - Phase III. As noted in Section 6.12.3.8 of JW/IELP (2003), based on information available, there are currently no rivers in Labrador designated or nominated under the CHRS. While a study of river systems in Labrador has been approved by the CHRS Board, the study has not yet been initiated. The timing of the study is to be determined by the provincial government. As there was no river in Labrador that was designated or nominated under the CHRS, it was not considered further in the assessment.

There are a number of rivers in Labrador with the potential to qualify for nomination as a heritage river, including the Traverspine, Eagle, Kenamu and Paradise rivers. It is likely that all of these rivers exhibit natural values such as unique landforms, hydrology and wildlife. As well, all have been used by humans, both historically and through recent times. The Churchill River would not likely qualify as a Canadian Heritage River due to the alterations caused as a result of hydroelectric power development.

Given that roads and highways and even commercial and industrial development, do not appear to be limiting factors to the designation of a Canadian Heritage River, the presence of the TLH - Phase III (either the preferred or outfitter routes) should not limit the potential for rivers in central Labrador to be considered for heritage river status. It is more likely that attributes, such as geology, landforms, hydrology, vegetation, wildlife and landscapes, and the uniqueness of these attributes, will be the main deciding factors.



Based on this review, the following paragraphs are added to JW/IELP (2003) after the first paragraph on Page 429:

The proposed highway route will cross the Churchill, Traverspine, Kenamu, Eagle and Paradise rivers. All of these rivers, except for the Churchill River, could be considered as potential candidates for Canadian Heritage Rivers. The Churchill River would not likely qualify as a Canadian Heritage River due to the alterations caused as a result of hydroelectric power development. The other rivers and surrounding areas, while they may have been subject to some level of human use, have not been subjected to alteration like that of the Churchill River.

The TLH - Phase III will not disturb or alter the river channels or flows. In addition, roads and highways are found near or crossing designated Canadian Heritage Rivers elsewhere in Canada, including the Dempster Highway that passes by the mouth of the Arctic Red River in the Western Arctic (CHRS 2003). Therefore, the presence of the highway route through central Labrador is not likely to limit the potential of area rivers for consideration as Canadian Heritage River candidates. It is more likely that attributes, such as geology, landforms, hydrology, vegetation, wildlife and landscapes, and the uniqueness of these attributes, will be the main deciding factors in river designation.

2.5 Mitigation

Comment 6:

The Guidelines require full consideration of the precautionary principle however it is not evident that full consideration was utilized in impact avoidance through scheduling and siting constraints (e.g., the EIS/CSR indicates that the proponent's major mitigation initiative was to select the route that avoids wetlands yet the preferred route runs through the middle of the major wetland/string bog complexes in the headwaters of the Eagle River watershed. The precautionary principle seem needs to be considered in assessing the potential for the highway's effects on fish and the fishery or to propose mitigation for those effects.

Response 6:

Application of the precautionary principle must be balanced with practical considerations or the situation would arise that no developments could be undertaken for fear of resulting in adverse environmental effects. Many factors are taken into consideration for the scheduling and siting constraints.

Ideally, scheduling of construction activities would avoid migration times for wildlife, avifauna and fish. Similarly, breeding and hatching/calving/emergence times should be protected from disturbance. The



precautionary principle would recognize the potential for adverse effects and go further to respond to the unknowns that might have the same result. However, in a practical sense, when the available construction season is so short, common sense must be used to balance the proposed activities with the recognized potential effects to get the most accomplished with the least adverse effects.

Construction over wetlands is avoided where possible, as wetlands do not provide the preferred solid foundation for road construction. However, if a route through wetland regions is selected to take advantage of good foundation conditions, the surrounding wetland does not necessarily suffer for it. The proposed highway route avoids wetlands wherever possible. However, in the centre portion of the highway route (i.e., in the Eagle Plateau area), the vast wetland complexes that occur make it impossible to avoid all wetland areas. Even within these wetland complexes, the road alignment follows areas of forest or scrub or skirts the edges of discreet wetlands, where possible.

Reference is made in many places to the headwaters of the Eagle River and the implication is that the headwater areas are to be avoided for unstated reasons. It can easily be seen that a crossing near the mouth of a river should have less potential environmental effects on the watershed than a crossing further upstream or in the headwaters. This would be the case for the crossing of the Churchill River, where, with the exception of migrating fish, there is little potential to have effects on the upstream areas. On the topic of headwater areas, it is interesting to note that the outfitter route has a longer route length and more watercourse crossings in the headwaters of the Eagle River than does the preferred route.

The precautionary principle has been applied to consideration for the preservation of fish and fish habitat in that all potential fish habitat is considered to be used by fish and will be protected accordingly by provision for fish passage, no net loss of productive habitat, and standard environmental protection measures for construction and operation.

Application of the precautionary principle to fisheries is not within the mandate or regulatory control of the Proponent. Fisheries potential will be greatly enhanced by the access provided by the new road. However, the prosecution of the fisheries by all harvesters (recreational, outfitting operations and subsistence fisheries) must be done in balance with protection of the stocks and fish habitat.

Increased access to previously remote areas provided by TLH - Phase III has the potential to increase fishing pressure on fish stocks located along the route; however, the anticipated increase in fishing pressure cannot be quantified at present. Also, there is a paucity of biological information on these fish stocks, which makes it difficult to estimate a sustainable yield for the fish populations in question. Given this uncertainty, there is a need for the application of the precautionary principle to ensure conservation of fish stocks along the route.



DFO has ultimate responsibility for the protection and conservation of inland fish resources in Newfoundland and Labrador. Increasingly, DFO has introduced new management actions aimed at conserving inland fish species when public concern has been raised over conservation. This is evidenced by the scheduling of additional salmon rivers and the introduction of special trout management measures in select areas along TLH - Phase II. As well, popular trout fishing destinations on the island portion of Newfoundland and Labrador have had special management measures introduced in response to public concern over conservation.

Recent regulatory amendments to the *Newfoundland Fisheries Regulations* will allow for greater flexibility in introducing new and innovative management approaches to deal with conservation concerns. The ability to manage inland fish by individual species rather than by the past multi-species approach and the ability to manage these species by length rather than by numbers of fish or weight, will enable resource managers to consider a wider array of management measures to deal with conservation concerns that may arise in select areas (i.e., consideration of introducing maximum retention sizes, minimum retention sizes and slot limits, if bag limits become ineffective in the face of increasing effort).

A recent data collection program being conducted by the provincial Inland Fish and Wildlife Division to collect fish, plant and macroinvertebrate population inventory data from lakes in the vicinity of TLH - Phase III should provide valuable information to fisheries managers. The program will monitor fish populations in affected watersheds to provide baseline data for: 1) assessing the long term effects of increased access on fish populations; and 2) development of management strategies to conserve fish populations if/when they become necessary.

DFO's commitment to involve users in the development of a new long term management plan prior to the completion of the highway (Comment 117) represents a form of cooperative management, whereby user groups can become directly involved in designing management plans that deal with local concerns. DFO should ensure that the results of the population inventory study and the new management actions that can be taken to deal with conservation concerns are clearly communicated to user groups. These new management capabilities, when combined with area specific population data and the local knowledge of user groups, should go a long way in addressing conservation issues.

Comment 7:

The Guidelines require the proponent to include an assessment of the present capacity of resource agencies to mitigate and monitor cumulative environmental effects resulting from increased access to the study area. Instead the Cumulative Effects Assessment makes the assumption that relevant government agencies will have adequate resources to effectively carry out their mandate with respect to enforcement. The EIS/CSR



should comply with the requirement of the Guidelines or the proponent should also use the assumption that relevant government agencies will **not** have adequate resources to effectively carry out their mandate with respect to enforcement and generate a second Environmental Effects Summary for each of the VECs based on that assumption. The Environmental Effects Summary prepared for the second assumption should then be compared to the Environmental Effects Summary prepared for the first assumption. Although planning and control measures are available to regulate activities associated with increased access, in the opinion of several agencies current resources are not believed adequate to enforce such regulations, considering the difficulties associated with enforcement across the large, sparsely populated area along the highway corridor. Options to be considered in addressing this issue could include the requirement to increase dedicated staff and funding to resource agencies for conservation and protection in the area, and cooperation with aboriginal groups and other regulatory agencies.

Response 7:

In response to this comment and others presented in the deficiency statement, further discussion on this issue of induced development and activities that may occur as a result of the TLH - Phase III is presented in Appendix E. Appendix E indicates an amendment to Chapter 7.0 of the EIS/CSR for the preferred route, which provides a summary discussion on potential cumulative environmental effects that may result from induced development and activities.

Corresponding with this amendment, all cumulative environmental effects sections (i.e., Sections 6.x.10) for each of the VECs discussed in the EIS/CSR are also amended. The following text for each section (as noted below) is inserted at the end of the respective cumulative environmental effects sections.

6.1.10 Cumulative Environmental Effects (Raptors)

If resources agencies do not have adequate resources to plan or manage activities such as cabin development, human disturbance around nesting and foraging areas may cause raptors to be displaced. Similarly, uncontrolled access to wetlands by all-terrain vehicles (ATVs) could result in noise disturbance or destruction of nests by ATVs, negatively affecting ground nesting raptors such as the threatened short-eared owl. The low densities of these species in the region means that only a few individuals from a population would likely be affected as long as the effects are limited to areas near the road.

If large scale industrial harvesting occurs without any consideration of habitat requirements for boreal forest species. This would only result from negligence or carelessness in the planning or implementation of forest harvesting plans. A moderate (significant) cumulative effect resulting from these activities (i.e., one affecting a portion of a population in such a way as to cause a change in the abundance and/or distribution of that



portion of the population or any populations or species dependent upon it over one or more generations, but does not change the integrity of any population as a whole) may be the result.

The various resource management agencies should consider a cooperative management or regional land use planning approach to managing the land and resources along the highway and surrounding area. In addition, the departments and agencies responsible for managing wildlife resources may need to review existing management policies and programs to ensure that they are appropriate. There may also be a need for agencies to increase their enforcement staff levels.

6.2.10 Cumulative Environmental Effects (Waterfowl)

If resources agencies do not have adequate resources to plan or manage activities such as cabin development and forest harvesting in riparian zones, it may cause waterfowl to be displaced from nesting and foraging areas and may degrade water quality, thus affecting forage availability for waterfowl. Similarly, uncontrolled access to wetlands by ATV could result in noise disturbance or destruction of nests by ATVs, negatively affecting nesting waterfowl. Riparian zones and surrounding waterbodies may be degraded through improper forest harvesting practices, cabin construction and other human activities such as ATV use. The low density of waterfowl in the region means that only a few individuals from a population would likely be affected as long as the effects are limited to areas near the road.

If hunting occurs in the future under inadequate regulatory enforcement, local declines in populations of waterfowl could result. For example, migratory bird regulations now allow harvesting in Labrador to begin on the first Saturday in September. Waterfowl surveys conducted for the EIS/CSR in 2002 and 2003 indicated that in early September there are young waterfowl that are still flightless during this period. Groups of such waterfowl would be particularly vulnerable to hunting, particularly if a large number of hunters are covering large areas using ATVs. If unregulated hunting occurs, a moderate (significant) cumulative effect resulting from this activity (i.e., one affecting a portion of a population in such a way as to cause a change in the abundance and/or distribution of that portion of the population or any populations or species dependent upon it over one or more generations, but does not change the integrity of any population as a whole) may be the result.

The various resource management agencies should consider a cooperative management or regional land use planning approach to managing the land and resources along the highway and surrounding area. In addition, the departments and agencies responsible for managing wildlife resources may need to review existing management policies and programs to ensure that they are appropriate. There may also be a need for agencies to increase their enforcement staff levels.



6.3.10 Cumulative Environmental Effects (Caribou)

Woodland caribou are endangered throughout their range in Canada (with the exception of the Island of Newfoundland). Activities such as poaching and unregulated timber harvesting could have adverse effects on the MMCH. The magnitude of the effect would depend on the extent of timber harvesting and level of unregulated hunting.

If large scale industrial forest harvesting occurs without any consideration of habitat requirements for caribou, access from the highway by ATV and along resource extraction roads (from forest harvesting) is uncontrolled, and no enforcement of regulations prohibiting hunting occurs, a major (significant) cumulative effect resulting from these unregulated activities (one affecting a caribou population in such a way as to cause a change in abundance and/or distribution beyond which natural recruitment (reproduction and in migration from unaffected areas) would not return that population, or any populations or species dependent upon it, to its former level within several generations) may result.

The various resource management agencies should consider a cooperative management or regional land use planning approach to managing the land and resources along the highway and surrounding area. In addition, the departments and agencies responsible for managing wildlife resources may need to review existing management policies and programs to ensure that they are appropriate. There may also be a need for agencies to increase their enforcement staff levels.

6.4.10 Cumulative Environmental Effects (Furbearers)

If resource management agencies do not have the resources to effectively manage trapping activities (including enforcement of trapping regulations and research to understand population dynamics of various species), the cumulative effects on furbearer populations from increased access would be minor (not significant) as long as trapping and other induced activities are limited to areas near the road. If there is uncontrolled accessibility from the highway by ATV and snowmobile and along resource extraction roads (from forest harvesting), depletions of furbearer populations may occur. Similarly, if inadequate planning or management of activities such as forest harvesting occurs, populations of terrestrial furbearers such as fox, marten, lynx, and red squirrel may decline if large areas of forested habitat are removed without any consideration of habitat requirements for furbearer species. If there is uncontrolled access and trapping, a moderate (significant) cumulative effect resulting from this activity (i.e., one affecting a portion of a population in such a way as to cause a change in the abundance and/or distribution of that portion of the population or any populations or species dependent upon it over one or more generations, but does not change the integrity of any population as a whole) may result. Resident species such as beaver or those particularly vulnerable to trapping, such as marten, may be particularly affected. It should be kept in mind



that levels of trapping activity would tend to be influenced more by prices and abundance of furbearers, than purely by improved access.

The various resource management agencies should consider a cooperative management or regional land use planning approach to managing the land and resources along the highway and surrounding area. In addition, the departments and agencies responsible for managing wildlife resources may need to review existing management policies and programs to ensure that they are appropriate. There may also be a need for agencies to increase their enforcement staff levels.

6.5.10 Cumulative Environmental Effects (Fish and Fish Habitat)

In a case where relevant government agencies do not have the resources to adequately carry out their mandate, it is conceivable that violations may increase as a result. This is not projected to lead to a measurable change as far as the direct operation of the road is concerned as the effects would be limited to areas near the road and exposure of any local stock would be limited to one or two crossing locations. If unregulated forest harvesting, mining or cabin development occurs, a moderate (significant) cumulative effect resulting from these activities (i.e., one affecting a portion of a population in one of the watersheds that results in a change in abundance and or distribution over one or more generations of that portion of the population, or any populations or species dependent upon it, but does not change the integrity of any population as a whole; it may be localized. A change in fish habitat (including food sources) that produces the same result in populations would also be assessed as a moderate effect) could conceivably be the result. However, this would only be the case for cumulative effects rather than direct operational effects, and it would only result from negligence or carelessness in the implementation of other projects or activities.

The various resource management agencies should consider a cooperative management or regional land use planning approach to managing the land and resources along the highway and surrounding area. In addition, the departments and agencies responsible for managing wildlife resources may need to review existing management policies and programs to ensure that they are appropriate. There may also be a need for agencies to increase their enforcement staff levels.

6.6.10 Cumulative Environmental Effects (Species at Risk)

If resources agencies do not have adequate resources to plan or manage activities such as cabin development, human disturbance around nesting and foraging areas may cause short-eared owls to be displaced. Similarly, uncontrolled access to wetlands by all-terrain vehicles (ATVs) could result in noise disturbance or destruction of nests by ATVs. As short-eared owls are associated with open areas, forestry activity would have a negligible effect, although other activities such as mineral exploration may cause disturbance to short-



eared owls. However, even if large numbers of people were to travel large distances from the highway on ATVs, the low density of short-eared owls in the region means that only a few individuals from the population would likely interact with such activity. As a result, even with inadequate planning or management of induced activities, the cumulative effects of highway development on short-eared owls is predicted to be minor (not significant) (i.e., one affecting a specific group of individuals of the population of short-eared owls in such a way as to cause a change in abundance and/or distribution in a localized area and/or over a short period (one generation or less), but not affecting other trophic levels or the integrity of the population itself).

Travel through riparian zones is likely to increase in order to access waterbodies from the highway. Cabin development and forest harvesting in riparian zones may also occur, creating areas of permanent alteration to riparian habitat. With inadequate planning and enforcement, these activities could cause disturbance to breeding harlequin ducks and degrade water quality, thus affecting forage availability. Similarly, illegal harvesting of harlequin ducks could occur if hunting regulations are not enforced. However, if harlequin ducks are present in the region surrounding the proposed highway, they are present at low densities and the likelihood that unchecked induced activities would interact with harlequin duck is low. Therefore, the residual cumulative effects of highway development on harlequin ducks is predicted to be minor (not significant) (i.e., one affecting a specific group of individuals of the population of harlequin ducks in such a way as to cause a change in abundance and/or distribution in a localized area and/or over a short period (one generation or less), but not affecting other trophic levels or the integrity of the population itself).

The various resource management agencies should consider a cooperative management or regional land use planning approach to managing the land and resources along the highway and surrounding area. In addition, the departments and agencies responsible for managing wildlife resources may need to review existing management policies and programs to ensure that they are appropriate. There may also be a need for agencies to increase their enforcement staff levels.

6.7.10 Cumulative Environmental Effects (Geomorphology)

If the appropriate planning is not applied, surficial features could be affected. For example, uncontrolled quarrying activity could result in the disturbance of glacial features such as moraines, eskers, and drumlins, or exposure of acid-generating rock. However, quarrying activity would likely only occur close to the highway and the potential for acid-generating rock along the proposed highway route is low. As a result, a not significant cumulative effect (one that does not alter geomorphological features along the highway right-of-way, such that there is a measurable, sustained degradation in water quality as a result of the exposure of acid-generating rock, slumping and erosion, and/or disturbance to permafrost) is predicted.



The various resource management agencies should consider a cooperative management or regional land use planning approach to managing the land and resources along the highway and surrounding area. In addition, the departments and agencies responsible for managing wildlife resources may need to review existing management policies and programs to ensure that they are appropriate. There may also be a need for agencies to increase their enforcement staff levels.

6.8.10 Cumulative Environmental Effects (Water Resources)

In a case where relevant government agencies do not have the resources to adequately carry out their mandate, it is conceivable that inspections and prosecutions would be reduced and accidents and violations increased as a result. This is not projected to lead to a substantial change as far as the direct operation of the road is concerned. If activities such as forest harvesting, mining, or cabin development occurs in the future under inadequate regulatory enforcement, a moderate cumulative (significant) environmental effect resulting from these unregulated activities (13 to 36 months over an area of 11 to 100 km², 11 to 50 events/year) could conceivably be the result. However, this would only be the case for cumulative effects rather than direct operational effects, and it would only result from negligence or carelessness in the implementation of other projects or activities.

The various resource management agencies should consider a cooperative management or regional land use planning approach to managing the land and resources along the highway and surrounding area. In addition, the departments and agencies responsible for managing wildlife resources may need to review existing management policies and programs to ensure that they are appropriate. There may also be a need for agencies to increase their enforcement staff levels.

6.9.10 Cumulative Environmental Effects (Wetlands)

Uncontrolled access to wetland areas by ATVs may result in rutting, destruction of vegetation and degradation of water quality in localized areas around trails. However, it is unlikely that ATVs crossing wetland areas would actually cause changes to the hydrological regime of such wetlands. While an activity such as forest harvesting does not directly occur on wetland areas, inadequate regulatory enforcement of appropriate harvesting methods could result in disturbance, changes in water quality, and alteration of the hydrological regimes of wetlands adjacent to harvesting operations. However, the area around the proposed highway with the greatest potential for large-scale forestry activity does not coincide with the area that has the greatest amount of wetland. Therefore, it is anticipated that even with inadequate control of ATV access to wetlands and no enforcement of forestry regulations, there would not be a significant cumulative effect resulting from these activities (one that does not affect the ecological integrity of the wetlands within 100 m of the proposed highway in such a way as to impair wetland function to an extent where increased



flooding along the route, occurs over several years, and/or there is a measurable sustained degradation in water quality) on wetlands.

The various resource management agencies should consider a cooperative management or regional land use planning approach to managing the land and resources along the highway and surrounding area. In addition, the departments and agencies responsible for managing wildlife resources may need to review existing management policies and programs to ensure that they are appropriate. There may also be a need for agencies to increase their enforcement staff levels.

6.10.10 Cumulative Environmental Effects (Riparian Habitat)

Travel through riparian zones is likely to increase in order to access waterbodies from the highway. As well, cabin development and forest harvesting in riparian zones may also occur, creating areas of permanent alteration to riparian habitat. With inadequate planning and enforcement, these activities could cause disturbance and loss of habitat, affecting wildlife species that tend to use riparian habitats disproportionately to other habitat types (i.e., furbearers, waterfowl, raptors). As well, water quality could be degraded, thus affecting forage availability for some of these groups. However, it is predicted that there would be a not significant cumulative effect from these activities (one that does not affect riparian habitat along the corridor of the proposed highway in such a way as to impair its ecological function to the extent that there are measurable effects to water quality and/or dependent populations) due to the large amount of riparian habitat available in central Labrador and the localized nature of effects to the riparian zone from unregulated cabin development and forest harvesting along the highway corridor.

The various resource management agencies should consider a cooperative management or regional land use planning approach to managing the land and resources along the highway and surrounding area. In addition, the departments and agencies responsible for managing wildlife resources may need to review existing management policies and programs to ensure that they are appropriate. There may also be a need for agencies to increase their enforcement staff levels.

6.11.10 Cumulative Environmental Effects (Historic Resources)

WST has committed to a Stage 1 Historic Resources Overview Assessment in advance of the onset of construction, once the centre line is cut. In addition, the EPP would require the contractor to report any resources discovered during construction. Improved access to the area may result in the discovery of historic resources by other users, who may or may not report the findings to the PAO. However, given the probability of encountering historic resources is low, the cumulative environmental effect is assessed as minor (not significant).



6.12.10 Cumulative Environmental Effects (Resource Use and Users)

With the implementation of appropriate planning and enforcement, the TLH - Phase III, in combination with other projects and activities that have been or would be carried out, is not likely to result in significant adverse cumulative environmental effects on resource use and users. As noted in Section 7.12.6, there are management and planning processes in place that offer a means for directing and controlling development and other activities along the highway. However, should the relevant government agencies not have adequate resources to fulfill enforcement requirements and should the level of adherence to regulatory requirements by resource users decline, then the resulting cumulative effects resulting from this would likely be adverse and significant.

Without proper application of the management and planning processes and related enforcement requirements, it is expected that there may be some level of uncontrolled activities and development occurring along the highway, such as:

- uncontrolled development activity and side roads being developed along the highway;
- ATV and other trails being developed off the highway to provide access to cabins, rivers and/or lakes;
- uncontrolled cabin development along and off the highway;
- uncontrolled hunting, trapping and fishing activity;
- disruption of current land and resource use patterns of the Innu and other current users;
- startup of unlicensed outfitting camps along the highway;
- uncontrolled mineral exploration activities; and
- uncontrolled forestry activity, both commercial and domestic.

The various resource management agencies should consider a cooperative management or regional land use planning approach to managing the land and resources along the highway and surrounding area. In addition, the departments and agencies responsible for managing wildlife resources may need to review existing management policies and programs to ensure that they are appropriate, (e.g., adaptive management). There may also be a need for agencies to increase their enforcement staff levels.

6.13.10 Cumulative Environmental Effects (Akamiuapishku/Mealy Mountains National Park)

The significance criteria for this VEC is whether the presence of the highway would affect the ecological integrity of the park study area in such a way as to preclude its designation as a National Park. As effects of inadequate management and planning on certain components of the environment that contribute to the ecological integrity of the Mealy Mountain Park Study Area have been assessed to be moderate (significant) (i.e., raptors, waterfowl, furbearers, species at risk) or major (significant) (i.e., MMCH), inadequate



management and planning following road construction, would result in significant cumulative environmental effects resulting from the unregulated activities on the ecological integrity of the Akumiupishu/Mealy Mountain Park Study Area.

The establishment of the Akamiupishku/Mealy Mountains National Park itself would be an important means of addressing the potential environmental effects of future development activity in the region. Development activities and human access would be controlled through management plans and park regulations that would define the acceptable levels of activity within the park. Following highway construction, and prior to establishment of the park, development controls would be required to ensure that the ecological integrity of the Akamiupishku/Mealy Mountains National Park study area is not compromised.

The various resource management agencies should consider a cooperative management or regional land use planning approach to managing the land and resources along the highway and surrounding area. In addition, the departments and agencies responsible for managing wildlife resources may need to review existing management policies and programs to ensure that they are appropriate. There may also be a need for agencies to increase their enforcement staff levels.

6.14.10 Cumulative Environmental Effects (Tourism and Recreation)

With appropriate enforcement and planning, the cumulative environmental effects of induced activities on tourism and recreation would not be significant. However, if regulatory and resource management agencies are unable to ensure the appropriate application and enforcement of applicable legislation and regulations, the potential exists for moderate (significant) cumulative environmental effects. These effects could potentially result from lack of management and enforcement of activities associated with the use of fish and wildlife, cabin development, and ATV use and trail development. In addition, if local tourism associations do not conduct appropriate planning, they may not be in a position to take advantage of the potential tourist-related benefits associated with the road.

The various resource management agencies should consider a cooperative management or regional land use planning approach to managing the land and resources along the highway and surrounding area. In addition, the departments and agencies responsible for managing wildlife resources may need to review existing management policies and programs to ensure that they are appropriate. There may also be a need for agencies to increase their enforcement staff levels.



6.15.10 Cumulative Environmental Effects (Employment and Business)

Cumulative environmental effects could potentially result from lack of management and enforcement of activities associated with the use of fish and wildlife, and cabin development. In addition, if local tourism associations do not conduct appropriate planning, they may not be in a position to take advantage of the potential tourist-related benefits associated with the road. There is potential for minor (not significant) cumulative environmental effects resulting from unregulated activities on employment and business, specifically due to potential effects on the tourism and recreation sector. While there may be a negative effect in one sector of the economy, it is expected that overall the highway would still have a positive effect on the local and regional economy.

The various resource management agencies should consider a cooperative management or regional land use planning approach to managing the land and resources along the highway and surrounding area. In addition, the departments and agencies responsible for managing wildlife resources may need to review existing management policies and programs to ensure that they are appropriate. There may also be a need for agencies to increase their enforcement staff levels.

6.16.10 Cumulative Environmental Effects (Community Life)

Community life takes into consideration the social characteristics, and infrastructure and services of communities within the region. The project is not likely to result in significant adverse cumulative effects in combination with other projects and activities that have been or would be carried out. Note that if there is inadequate monitoring of the use of the highway during operation, the possibility exists that there would be an increase in the numbers of accidental events, and a potential, corresponding increase in the demand for health care services. However, given the low volume of traffic that is anticipated to use the highway, the number of accidental events that could potentially occur are not expected to exceed the capabilities of regional and/or provincial health care services.

2.6 Effects Evaluation and Selection of Preferred Alternative

Comment 8:

This evaluation and selection is not provided. The evaluation of highway alternatives, as required by 3.3.2 above, should be supported by a substantive accounting of the environmental effects and socio-economic implications of each alternative. The option that represents the greatest gain, for the least environmental cost, should be apparent from the analysis to be provided.



Response 8:

Further details on the analysis of alternative methods of carrying out the project are provided in Chapter 2.0 of Appendix C, which contains the environmental assessment for the outfitter route. Chapter 8.0 of the same document also provides discussion on the evaluation of route alternatives.



3.0 RESPONSE TO PART II COMMENTS

3.1 EIS/CSR Introduction

3.1.1 Caribou Component Study (EIS/CSR Section 1.4.3.3)

Comment 1:

The Science Division was responsible for conducting the study, not the Inland Fish and Wildlife Division.

Response 1:

Section 1.4.3.3 of the EIS/CSR is amended to reflect this correction. The first sentence of the first paragraph in Section 1.4.3.3 is amended as follows:

The Caribou Component Study was completed by the Science Division of the Department of Tourism, Culture and Recreation from March to August 2002.

3.2 EIS/CSR Proposed Undertaking

3.2.1 Alternatives to the Project (EIS/CSR Section 2.2.1)

Comment 2:

The description of alternatives to the project highlights the planned reduction in alternative transportation means - including air and marine services - and puts considerable emphasis on associated financial cost savings. Economic costs and benefits are indeed important considerations. However the Canadian Environmental Assessment Agency's Operational Policy Statement on the consideration of project alternatives also emphasizes the importance of considering environmental costs and benefits. This is not currently reflected.

Response 2:

Further details on the analysis of alternative methods of carrying out the project are provided in Chapter 2.0 of Appendix C, which contains the environmental assessment of the outfitter route.



Comment 3:

A shift away from marine and air services toward ground transportation will presumably increase the need for individuals to acquire and operate their own vehicles for transportation, and increase the frequency of commercial and personal travel. The completion of Phase III will also likely support this increase by enhancing ground transportation access. This, in turn, will likely have an effect on the resulting volume of Greenhouse Gas (GHG) emissions. The environmental assessment of a project of this magnitude should examine the potential change in overall GHG emissions associated with a shift in transportation mode. The examination should include a comparison of fuel consumption and associated GHG emissions from current transportation modes and from anticipated transportation modes if the highway were to proceed. An accounting of GHG emissions and losses of GHG sinks associated with the highway compared with an unaltered environment is required by the Guidelines.

Response 3:

Section 2.2.1 of the EIS/CSR is amended by placing the following text at the end of the section on Page 23. Note that the new table (Table 2.2) is inserted into the EIS/CSR as Table 2.1. As a result, the numbering of subsequent tables in Chapter 2.0 of the EIS/CSR is amended to reflect this addition.

Table 2.2 Greenhouse Gas Emissions (CO₂) Associated with Regional Travel

	Estimated Level of CO ₂ Generated by Current Travel (ktonnes)	Estimated Level of CO ₂ Generated by Future Travel (ktonnes)
Passenger and Light Duty Vehicles	-	4.31
Heavy Duty Trucks	-	0.19
Ferry	4.3	-
Aircraft	0.8	0.09
Total	5.1	4.59

The change in transportation services in the region will also lead to changes in the greenhouse gas (GHG) emissions, in particular carbon dioxide (CO₂) emissions, experienced in the region (Table 2.1). Calculations indicate that GHG emissions will likely be less following the completion of the TLH – Phase III and elimination of the ferry service and reduced air service.

The effect of the project on transportation-related GHG emissions was calculated based on the assumption that highway construction would result in the elimination of the ferry service, a reduction in the air service to the communities, and a sustained vehicular traffic all year on the highway.



To calculate vehicle GHG emissions, emission factors were taken from Faiz et al. (1996) for heavy duty diesel trucks and for passenger vehicles. Truck fuel consumption was estimated to be 38 L/100 km. Cars and light trucks are estimated to consume 10 L/100 km. These estimates are within approximately 10 percent.

The future vehicle traffic on the road is estimated to be 200 cars per day, for a daily total of approximately 80,500 vehicle kilometres. The CO₂ emissions associated with this traffic is estimated to be 11.8 tonnes of CO₂/day. An additional estimated two tractor trailers would emit a further 518 kg of CO₂/day. For an annual operating period of 52 weeks, the annual CO₂ emissions would be 4.5 ktonnes.

The fuel consumption of the ferry is estimated to be 1,584,000 L/year, based on an assumption of three ferry trips per week for 22 weeks per year with 72,000 L of fuel being used each week (i.e, 24,000 L per round trip of 24 hours). On combustion, this is equivalent to an annual CO₂ emission level of 4.3 ktonnes.

Aircraft were assumed to be Twin Otter or other small aircraft, and fuel consumption was estimated from FAA (1994). Aircraft fuel consumption is estimated at 210 L/hr at cruising speed. The adjustment in air service to accommodate changes in demand and scheduling will be a reduction from daily flights through eight airports to a weekly flight through five airports. Assuming that this will correspond to equivalent cruising flight time reductions from four to three hours, the CO₂ emissions reduction is calculated to be from 0.8 to 0.09 ktonnes/year; that is, approximately a factor of 10.

Forest and wetland ecosystems have the ability to remove carbon from the atmosphere (as CO₂) and to incorporate this carbon into plant biomass. The decay of this biomass leads to the accumulation of carbon in forest soils and wetlands. Preservation of these carbon sinks is now recognized as an important measure in reducing levels of atmospheric CO₂.

While the GHG emissions may be reduced due to the changes in transportation in the region, there will be a corresponding decrease in carbon sinks in the region. The clearing of the proposed right-of-way will result in the disturbance of approximately 750 ha for the preferred route (840 ha for the outfitter route). This will include the permanent loss of approximately 481 and 496 ha of standing biomass in forested land from the preferred and outfitter routes, respectively, which will be cleared for the right-of-way. Construction activities will also lead to the loss of carbon from soils as a result of disturbance of soils on the right-of-way. Loss of soil carbon occurs whenever soils are disturbed and manipulated, and results from increased activity of soil micro-organisms.

Loss of carbon from standing forest biomass is considered to be not important in consideration of the extent of carbon losses due to forest harvesting, and forest fires. Approximately 25,000 ha of Labrador forests was



lost to fires alone in 2002. During construction, salvageable wood resources will be allocated for other processing, such as for fibre of lumber, in order to preserve some of this carbon in a non-atmospheric form. Minimizing the area of soils and vegetation disturbed during construction will help to mitigate losses of carbon from standing biomass and from soils.

Following construction, all areas with the exception of the permanent road surface and shoulders will be re-vegetated. Soil carbon that is lost during construction will therefore be replenished over time, once roadside vegetation becomes established and is maintained.

3.2.2 Alternative Means for Carrying out the Project (EIS/CSR Section 2.2.2)

Comment 4:

One of the technical/engineering factors listed is watercourse location. Identify whether during route location any consideration was given to proximity of proposed crossings to major inflows or outflows of ponds or lakes, or to obstructions. Pond and lake inflows and outflows are areas of high productivity, and should be avoided as preferred crossing locations where possible. Crossings at or near major waterfalls, or other obstructions (e.g., stream #23 and #24), may be a problem as fish could concentrate at these sites and be particularly susceptible to heavy angling pressure. This could be a particular concern for anadromous fish.

Response 4:

Agreed. Proximity of proposed crossing locations, on both the preferred and outfitter routes, to major inflows or outflows of ponds or lakes, or to obstructions were considered in determining route location.

3.2.3 Alternative Routes through Central Labrador (EIS/CSR Section 2.2.2.4)

3.2.3.1 Route Proposed by Outfitters (A13)

Comment 5:

The EIS/CSR states that Innu raised concerns with this route. Describe the concerns raised.



Response 5:

The EIS/CSR (JW/IELP 2003, p. 30) states: *... this proposed route is located south of Pepuakamau area traditionally used by the Innu (Innu Nation 2002). Therefore, due to the additional cost and schedule implications, and concerns raised by the Innu, A13 is not considered further.* The concerns being referred to are concerns within the area in which the outfitter route is located. The outfitter route was not discussed as part of the consultation carried out for the Innu Nation (2002) study.

Review of Innu Nation (2002) indicated that there was expressed concern about any development occurring around the large central lakes of the region that are used by the Innu for harvesting activities, and that development would be best kept away from these areas. Innu Nation (2002, p. 4) states: *All Innu consulted believe that the road must be kept as far away as possible from the main lakes used by the Innu for harvesting activities. These lakes include Uinikush, Nekanikau, Pepuakamau (Crooks Lake), Uapinatsheu-nipi, Mishtashini, Mitshishutshishtun, Eshkanat-katshipukutiniht and Mashkunipi.* In addition, Innu Nation (2002, p.3) states: *... the vast majority of those consulted say that the best route option is the Mishtashini-shipiss crossing of the Churchill River (A1) and a route as straight as possible over the Kenemu River to the north of Uinikush and Nekanikau.*

Further concern is raised in Innu Nation (2002) about non-Innu access to lands in areas crossed by the highway, in particular access to areas in the headwaters of the *Iatuekupau-shipu* (Eagle River). Innu Nation (2002, p. 6) states: *Based on the consultation work, it would appear that the Innu are prepared to accept the TLH through their traditional land use area in the Akamiuapishku region, but only under certain conditions. These include the acceptance of the preferred Innu routing option of which option A1 to A5 to A3 is the best approximation (away from major lakes used by the Innu), iron clad guarantees by government to restrict non-Innu access to lands crossed by the road particularly in the Iatuekupau-shipu (Eagle river) headwaters, environmental study and the implementation of workable environmental protection measures. Every possible means must be employed to minimize or eliminate negative impacts on the environment and Innu culture and harvesting activities.*

The outfitter route segment, identified as A13 in Figure 2.4 in JW/IELP (2003) crosses the Eagle River headwaters. As the Eagle River headwaters were clearly stated as a concern for the Innu, the outfitter route, which traverses the headwaters, did not appear to alleviate this issue. Thus, combined with the additional costs and schedule implication, the outfitter route was not considered further in JW/IELP (2003).

Following direction from the Minister of Environment in April 2003, the outfitter route as a possible routing for the TLH - Phase III was subjected to more detailed study. The results of the environmental assessment on the outfitter route are presented in Appendix C of this addendum.



Comment 6:

Fisheries and Oceans Canada (DFO) notes that the outfitters' alternative route would eliminate the need for a bridge on the South Branch of the Eagle River. By reducing easy access to the Eagle River, this route may alleviate concerns over increased angling pressure on the fish stocks of the Eagle River watershed, in particular the large Eastern brook trout and salmon, and the potential for negative effects on the sport fishing industry that this area supports. From a conservation and protection perspective, this alternative route would be more protective of the Eagle River fish stocks than the proponent's preferred route. Provide an effects evaluation of this protection as required by Section 7.2 of the Guidelines.

Response 6:

An environmental assessment of the outfitter route is presented in Appendix C. Further details on the analysis of alternatives for carrying out the project is provided in Chapter 2.0 in Appendix C.

3.2.4 Regulatory Approval Requirements (EIS/CSR Section 2.3)

Comment 7:

Table 2.1 acknowledges a requirement to submit an application to Navigable Waters Protection, Canadian Coast Guard for any bridges, causeways, pipe arch culverts and cylindrical culverts 1500 mm or larger. Photographs should accompany applications. Any temporary watercourse diversion must also be included with the original application for that specific crossing.

Response 7:

These requirements are noted by the proponent and the necessary documentation will be submitted to Navigable Waters Protection, Canadian Coast Guard. The last sentence in the requirements column of Row 2 (under Potential Federal Authorizations) of Table 2.1 is amended as follows:

An application must be submitted for each alteration to a navigable waterway, including any temporary watercourse diversion. Photographs are to be provided with the application.



3.2.5 Watercourse Crossings (EIS/CSR Section 2.4.4)

Comment 8:

Table 2.3 identifies a causeway/bridge configuration for the Churchill River crossing. Provide the rationale for that decision. A 60 m bridge span has been proposed for the Paradise River crossing yet for the Kenamu and Eagle River South Branch, two bridge spans of 30 m each are proposed. Provide the rationale for that decision. From a fish habitat perspective, clear span bridges would be preferable wherever feasible.

Response 8:

The choice of using two 30-m bridge spans, instead of one 60-m bridge, for the Kenamu River and Eagle River South Branch was based on cost, as using two 30-m spans is less expensive than a 60-m span bridge. Environmentally there is no difference between the two options.

Comment 9:

Table 2.3 also identifies that there are 31 crossings in Type I/II habitat yet only 17 pipe arches are proposed. Of the 17 pipe arches, seven are located in Type III/IV habitat, hence the majority of crossings in Type I/II habitat are cylindrical culverts. DFO considers that bottomless arch culverts are the preferred type to avoid any harmful alteration, disruption or destruction of fish habitat (HADD). Why are no bottomless arch culverts proposed? What criteria were used in selection of culvert type? Culverts and bridges must be sized to maintain as much of the natural stream width as possible. It would appear from the information presented in the EIS/CSR and the Fish and Fish Habitat Component Study that this is not always the case. Wherever infilling is proposed at any crossing location DFO requires site-specific habitat information for HADD determination purposes.

Response 9:

The culvert sizes provided in the EIS/CSR are minimum sizes. The final size requirements will be determined during the detailed design phase. In addition, the final decision on the type of structure to be used will be determined in consultation with DFO through the permit and approvals process. Round pipes are less destructive to install in terms of effects, while bottomless arch culverts are more destructive from a construction perspective and are the most expensive structures. Bottomless arch culverts work better on bedrock; if not placed on bedrock, scour often occurs.



Comment 10:

A number of discrepancies have been noted between the EIS/CSR and the Fish and Fish Habitat Component Study. For example, a comparison of Table 2.3 in the EIS/CSR and Tables 3.4 and 3.5 in the Fish and Fish Habitat Component Study revealed a number of inconsistencies. In Table 3.4 and 3.5, there are 9 stream crossings that have drainage areas ranging from 13.1 km² up to 140 km² that are not scheduled for pipe arch type or bottomless culverts (#46, #48, #52, #55, #61, #71, #77, #82 and #87). Also there are two locations that cross a pond or a steady that have large drainage areas and have no indication as to the type of culvert to be used. These need to be reviewed. Additionally, Table 2.3 details several crossings that have large pipe arch type culverts for watershed drainage areas that are 5.0 km² or less. There is a possibly a mix-up with respect to culvert designations in the two reports.

Response 10:

During the preparation of the EIS/CSR, some of the crossing numbers were revised to reflect the actual crossings as verified during the field studies. Inadvertently, some of the numbers were not changed in EIS/CSR Table 2.3 (specifically #46, #48, #52, #55, #61 and #70), as suggested by the reviewer. The amended table is provided below (Table 2.3). The EIS/CSR has been amended to reflect these changes. The tables in the Fish and Fish Habitat Component Study are correct and no revision is required to that document.

Table 2.3 TLH - Phase III Watercourse Crossings Requiring Bridge, Causeway and Pipe Arch Structures

Crossing No.	Watercourse	Watershed	Preliminary Structure Type	Preliminary Structure Size
1	Churchill River	Churchill	Bridge and Causeway	3 bridge spans, 120 m each; 500 m causeway
15		Traverspine	Pipe Arch	4,370 mm x 2,870 mm
16		Traverspine	Pipe Arch	5,890 mm x 3,710 mm
22		Traverspine	Pipe Arch	5,890 mm x 3,710 mm
23	Traverspine River	Traverspine	Bridge	15 m bridge span
24		Traverspine	Pipe Arch	4,370 mm x 2,890 mm
28		Traverspine	Pipe Arch	4,370 mm x 2,870 mm
36	Kenamu River	Kenamu	Bridge	2 bridge spans, 30 m each
38		Kenamu	Pipe Arch	4,370 mm x 2,870 mm
40		Kenamu	Pipe Arch	3,890 mm x 2,690 mm



Crossing No.	Watercourse	Watershed	Preliminary Structure Type	Preliminary Structure Size
41		Kenamu	Pipe Arch	3,890 mm x 2,690 mm
46		Eagle	Pipe Arch	5,490 mm x 3,530 mm
48		Eagle	Pipe Arch	3,890 mm x 2,690 mm
52		Eagle	Pipe Arch	7,040 mm x 4,060 mm
55		Eagle	Pipe Arch	6,250 mm x 3,910 mm
61		Eagle	Pipe Arch	3,890 mm x 2,690 mm
71		Eagle	Pipe Arch	4,370 mm x 2,870 mm
73	Eagle River - South Branch	Eagle	Bridge	2 bridge spans, 30 m each
79	Otter Brook	Eagle	Bridge	20 m bridge span
86		Eagle	Pipe Arch	5,490 mm x 3,530 mm
88		Eagle	Pipe Arch	3,890 mm x 2,690 mm
91		Eagle	Pipe Arch	4,370 mm x 2,870 mm
94	Paradise River	Paradise	Bridge	60 m bridge span

Note: Watercourse crossing numbers listed correspond with those shown in Figure 2.7 (of the EIS/CSR). All other crossings will have corrugated steel pipe (CSP) structures.

The culvert sizing information provided by WST for crossings #77, #82, and #87 was that these crossings would have 3,000 mm pipe culverts, as indicated on the notes at the bottom of Table 2.3.

Any crossings of ponds or steadies that have the potential to alter or disturb fish habitat will be reviewed by WST in consultation with DFO. In recognition of DFO's guiding principle of no net loss of productive fish habitat, every effort will be taken to design and install effective crossings while preserving fish habitat and fish passage. The final surveyed alignment, in conjunction with stream habitat features and other factors, will determine the location and design of each crossing structure.

Comment 11:

According to the EIS/CSR, the actual engineering surveys for the culvert and bridge installations have not yet been completed and the detailed design information was not available at the time of the report completion. Without the information on stream crossing structures and stream crossings as specified in Sections 3.6 and 4.1 of the Guidelines, it is not possible to determine the appropriateness of any proposed culvert installations with respect to fish passage and whether or not it would constitute an obstruction to resident or anadromous fish species. In addition, it is not possible to determine whether there is the potential for HADD of fish habitat associated with stream crossing installations and to quantify the extent of any



HADD. In general, even though the EIS/CSR recognizes the negative effects to fish populations that can result from the improper design and installation of culverts, the information presented is not sufficient for DFO to ascertain whether culverts will be properly designed and installed at proposed stream crossings.

Response 11:

The culvert sizes provided in the EIS/CSR are minimum sizes. Final requirements for crossing structures will be determined during the detailed design phase. WST has committed to ensuring that all crossing structures are installed in a manner that minimizes effects on fish and fish habitat (i.e., in accordance with DFO guidelines). Watercourse crossing will be designed and constructed in consultation with the provincial Water Resources Division and DFO. Construction details for each watercourse crossing (including bridge or culvert type, clearance from watercourse, height, width, length, diameter and other relevant information) will be submitted to the provincial Water Resources Division and DFO prior to construction. As well, all appropriate environmental authorizations will be obtained.

3.2.6 Design Criteria for Crossing Structures (EIS/CSR Section 2.4.4.1)

Comment 12:

This section states that details for each watercourse crossing would be submitted prior to construction. It is important that the detailed design information be submitted after completion of the preliminary design stage and prior to the tender of the construction contract. This would enable DFO to assess the type of culverts proposed, determine the appropriateness of the proposed stream crossing design and identify any installations that are problematic with respect to fish passage or potential for HADD.

Response 12:

As discussed in Section 2.4.4.1, watercourse crossings will be designed and constructed in consultation with the provincial Water Resources Division and with DFO to ensure that crossing structures are installed in a manner that minimizes the effects on fish and fish habitat. Construction details for each watercourse crossing (including bridge or culvert type, clearance from watercourse, height, width, length, diameter and other relevant information) will be submitted to the provincial Water Resources Division and DFO prior to construction. WST will provide detailed design information to DFO after completion of the preliminary design stage and prior to the tender of the construction contract. As well, all appropriate environmental authorizations will be obtained.



Comment 13:

Appendix D, Department of Works, Services and Transportation - Relevant Specifications, Form 421, Form 423, and Form 424 are specifications that will be used by contractors to bid on the work. These Forms should detail the design criteria for proper culvert installation regarding maximum slope for the type of culvert. Embedment depths of 300 mm (150 mm where bedrock is encountered) are specified in Forms 421 and 423. The guidance from Gosse et al (1998) should be adhered to with regard to embedment depths. Form 424 does not have any criteria for culvert installation.

Response 13:

WST Specifications 421 (Supply and Installation of Pipe Culverts), 423 (Supply and Installation of Structural Plate Pipe) and 424 (Supply and Installation of Structural Plate Arch) are construction specifications that outline the procedures for contractors to use in completing the work. Contractors are not involved in design of watercourse crossing structures. The design work is carried out by WST engineers. Any site-specific concerns are addressed specifically in construction contracts and/or the EPP as appropriate.

3.2.7 Pipe Arch and Cylindrical Culverts (EIS/CSR Section 2.4.4.4)

Comment 14:

This section states that most of the stream crossings can be accommodated using cylindrical culverts ranging in size from 800 to 3000 mm in diameter. This section discusses the design criteria with respect to slope and velocity for culverts >25 m but there are no design parameters discussed for culverts <25 m, arch-type culverts or bottomless culverts. Also, the criteria provided for culverts >25 m do not appear to incorporate any biological considerations. It appears from the EIS/CSR that the only fish species considered as being affected are Atlantic salmon and brook trout. This needs to be clarified, since culvert design may need to take into account the provision of fish passage for other species in some locations.

Response 14:

Most design parameters apply equally to culverts less than 25 m in length. Proposals for pipe arch culverts are provided in the project description, no bottomless culverts are proposed (except that, functionally, a bridge is a bottomless culvert). Biological considerations will be appropriately applied, regardless of culvert length. It was not intended that a distinction would be made at the 25 m length criteria. That criteria happened to be mentioned in discussions between WST and DFO.



The guidelines for culvert design to accommodate fish species are largely those provided by DFO in Gosse et al. (1998). The guidelines are for the protection of fish habitat in Newfoundland and Labrador. The guidelines note that site-specific information should be integrated into the design criteria. This can only be done when the siting of each crossing structure is finalized. Recognizing that other species are present at some crossing, the requirements of those species, as well as they are known, can be considered in the final design.

Comment 15:

Where baffles or weirs are proposed, specific biological and engineering input is required and is essential to ensure adequate fish passage. The proponent should provide specific design criteria and site conditions under which circular, arch-pipe, bottomless and baffled culverts are to be utilized to provide adequate fish passage.

Response 15:

Watercourse crossings will be designed and constructed in consultation with the provincial Water Resources Division and with DFO to ensure that crossing structures are installed in a manner that minimizes effects on fish and fish habitat. WST will consult with provincial and federal government officials to ensure that the best available data are used for designing watercourse crossings. Construction details for each watercourse crossing (including bridge or culvert type, clearance from watercourse, height, width, length, diameter and other relevant information) will be submitted to the provincial Water Resources Division and DFO prior to construction. As well, all appropriate environmental authorizations will be obtained.

3.2.8 Site Rehabilitation and Monitoring (EIS/CSR Section 2.5.2.7)

Comment 16:

All revegetation should be done using native species and seed sources only.

Response 16:

WST will give consideration to using native species in any revegetation activities. Paragraph 1 of Section 2.5.2.7 is amended by adding a new sentence immediately before the last sentence of the paragraph. This sentence reads as follows: *WST will give consideration to using native species in any revegetation activities.*



3.2.9 Effects of the Environment on the Project (EIS/CSR Section 2.9)

Comment 17:

The discussion of effects of the environment on the project is inadequate. Potential effects on crossing structures are mentioned but no further discussion is offered. Also, there is no discussion of potential environmental effects resulting from structural failures as specifically required by Section 5.0 of the Guidelines.

Response 17:

Structural failure is considered within the context of accidental/unplanned events. Potential accidental events associated with the TLH - Phase III are described in Section 2.8 of the EIS/CSR, while the potential effects resulting from any accidental events (including structural failures) are discussed in the environmental effects analysis section of each VEC (i.e., 6.x.8.3).

Comment 18:

The potential effects of changes in precipitation volumes, changes in tidal flow, and related changes to flood risk do not appear to have been discussed or analyzed. These basic factors should be incorporated in the EIS/CSR, and should explicitly take into account the potential effects of climate change. Recent experiences with winter weather and related potential effects on project operation (e.g., road closures) should be part of this discussion.

Response 18:

Section 2.9 of the EIS/CSR is amended by placing the following text at the end of the section on Page 69:

There is a lack of knowledge about the potential effects of climate change that may be experienced in Labrador. EMAN-North (2001) notes that northeastern Canada, especially Labrador, is responding differently to changes in temperature than other parts of northern Canada. While it is not currently known what the predictions are for Labrador with respect to climate change, potential changes, such as rising sea level, changes in sea ice patterns and ocean currents, storm surges and more frequent storms, and temperature changes, may have implications for the climate in south-central Labrador.

For example, increasing temperatures may result in more precipitation falling as rain rather than snow. Should increasing amounts of rain be combined with more violent storms, this would have implications for



watercourse crossing structures. Similarly, cooling temperatures may result in more snow and ice, which has implications for spring runoff. Watercourse crossing structures will be designed to allow for the passage of increased flow and ice.

Major cuts and fills along the right-of-way can affect the deposition of snowfall, depending on micro-climatic conditions. This would have implications for snow clearing and ice control requirements.

The normal surveillance of the highway will be the responsibility of the RCMP. It is assumed that adverse weather conditions will be taken into consideration and appropriate travel advisories provided to restrict travel during severe weather conditions.

During construction, climate change may affect the project if there is an increase in the frequency and severity of storms, one of the forecasted effects of climate change. However, it is unlikely that the magnitude of these changes within the construction period will be sufficient to cause any effect. The “normal” variation of weather will be greater than the incremental effect of climate change. In the longer term, any increased frequency of adverse weather may, or may not be sufficient to be observed.

3.2.10 Environmental Management Planning (EIS/CSR Section 2.10)

Comment 19:

This section indicates that the Environmental Management Plan will be finalized after the project is released from the environmental assessment process. The proponent is encouraged to use the environmental assessment process as a tool to support the development of its environmental management plan and include as much detail as possible regarding the form and content of the environmental management plan within the EIS/CSR.

Response 19:

WST has used the environmental assessment process as a tool to support the development of its environmental management plan and is committed to finalizing the plan after the project is released from the environmental assessment process. Section 2.10 of the EIS/CSR provided considerable detail on the content of the environmental management plan, including:

- consideration of the precautionary principle;
- the management and reporting structure for the project;
- detailed environmental protection measures for construction and operation;



- commitment to and outline for an EPP;
- commitment to environmental awareness training;
- rehabilitation of disturbed areas;
- emergency response and contingency measures; and
- environmental monitoring.

The environmental management plan outline provided by WST in Section 2.10 of the EIS/CSR incorporates both standard and project-specific mitigation measures aimed at eliminating or minimizing any adverse environmental effects. WST will implement the plan and continue the application of best practices throughout highway construction and operation. The details of the environmental management plan will be finalized in consultation with the appropriate regulatory agencies after the project is released from the environmental assessment process and final design plans are available.

3.2.11 Environmental Protection Measures (EIS/CSR Section 2.10.3)

Comment 20:

Based on the information presented, it does not appear that the identified environmental protection measures will enable compliance with the *Migratory Birds Convention Act* (MCBA) and its regulations. For example, Environmental Protection Measure #1.5 for highway construction indicates that “where active migratory bird nests are present or suspected, vegetation clearing will not be conducted until eggs have hatched and young are mobile.” In practical terms, how will the presence or suspected presence of active nests be established? Details should be provided in the EIS/CSR. Given the difficulty in identifying nests, Environment Canada strongly recommends that clearing activity be avoided during the nesting season for migratory birds. The recommendation also applies to maintenance activities related to Environmental Protection measure #2.7 for highway operation.

Response 20:

Environmental protection measure 1.5 (Table 2.7) and 2.7 (Table 2.8) are amended by adding the following: *The presence or suspected presence of active nests will be established by observation. Trees will be inspected for active bird nests prior to removal. Whenever possible, trees with active nests will be left standing until such time as the young have fledged. Bird observations will also be recorded in the wildlife log kept by the Resident Engineer. A log of this nature is standard practice, and was used during construction of Phase II of the TLH.*



Comment 21:

Table 2.7, the following sentences should be added to 1.5: “Trees will be inspected for active bird nests prior to removal. Whenever possible, trees with active nests will be left standing until such time as the young have fledged.”

Response 21:

Refer to Response 20, as provided for Comment 20.

Comment 22:

Table 2.7, 1.9 should be modified to read “All merchantable or forest product timber will be salvaged and will be the property of the contractor. Merchantable timber should not be piled in the vicinity of a blasting operation or in any other area where construction activities could negatively impact the value or utility of the timber.”

Response 22:

Environmental protection measure 1.9 (Table 2.7) is amended by adding the following: *Merchantable timber should not be piled in the vicinity of a blasting operation or in any other area where construction activities could negatively effect the value or utility of the timber.*

Comment 23:

Table 2.7, the second 1.1 should be 1.10 and should be modified to read “Fires will be located a minimum of 10 m from the existing tree line and/or adjacent piles of slash and piled merchantable timber, or as directed by the Conservation Officer.”

Response 23:

The numbering of environmental protection measure 1.10 (Table 2.7) is amended to read 1.10 instead of 1.1. The second sentence of 1.10 is amended to read: *Fires will be located a minimum of 10 m from the existing tree line and/or adjacent piles of slash and piled merchantable timber, or as directed by the Conservation Officer.*



Comment 24:

Table 2.7, add 3.12 which should read as follows: “Uncontrolled blasting, caused by failed discharges or otherwise, will be reported immediately to DFRA or DFO officials. Where uncontrolled blasting results in degradation to terrestrial or aquatic habitats, mitigative measures as recommended by DFRA or DFO will be implemented.”

Response 24:

Table 2.7 is amended to include an additional environmental protection measure with respect to blasting activity (i.e., Item 3.12). Environmental protection measure 3.12 reads as follows: *Uncontrolled blasting, caused by failed discharges or otherwise, will be reported immediately to DFRA or DFO officials. Where uncontrolled blasting results in degradation to terrestrial or aquatic habitats, mitigative measures as recommended by DFRA or DFO will be implemented.*

Comment 25:

Table 2.7, add 3.13 which should read as follows: “Blasting areas will be surveyed for caribou and other wildlife species. Presence of wildlife in the immediate area will result in postponement of blasting activities. Guidelines for mitigation of the impacts of blasting activities on wildlife will be developed in consultation with the Inland Fish and Wildlife Division.”

Response 25:

Table 2.7 is amended to include a second additional environmental protection measure with respect to blasting activity (i.e., Item 3.13). Environmental protection measure 3.13 reads as follows: *Blasting areas will be surveyed for caribou and other wildlife species. Presence of wildlife in the immediate area will result in postponement of blasting activities. Guidelines for mitigation of the impacts of blasting activities on wildlife will be developed in consultation with the Inland Fish and Wildlife Division.*

Comment 26:

Table 2.7, add 8.10 which should read as follows: “Efforts will be made to deter nuisance animals using non-lethal deterrents. Nuisance animals will be reported to DFRA and if relocation is necessary, it will be at the expense of the proponent.”



Response 26:

Table 2.7 is amended to include an additional environmental protection measure with respect to establishing and operating construction camps and laydown areas (i.e., Item 8.10). Environmental protection measure 8.10 reads as follows: *Efforts will be made to deter nuisance animals using non-lethal deterrents. Nuisance animals will be reported to DFRA and, if relocation is necessary, relocation will be carried out at the expense of WST.*

3.2.12 Emergency Response and Contingency Plans (EIS/CSR Section 2.10.5)**Comment 27:**

Table 2.10, add 5.5 which should read as follows: “The Inland Fish and Wildlife Division will be notified immediately if any species at risk or raptor nests are located by Works, Services and Transportation personnel or contractors.”

Response 27:

Table 2.10 is amended to include an additional emergency response and contingency measure with respect to wildlife encounter prevention and response (i.e., Item 5.6, note that the current listing of measure for wildlife encounter prevention and response includes Items 5.1 to 5.5). Item 5.6 reads as follows: *The Inland Fish and Wildlife Division will be notified immediately if any species at risk or raptor nests are located by WST personnel or contractors.*

Comment 28:

Table 2.10, add 5.6 which should read as follows: “Works, Services and Transportation staff will maintain a logbook to record sightings of wildlife species. The Inland Fish and Wildlife Division will be consulted for direction on the development and maintenance of the logbook.”

Response 28:

Table 2.10 is amended to include a second additional emergency response and contingency measure with respect to wildlife encounter prevention and response (i.e., Item 5.7, see response to Comment 27 for explanation on numbering). Item 5.7 reads as follows: *WST will maintain a log book to record sightings of wildlife species. The Inland Fish and Wildlife Division will be consulted for direction on the development and maintenance of the log book.*



3.2.13 Environmental Effects Monitoring (EIS/CSR Section 2.10.8.2)

Comment 29:

This section should be revised to indicate that breeding bird, rare plant and beaver surveys will be conducted prior to the start of each construction season. Data collected should be copied to Inland Fish and Wildlife Division along with the proposed mitigative measures. The section should be expanded to provide more detail on proposed monitoring protocols to evaluate the accuracy of effects predictions made in the EIS/CSR.

Response 29:

Canadian Wildlife Service (CWS) (Newfoundland and Labrador) and WST agreed on a program of forest songbird surveys that was carried out in June 2003. The results of the surveys (point counts and atlassing in plots in representative ecoregions) will be provided to CWS. As per the agreement with CWS, no further follow-up measures are required for forest songbirds. Refer to Response No. 20 for details on environmental protection measures related to active bird nests.

The rare plant survey will be conducted after the survey line has been cut. Refer to the response to comment No. 30 below for details on the survey methodology.

With respect to beavers, the annual pre-construction survey for active raptor nests will also involve a survey for active beaver ponds within 100 m of the highway. Refer to the response to Comment No. 76 (Section 3.4.5.1 of this addendum) for details on amendments to mitigation measures regarding beaver ponds. In addition, the first sentence of Paragraph 3, Section 2.10.8.2 is amended to read as follows:

Prior to each construction season, a survey for active raptor nests (specifically osprey and bald eagle) will be completed within 800 m of the construction zone and a survey will be completed for active beaver ponds within 100 m of the highway.

3.3 EIS/CSR Environmental Setting

3.3.1 Rare and Endangered Vascular Plant Species (EIS/CSR Section 3.2.1.3)

Comment 30:

Additional information is required on the methodology for the rare plant survey. Trained botanists should perform the surveys and sampling protocols should be standardized and rigorous enough to ensure adequate



data collection for analysis, effects assessment and mitigation. Plant samples should be collected and arrangements should be made to have the samples provided to a Newfoundland herbarium. The Inland Fish and Wildlife Division can be consulted for further direction.

Response 30:

Section 3.2.1.3 of the EIS/CSR is amended by adding the following at the end of the section:

The methodology to be used for the rare plant survey on the TLH - Phase III route will be the same as that used for the rare plant survey conducted for Phase II of the TLH. The geographic extent of a survey site will be defined as the area where the right-of-way passes through or within 100 m of a high potential site. Potential sites were identified by a modelling exercise described in Appendix F of the EIS/CSR. Survey sites will be transferred onto 1:12,500 black and white aerial photos of the route and will be used to aid in navigation. The UTM coordinates (NAD83) for the beginning, end and any right-of-way turns within the survey sites will be entered into a Garmin 12 global positioning system (GPS) unit to facilitate the location of these points in the field.

The study team will consist of a botanist, navigator/field assistant and helicopter pilot. At each of the survey areas the botanist and navigator will land as close to the survey site as possible and use GPS to navigate to one end of the survey site. A transect, which will run along the centre line of the proposed highway route, will then be established through the survey site. Each transect will be broken down into legs; the number of legs dictated by whether the right-of-way is straight or curved, the degree of the curve, and the length of the transect. Straight transects will contain one leg, while curved transects will contain a number of legs linked together to approximate the curve or curves dictated by the right-of-way. The minimum length of a leg will be 100 m. The coordinates of each leg will be entered into the GPS as waypoints prior to commencing the field survey. Bearing and distance between adjacent waypoints on the transect will also be calculated. A compass and hipchain will then be used to navigate along the transect. The use of a hipchain line to mark the transect will allow the survey to be focused within the right-of-way. A zigzag course to either side of the transect will be followed, keeping the hipchain line to the left. When the end of the transect is reached, the course will be reversed, and the same pattern followed on the opposite side of the hipchain line back to the beginning of the transect.

All observations of vascular plants will be recorded. Areas of unusual habitat types will be searched more intensively than areas supporting common habitat types. Plants which can not be identified in the field will be returned to the laboratory for identification. The nomenclature used in the study will be that of Rouleau (1978). The locations of rare species will be recorded on the route mapping or aerial photos, and/or GPS coordinates taken. The number of individual shoots will be recorded and, where possible, the general



distribution of the species in the surrounding area will be determined. Specimens of rare species will be dried and retained as voucher specimens. Samples can be provided to a Newfoundland herbarium following consultation with the Inland Fish and Wildlife Division.

3.3.2 Wildlife (EIS/CSR Section 3.2.3)

Comment 31:

The EIS/CSR states that the Mealy Mountain Caribou Herd (MMCH) numbers less than 600 animals. The estimated population of the Mealy Mountain Caribou Herd from the most recent census is approximately $2\,500 \pm 1\,500$ animals (Otto 2002a).

Response 31:

The second sentence in Paragraph 1 of Section 3.2.3 of the EIS/CSR are revised as follows: *Prior to a recent population estimate from work conducted in conjunction with this EIS/CSR, Schaefer (1997) estimated the MMCH to number less than 600 animals. The recent census estimates the population at approximately 2,500 +/- 1,500 animals; however, Otto (2002a) cautions that the apparent population increase is biologically improbable and cannot be confirmed without further information on the population age structure. The range of the MMCH extends from Lake Melville south and from the Kenamu River headwaters east to the Labrador coast.*

Comment 32:

Recent information indicates that the Red Wine Herd is moving closer towards Goose Bay. There is a potential for this herd to be impacted by the highway. Given the very low population estimate for the Red Wine Herd and the level of effects associated with the low level flying activity, additional information should be provided to assess the potential effects of the highway and possible mitigation measures that could be applied to protect this herd during construction and operation.

Response 32:

Unpublished information provided by the Department of Forest Resources and Agrifoods (F. Phillips, pers. comm.) and the Department of National Defence (T. Chubbs, pers. comm.) indicates that individuals of the Red Wine Mountain Caribou Herd have occasionally been identified using the Happy Valley-Goose Bay region. Since 1982, when these animals first were collared and studied, there has been use of habitat south of the Churchill River, particularly in the Minipi River/Dominion Lake area. A collared Red Wine animal



was also found to have calved south of Mud Lake and an individual wintered around a large bog complex at the headwaters of the Traverspine River in 1999-2000. However, to date, no Red Wine animals have been observed east of the Kenamu River. The area west of the Kenamu River is an area where the range of individuals from the Red Wine and Mealy Mountains herds may overlap. Potential effects of the highway and mitigation measures identified would apply to individuals of both herds if they were present in the area west of the Kenamu River.

Comment 33:

Although there are no confirmed sightings of wolverine since the 1950s there are a number of unconfirmed sightings, some along the preferred route. Knox (1994) summarizes all sightings. This information should be presented to facilitate an assessment of the potential effects of the proposed route on potential wolverine recovery habitat.

Response 33:

There is a record of one wolverine being trapped in the Muskrat Falls area of the Churchill River in the 1950s (Knox 1994). In 1989, wolverine tracks were reported to the west of Sandwich Bay, north of the Eagle River (Knox 1994). These are the only two records for wolverine in the region of the proposed highway route. Wolverines tend to avoid areas of human activity and have large home ranges extending from less than 100 km² for females to over 1,000 km² for males (Environment Canada 2002). The species also exhibits a more generalized use of open areas and a wider variety of vegetation types than other mustelids such as marten.

Roads that permit human access can be detrimental to wolverines, particularly if hunting or trapping occurs. As well, wolverines do not tend to thrive in habitats that have been permanently altered by development and human settlement (Environment Canada 2002). It is likely that any recovery of wolverine in Labrador will occur north of Lake Melville, in tundra regions where there is little human disturbance and a large caribou herd to provide scavenging opportunities from wolf kills.

3.3.3 Freshwater Environment (EIS/CSR Section 3.3)

Comment 34:

Characterization of the lower portion of Paradise River as not suitable for angling is incorrect. In fact, angling on tributary streams is quite good and Paradise River has recently become a scheduled salmon river. Eagle River is a scheduled salmon river, and supports a significant recreational fishery and commercial



outfitting operations. Both river systems are unobstructed and Atlantic salmon and sea run trout can and do presently ascend both rivers into their upper reaches. Paradise River has spawning areas in its lower reaches in both the main stem and tributary streams. Table 3.4 should list Arctic charr and rainbow smelt for Paradise River. The statement that ‘there are 16 scheduled salmon rivers in the area and all are located in the Eagle River and Paradise River watersheds’ is incorrect. Also, the statement that ‘most if not all angling undertaken at these camps is hook and release’ is incorrect. It should say ‘some,’ as a lot of salmon are retained.

Response 34:

The characterization of the lower portion of Paradise River was taken from Anderson (1985) as cited, and no new information was obtained from the field surveys. Reddin et al. (2000) also reported that local residents report very little angling activity on the river. However, the comment has been deleted as it appears to be contentious and it adds no essential information to the assessment. The EIS/CSR does acknowledge that salmon and trout ascend Paradise River to the location of the road crossing and it does state that Paradise River was recently added to the list of scheduled salmon rivers. As stated in the addendum to the Fish and Fish Habitat Component Study, “*Contact with DFO scientists have identified a few additional published sources since Anderson (1985). Reddin et al. (2000) provides a list of species in Paradise River that is taken from Anderson (1985). The Reddin et al. (2000) report lists catches in lower estuary traps in Paradise River that include 349 smelt, one charr, and one pike, along with salmon parr, brook trout and several marine species. This report does not confirm these species to be present in the freshwater environment; however, other sources have confirmed smelt catches upstream in Paradise River (G. Bird, pers. comm.). A revised list of species is provided in the appended Fish and Fish Habitat Component Study (Appendix B).*”

This statement: *There are 16 scheduled salmon rivers in the area and all are located in the Eagle River and Paradise River watersheds*, in Paragraph 7, Section 3.4.5 of the EIS/CSR is incorrect and has been amended to read: *There are 16 scheduled salmon rivers in the area, including the Paradise River and Eagle River*.

The statement: *Most if not all angling undertaken at these camps is hook and release*, in Paragraph 9, Section 3.4.5 of the EIS/CSR has been amended to read: *Some of the angling undertaken at these camps is hook and release*.



3.4 Environmental Effects Assessment (EIS/CSR Section 6.0)

3.4.1 General Comments

Comment 35:

The conclusion and recommendations of the Labrador Innu Land Use Component Study should be incorporated into the effects assessment to provide an integrated and comprehensive evaluation of effects and allow the further incorporation of appropriate conclusions and findings into the Environmental Protection Plans.

Response 35:

Armitage and Stopp (2003) conducted the study on Innu land and resource use in the vicinity of the TLH - Phase III, which also included an analysis of potential environmental effects on Innu land and resource use due to the project. The component study was accepted as satisfactory with no further requirements for follow-up work or study. The EIS/CSR has been amended to incorporate the discussion of environmental effects on Innu land and resource use into a separate chapter.

The conclusions and recommendations presented in Chapter 6 of the Armitage and Stopp (2003) report are provided in Appendix D. These conclusions and recommendations indicate that the overall finding with respect to Innu land and resource use patterns is that there will be significant changes due to increased access and land use. The incorporation of the Armitage and Stopp (2003) effects analysis into the EIS/CSR means that the summary of residual environmental effects as presented in Section 7.3 is also amended. Thus, the final results are changed to indicate that highway construction effects on Innu land and resource use are noted as minor and that TLH - Phase III operation will have a significant effect on Innu land and resource use, if the preferred route is used. However, it is noted that the effects significance for operation is reduced when considered in the context of a land claim agreement being settled for the area and further reduced when considered in light of a national park being established in the area.

The EIS/CSR for the outfitter route alternative is presented in Appendix C. As there was no requirement identified in the deficiency statements (i.e., all deficiency statements provided for the EIS/CSR and all component studies determined to require further information) for further Innu land and resource use information to be gathered, no further study was undertaken in this regard.



Comment 36:

Section 5 of the Guidelines clearly indicates that particular emphasis shall be placed on the significant increase in human access and the attendant implications for increased development pressure along with induced development (e.g., forest harvesting, fish harvesting, fur harvesting). However, the EIS/CSR provides little discussion of these potential effects.

Response 36:

The potential environmental effects due to resource use activities were discussed in detail in Section 6.12 of JW/IELP (2003), the EIS/CSR for the preferred route. This section provides an overview of the various types of resource use activities that occur throughout the region. Greater detail can be found in JW (2003a), the Land and Resource Use Component Study completed for the environmental assessment. The environmental effects analysis, presented in Section 6.12.8, considered the potential for an increase in land and resource use activities due to the improved access into the area provided by the TLH - Phase III. The analysis concluded that the residual environmental effects (those environmental effects remaining after mitigation is applied) for land and resource use were minor (not significant) for construction and operation, and minor to major (not significant to significant) for an accidental/unplanned event.

Further discussion on this issue of induced development and activities that may occur as a result of the TLH - Phase III is presented in Appendix E.

Comment 37:

The cumulative environmental effects sections for each of the VECs seems to be very narrow in scope and compounds the averaging out of effects in its predictions. Cumulative environmental effects from opening up a previously inaccessible remote area often have a more significant environmental effect than the original development. The cumulative environmental effects predictions rely heavily on the use of assumptions. While it is acknowledged that cumulative effects may not be the sole responsibility of the proponent for mitigation and enforcement purposes, it is the proponents responsibility to accurately and comprehensively provide a prediction of effects. Although forestry activity will undoubtedly occur after the highway is constructed, its potential effects on some of the VECs needs to be addressed. Also current provincial harvesting guidelines offer significantly more protection to habitat requirements than is described (e.g., 20 m buffer around waterbodies). Further, harvesting guidelines specific to District 19 offer significantly more habitat protection than is seen in other jurisdictions and again this is not reflected in the EIS/CSR. Examples are: forestry activity is not likely to be concentrated in core MMCH habitat; harvesting guidelines prohibit activities within 800 m of active raptor nests, and not all raptors can be similarly characterized in their



reaction to nearby harvesting activity; and, staging areas for waterfowl, especially that for threatened species, would not be considered for forest harvesting.

Response 37:

Further discussion on this issue of induced development and activities that may occur as a result of the TLH - Phase III and resulting cumulative environmental effects is presented in Appendix E.

With respect to forestry, the forestry management planning process involves various user groups in the planning process, including industry representatives, the general public, government resource managers and non-governmental organizations. In addition, forestry management plans are also required to be registered under the *Environmental Protection Act* and, as a result, are subject to public review under the environmental assessment process.

The Innu have been involved in the forestry management planning process that has been established for District 19A (i.e., the area which includes the western portion of both the preferred and outfitter routes). The management plan outlines objectives for forest management in the district and, as noted in Comment 36, the *harvesting guidelines specific to District 19 offer significantly more habitat protection than is seen [in] other jurisdictions*. Forest management plans are subject to the provincial environmental assessment process, which provides for public and government review and input. In addition, the harvesting guidelines (as noted in Comment 37) for the district will also serve to protect area habitat.

Any further assessment of the potential effects of forestry activity on the VECs (as identified for this assessment) would be best addressed in the environmental assessment of the forest management plans. As details pertaining to the proposed projects of other proponents (in this case, the proposed forestry operations) are not typically made available to other proponents, it is not possible to develop a full understanding of the planned activities associated with the other projects.

Comment 38:

The assertion repeated throughout that mitigating the effects is, for the most part, beyond the ability and responsibility of the proponent is not entirely justified. For example, if a change in the proposed route, or some other mitigative measure, would substantially lessen the environmental implications of development pressure, then such a mitigation measure should be given adequate consideration by the proponent. Indeed, the difficulty in directly mitigating environmental effects of future activities does not preclude the need to give them full discussion and consideration, and to develop mitigation recommendations or adopt any mitigation measures that are feasible.



Response 38:

In response to direction provided by the Minister of Environment, an environmental assessment of an alternative routing (the outfitter route) has been conducted. The results of this environmental assessment are provided in Appendix C.

Comment 39:

A comprehensive discussion of reasonably foreseeable induced development is also important in evaluating the suitability of the proposed routing. Conceivably, future development will be concentrated around the proposed routing, resulting in a higher level of development pressure and greater environmental effect in its immediate vicinity. Therefore, the EIS/CSR should demonstrate that the proposed routing will not introduce development pressure to sensitive habitat areas that could result in significant cumulative effects. Without this analysis, a potentially major source of environmental effect would be overlooked.

Response 39:

It is acknowledged that consideration of reasonably foreseeable induced development is important in conducting a cumulative environmental effects assessment. The environmental assessment of the proposed TLH - Phase III project considered those future planned projects and activities that were ongoing or likely to proceed, and had been issued permits, licences, leases or other forms of approval, as specified by the Canadian Environmental Assessment Agency (1994).

The following existing, planned or reasonably foreseeable future projects and activities (assuming appropriate planning and management are in place and regulatory requirements and mitigation measures are fulfilled) were considered in the cumulative environmental effects assessment:

- existing sections of the Trans Labrador Highway (Phases I and II);
- other roads in central and southern Labrador;
- Akamiuapishku/Mealy Mountains National Park;
- hydro development, including transmission lines;
- forestry activities;
- tourism and recreation activities, including outfitting operations;
- land and resource use activities, including consideration of improved access, by Innu and other residents of Labrador;
- Voisey's Bay Mine/Mill development;
- mineral exploration; and



- low-level military flight training.

These existing, planned or reasonably foreseeable future projects and activities were considered in the context of the cumulative environmental effects assessment as presented in Section 6.X.10 for each VEC of the EIS/CSR. While increased use of the area in the vicinity of the highway may result from the improved access provided by the highway, the planning and control measures in place by several various agencies to govern development and other activities that may be carried out in the area act to reduce the potential adverse cumulative effects. In addition, no small, singular sensitive areas were identified during the environmental assessment. What may potentially be sensitive areas, such as caribou calving areas, fish spawning, and waterfowl breeding, moulting and staging areas, are scattered or widely distributed over large areas along the route or the vast areas distant from the route. Therefore, any disturbance due to development would have to be very extensive before any sensitivity would be introduced.

In addition, in response to this comment and others presented in the deficiency statement, further discussion on this issue of induced development and activities that may occur as a result of the TLH - Phase III is presented in Appendix E.

Comment 40:

Beyond the requirement of the Guidelines to consider induced effects, the CEA Agency's *Operational Policy Statement on Addressing Cumulative Environmental Effects* suggests that a cumulative effects assessment include projects that are "reasonably foreseeable." It is stated repeatedly under individual "mitigation" sections for VECs that many of the potential adverse effects of the highway stem from the improved access provided by the highway and the associated increase in human presence and activities in this previously remote area. This statement acknowledges that induced development, increased development pressure and increased human access are "reasonably foreseeable" activities. Therefore, they should receive full consideration.

Response 40:

Refer to the response to Comment 39. In addition, further discussion on this issue of induced development and activities that may occur as a result of the TLH - Phase III is presented in Appendix E.

Comment 41:

At numerous points in the EIS/CSR, and summarized in section 7.1, compliance with various guidelines and standard contract language are identified as mitigative measures. However, specific descriptions of the



actual measures and how they will be applied are sporadic. The EIS/CSR should describe the proposed mitigation strategy and specific mitigation measures - in an appendix if necessary - rather than rely upon a list of guidelines. For example, the proponent indicates that it will confer with the Inland Fish and Wildlife Division regarding mitigation for raptor nests within the right-of-way. Does this mean that the raptor nest guidelines will be applied? If so, the EIS/CSR must be definitive in this regard. If not, then the guidelines should not be presented as mitigation.

Response 41:

As noted in Section 6.1.11, WST is committed to conducting an annual pre-construction raptor survey to identify active osprey or bald eagle nests within 800 m of that year's construction zone. If any active nests are identified during the annual surveys, their location will be mapped and each nest site will be reviewed in consultation with the Inland Fish and Wildlife Division to determine the appropriate mitigation. WST is also committed to minimizing disturbance around active raptor nests by following the Island Fish and Wildlife Division guidelines for construction around active raptor nests. The effective mitigation for each active nest must be assessed on an individual basis, as topography will influence the potential disturbance that may be experienced at the nest site as a result of construction activity. For example, a nest 250 m away from the construction activity with a clear line of sight would be expected to experience more disturbance than a nest that is also 250 m away yet is located behind a hill or around the bend of a river. WST is also willing to shift road alignment to avoid an active raptor nest when engineering considerations or topographical features do not preclude the ability to this. During construction of the TLH - Phase II, the highway alignment was shifted approximately 200 m to avoid an active osprey nest near the community of Paradise River. The nest was also re-occupied in the year following construction.

Comment 42:

The EIS/CSR should identify information gained from Phase II mitigation experience. For example, using the raptor example above, how did conferring with Inland Fish and Wildlife Division protect raptor nests? Was the mitigation successful? How many nests were removed? How many times was construction delayed for nesting? How and where was the road realigned to avoid raptor nests? Previous mitigation experiences, particularly for Phase II, should be reflected for all applicable VECs throughout.

Response 42:

On TLH - Phase II there was only one active osprey nest that was in potential conflict with highway construction activities. Following discussion with Inland Fish and Wildlife Division, the highway alignment



near Paradise River was moved approximately 200 m. The construction continued within 250 m of the active nest; abandonment did not occur and the nest was re-occupied the following year.

Comment 43:

Similarly, the effects analysis for each VEC should reflect the failure rate in planned mitigation as evidenced by previous phases of the Trans Labrador Highway. For example, the EIS/CSR concludes that residual effects on fish and fish habitat will be insignificant when standard mitigation measures are applied. However, evidence from Phase II seems to indicate there were failures at stream crossings. These failures should be considered when conducting the analysis for the proposed highway.

Response 43:

The EIS/CSR included mention of experience in TLH - Phase II, such as, *Culvert installations at a few locations along TLH - Phase II experienced water loss in the culvert, where most of the water flowed under the culvert barrel rather than through it, during low flow conditions. This was a result of the coarse fill used to embed the culvert pipe.* WST have committed to repairs to mitigate that situation as well as any other culvert failures. The situation at these crossings are therefore reversible (within 12 or 24 months), resulting in the overall conclusion that the effect on the larger population is not significant.

Comment 44:

Section 6.3 of the Guidelines clearly indicates basic requirements for a follow-up program. It is important that the assessment be conducted in a manner that supports an adaptive management approach. Accordingly, the EIS/CSR should include provisions for implementation of a follow-up program that allows the accuracy of effects predictions and the effectiveness of mitigation measures to be tested throughout the life of the project. The proponent should address if there is an expectation that responsible agencies may need to carry out monitoring programs and the costs of doing so. It is with follow-up results in hand that the provisions for project management can be adapted to ensure a commitment to avoid significant adverse environmental effects is respected.

Response 44:

As noted in Section 2.10.8.2 of the EIS/CSR, WST will conduct environmental compliance monitoring throughout project construction to ensure that EPP provisions, permits, approvals and authorizations are followed. WST is not proposing an environmental effects monitoring program for the TLH - Phase III construction and operation.



Prior to each construction season, a survey for active raptor nests (specifically osprey and bald eagle) will be completed within 800 m of the construction zone. During annual pre-construction surveys for active raptor nests, WST will also identify any active beaver ponds (defined by the presence of a beaver lodge in good repair with recent cuttings) that may be affected by vegetation removal as a result of highway construction. Prior to the start of any construction on the TLH - Phase III, the following will be completed:

- study to further assess acid-generating rock potential;
- field investigations to assess geotechnical parameters of materials to be used for construction;
- study to further assess the potential for encountering rare plants; and
- historic resources survey.

WST will also support fish population studies to be completed during the construction phase. The protocols for these studies have been developed by the Inland Fish and Wildlife Division, who will take the lead in the survey.

Construction employment, including numbers by occupation, gender and timing, will be monitored, with results provided to the Minister of Environment at the end of each construction season. A similar monitoring exercise for employment was carried out for the construction on the Phases I and II of the TLH.

The Canadian Environmental Assessment Agency (1997) indicates that due to the uncertainty and dispersed nature of induced activities, they are best addressed through a regional land use planning process that involves the relevant regional agencies. Given that most of the comments relate to cumulative or induced environmental effects, the environmental assessment for the TLH - Phase III could provide a resource that may be used by the relevant agencies to design the monitoring program, if it is determined that one is required.

Comment 45:

The testing of effects predictions and mitigation measures is especially important in cases where there is a lack of site-specific data. Under these circumstances, predictions often rely heavily on experience elsewhere and expert opinion. Uncertainty regarding effects resulting from a certain type of project under a specific set of environmental conditions dictates that the proponent demonstrate preparedness for a range of potential outcomes to be confirmed through follow-up.



Response 45:

As noted, the environmental assessment of the TLH - Phase III determined that construction and operation of the project would not likely result in significant adverse effects on any of the VECs identified for the environmental assessment. Site-specific and regional data, where available, were collected for all VECs. The effects predictions were based on the data collected and experience from similar projects elsewhere. WST is prepared to consider adapting construction practices and scheduling as appropriate.

Comment 46:

As it stands, the proposed follow-up program is inadequate. In many cases, a follow-up program for VECs either has not been developed, or would not permit an evaluation of the accuracy of effects predictions and the effectiveness of mitigation procedures. From the information provided, it appears that most of the follow-up proposed would actually occur before project construction, with no corresponding follow-up effort during and after construction. The proponent is advised to consult the CEA Agency's *Operational Policy Statement: Follow-up Programs Under the CEAA* that outlines how follow-up would be applicable to all phases of project implementation.

Response 46:

Agreed. Refer to the response to Comment 44.

Comment 47:

The Guidelines refer to the precautionary principle and state that “the best available technology and best management practices must be considered.” The EIS/CSR is deficient on this item with respect to stream crossings. There are no culvert selection criteria presented. DFO notes that the proponent has not proposed to use any bottomless arch culverts and that the majority of culverts are cylindrical pipes. DFO strongly recommends open bottom/bottomless arch culverts to minimize potential effects on fish and fish habitat, maintain fish passage, and sufficiently accommodate watercourse flows, particularly in sensitive habitats, as a mitigation against HADD of fish habitat. It is also suggested that natural stream conditions (i.e., widths, habitat) be maintained to the extent possible (Gosse et al. 1998).



Response 47:

WST have considered the best available technology and best management practices in the context of the habitat and fish conservation objectives. Those objectives must be met using appropriate technologies and practices in combination with site-specific conditions for construction in a cost-effective manner.

Culvert selection criteria are outlined in the EIS/CSR document and it should be noted that the preliminary structure design is based on hydrologic analysis, hydraulic analysis and details from topographic mapping. Any structure or culvert may be changed or upgraded on the basis of field survey data and site conditions determined at the time of the final route survey.

WST recognizes DFO's preferences and is committed to employing appropriate structures to meet habitat and fish protection requirements in consultation with DFO.

3.4.2 Raptors

3.4.2.1 Existing Knowledge (EIS/CSR Section 6.1.6)

Comment 48:

Define 'vicinity' and 'close proximity.' Caution should be used in interpreting data from studies where raptors established successful nest sites in the 'vicinity' of roads and highways. There is a difference between a bird establishing a nest near a road and having a new road constructed near a nest. Effects may be much greater for new developments in areas that were previously undisturbed.

Response 48:

The terms "vicinity" and "close proximity" were both used in the last sentence of Paragraph 2 in Section 6.1.6. The noted eagle nests were all within 5 km of the Bull Arm construction site (the vicinity) and one nest was less than 1 km away from the site (close proximity).

The term "close proximity" was also used in Sentence 7 of Paragraph 6 of Section 6.1.6 in reference to effects of vehicular disturbance on burrowing owls. Plumpton and Lutz (1993) do not define the term "close proximity" other than to indicate that burrowing owls commonly nest near roads. The measure of disturbance used for the study was number of vehicles per 15 minutes.



It is agreed that raptors already nesting in a previously undisturbed area may experience greater disturbance than raptors that choose to construct nests adjacent to an existing area of disturbance. This concept is discussed in several locations of Section 6.1.6. Experience on the TLH - Phase II (Red Bay to Cartwright) found that construction of the highway within 250 m of an active osprey nest did not result in abandonment of the nest and the nest was re-occupied the following year.

3.4.2.2 Mitigation (EIS/CSR Section 6.1.7)

Comment 49:

Additional discussion should be provided on options for mitigation. Mitigation guidelines for other developments recommend that no activity take place within 800 m of an active eagle or osprey nest during nesting (March 15 - July 15). A 200 m no activity buffer should be maintained at all other times of the year. Relocation of these nests likely is not an option as the nests would have to be moved too far to be considered out of the impact area. Data presented in the Component Study suggests that the string bog complex of the Eagle River watershed represents a relatively high density area for osprey. Without information on raptor densities in other areas (alternative routes) it is difficult to estimate the relative effect of the highway on raptor populations.

Response 49:

Refer to Response No. 41.

3.4.2.3 Cumulative Environmental Effects (EIS/CSR Section 6.1.10)

Comment 50:

Additional discussion should be directed towards the potential effects of increased access. Although regulatory and enforcement capabilities are outside the direct mandate of the proponent, limitations in human and financial resources for responsible government departments make it extremely unlikely that mitigation of increased access will be totally effective.



Response 50:

In response to this comment and others presented in the deficiency statement, further discussion on the issue of improved access through central Labrador and potential induced development and activities that may occur as a result of the TLH - Phase III is presented in Appendix E.

3.4.3 Waterfowl

3.4.3.1 Waterfowl and Passerine Birds (EIS/CSR Section 6.2)

Comment 51:

Waterfowl and passerine birds are considered together in most sections of the EIS/CSR. Presentation of information in this manner is confusing. It is also implied that a passerine bird component study was undertaken, which is not the case. Given the differences between waterfowl and passerines, including important differences in the nature and extent of potential interactions with the highway, these migratory bird groups should be discussed separately.

Response 51:

Information on the existing environment and existing knowledge for waterfowl and passerine birds were considered separately. While waterfowl and passerine birds were discussed together in the effects assessment section, where there were relevant differences in the nature and extent of potential interactions, each group was discussed separately for that potential interaction. Where the interaction would have similar effects on both waterfowl and passerine birds (i.e., habitat loss through vegetation removal), the discussion was generalized to include both groups.

In Section 1.4.3.1 of the EIS/CSR, the Waterfowl Component Study was incorrectly identified in the section title as the Waterfowl and Passerine Birds Component Study. However, the description of the study under the title clearly indicates that the study focussed only on waterfowl and at no point does Section 6.2 of the EIS/CSR imply that any original research on passerine birds was conducted. Note that the heading for Section 1.4.3.1 of the EIS/CSR is amended to read: *Waterfowl Component Study*.

Comment 52:

Table 6.5 indicates that Environmental Effects Evaluation of construction and operation is Not Significant (Minor). Relate this conclusion to the finding described in the Tourism and Recreation Component Study



that tallymen reported the disappearance and growing scarcity of certain species along a corridor 10 km wide on both sides of the main road system for the La Grand hydroelectric development. Clarify also why the Environmental Effects Criteria Ratings describe effects as irreversible, considering that effects have been described as Not Significant (Minor).

Response 52:

The results presented in Table 6.5 refer specifically to the effects analysis carried out on waterfowl in the vicinity of the proposed TLH - Phase III preferred route. The conclusions of the analysis are not immediately comparable to the finding described in JW (2003b). The finding regarding tallymen observations presented JW (2003b) in the Tourism and Recreation Component Study, is based on anecdotal information and opinions. No information was available on whether formal baseline surveys were conducted before the road was constructed or follow-up monitoring conducted after the road was operational. Without supporting data of this nature, the statement does not provide support for any other conclusion regarding waterfowl and the TLH - Phase III preferred route than what has already been determined.

While the effects on waterfowl for construction and operation of the highway were determined to be irreversible, the magnitude (i.e., nature and degree) of the predicted environmental effect was determined to be low and the area over which the effect was predicted to occur was determined to be relatively small compared to the large area crossed by the highway. Therefore, the overall effect on waterfowl was determined to be not significant (minor).

3.4.3.2 Waterfowl (EIS/CSR Section 6.2.3.1)

Comment 53:

The significance of the study area to waterfowl is not evident from the EIS/CSR. The data presented in the report indicate that there are large numbers of birds in the study area. The Eagle River Plateau is one of the most important areas for waterfowl in Labrador. Therefore, the significance of the study area to waterfowl in Labrador should be identified and the contribution of this population to the Atlantic Flyway should be recognized.

Response 53:

Section 6.2.3.1 is amended by adding the following at the beginning of the section:



The importance of Labrador to breeding waterfowl is a function of the large area which supports a substantial total population, estimated to represent 40 percent of the breeding population in the northern Atlantic Flyway (Goudie and Whitman 1987). Literature reporting on waterfowl densities in Labrador consistently indicates that densities are relatively low, as in most boreal-sub-arctic zones (i.e., Goudie and Whitman 1987; DND 1994). However, surveys conducted in the early 1990s (Bateman and Hicks 1995) identified the Eagle Plateau ecoregion as having the highest average density of Canada geese compared to neighboring ecoregions such as Paradise and Lake Melville. The results of surveys conducted in 2002 confirmed the relative importance of the Eagle Plateau area for waterfowl breeding, with 76 percent of the waterfowl observations along the proposed highway route occurring within this ecoregion.

Comment 54:

The low number of waterfowl found in the spring survey should be discussed in terms of the heavy ice conditions at the time.

Response 54:

Section 6.2.3.1 of the EIS/CSR indicates that species diversity and numbers were fairly low during the early spring survey (May 9, 2002). These results were expected as much of the survey area was still ice or snow-covered when the survey was conducted. However, a number of areas on the larger rivers, fast flowing sections of streams, and inlets and outlets of most ponds had open water during the survey. Waterfowl were congregated together in these areas, providing useful information on sites where early spring staging occurs.

Comment 55:

It is stated that although suitable habitat for Harlequin Ducks exists along rivers that will be crossed by the highway, no breeding Harlequins were found. It should also be stated that these rivers may provide habitat in the future as the populations recover and expand their breeding range.

Response 55:

The following is added to the end of Paragraph 12 (i.e., the first paragraph in the sub-section entitled “Harlequin Duck”) in Section 6.2.3.1: *While no harlequin ducks were observed in apparently suitable habitat within the study area, these rivers may provide future habitat should the harlequin duck population further recover and expand their breeding range. It should be noted that even though the potential habitat appeared to be suitable for harlequin ducks, factors such as water quality may make rivers in this region unattractive as harlequin duck habitat. For example, Goudie et al. (1994) hypothesized that the dark*



coloration of water in southern watersheds suggests different water chemistry to those further north where harlequin ducks were observed.

3.4.3.3 Waterfowl (EIS/CSR Section 6.2.6.1)

Comment 56:

Although some species may use highway rights-of-way, use does not indicate a preference. These areas may be sub-optimal habitat or may be used by non-breeding individuals. Interpretation of ‘use’ data without additional information on the demographics of individuals using the area and in relation to use of other areas must be done with extreme caution.

Response 56:

Section 6.2.6.1 provides numerous examples of studies where waterfowl avoided highway rights-of-way in favour of other, less disturbed areas (i.e., Eberhardt et al. 1989; Gill et al. 1996; Keller 1991). One study was referenced that indicated use of highway rights-of-way by blue-winged teal (Greenwood et al. 1995). In this study, it was found that blue-winged teal nested most frequently in highway rights-of-way even though they represented only 2 percent of the landscape in the study area. In the same study, mallard ducks selected rights-of-way second only to “brush” habitat. The study area was composed of approximately 40 percent “cropland”, habitat not considered attractive to nesting ducks. However, the point is that the ducks were not so disturbed by traffic and human activity as to avoid using the highway rights-of-way to nest and, in fact, they selected it over other areas that were also considered suitable nesting habitat.

3.4.3.4 Mitigation (EIS/CSR Section 6.2.7)

Comment 57:

It is indicated that “removal of forest vegetation in areas where active nests are identified, (will occur) outside of the nesting period in sensitive areas.” It is unclear why avoidance of clearing during the nesting period would only be practiced in sensitive areas, as the *Migratory Birds Convention Act* (MBCA) applies to all migratory birds regardless of health of their populations. Again, clearing activity should not be undertaken when migratory birds are breeding or nesting.



Response 57:

The first bullet in Section 6.2.7 is revised to read: *Vegetation removal restricted to 30 m in the right-of-way, with removal of forest vegetation in areas where active nests are identified, occurring outside of the nesting period.*

3.4.3.5 Environmental Effects Evaluation (EIS/CSR Section 6.2.9)**Comment 58:**

The finding that environmental effects are “not significant (minor)” is not supported by the text. In addition, the rating does not consider cumulative effects and increased access. It also does not consider potential changes in hydrology (see Wetland section) that would irreversibly affect waterfowl habitat.

Response 58:

The text supports the environmental effects analysis presented in the EIS/CSR. While it is acknowledged that there will be effects on waterfowl and passerine birds as a result of highway construction and operation, with appropriate mitigation, these effects, including cumulative effects, are assessed to be minor (not significant). Similarly, any changes to wetland hydrology as a result of road construction are expected to be minor and will have negligible effects on nesting habitat for waterfowl in the region.

Comment 59:

Effects prediction cannot be made in isolation from cumulative effects. Increased access will likely change the forest landscape, primarily through forest harvesting. These changes will likely be considerable and will likely have significant effect upon forest bird populations.

Response 59:

As was noted in Section 6.2.10, forest harvesting activity is likely to occur following highway construction. However, forest harvesting plans themselves go through an environmental assessment process and, in this area, forest harvesting plans have been developed in consultation with stakeholders, including Innu Nation. Both the forest management planning process and the environmental assessment process provide for consideration of other resources, including forest bird populations. With appropriate management, forest harvesting should not have a significant effect on forest bird populations in the region. Refer to Appendix



E for further discussion on the issue of improved access and potential induced development and activities that may occur as a result of the TLH - Phase III.

Comment 60:

Any conclusions offered in the EIS/CSR must be predicated on provisions for ensuring survey results are reviewed in consultation with Environment Canada, and that mitigation and follow-up measures acceptable to the Responsible Authorities and Environment Canada are developed before work on the highway is allowed to proceed.

Response 60:

Canadian Wildlife Service (Newfoundland and Labrador) and WST agreed on a program of forest songbird surveys which was conducted in June 2003. The results of the surveys (point counts and atlassing in plots in representative ecoregions) will be provided to CWS. As per the agreement with CWS, no further follow-up measures are required for forest songbirds.

3.4.3.6 Environmental Monitoring and Follow-up (EIS/CSR Section 6.2.11)

Comment 61:

Environment Canada notes the commitment to conduct breeding passerine bird surveys prior to construction, currently scheduled for 2003. The proponent states that the purpose of the surveys is “to establish a baseline for possible future monitoring.” From Environment Canada’s perspective, the purpose of this survey effort is not only to provide baseline information, but also to identify the presence of any bird populations particularly sensitive to disturbance or habitat loss (e.g., rare species or species known to be in decline). Given that the current scheduling arrangements do not allow survey results to be incorporated into the EIS/CSR, provisions for ensuring an appropriate mitigation and follow-up program that will be in place before any work on the highway is allowed to proceed should be described. Such a mitigation and follow-up program must be acceptable to the Responsible Authorities and to Environment Canada and must include the following elements to be effective:

- methods quantifying habitat losses, and provisions for a review of these data by the Canadian Wildlife Service of Environment Canada;
- a description of the full range of available mitigation options including: adjustments to the highway corridor; modifications to clearing schedules and techniques during construction and maintenance phases; and on-site habitat creation or rehabilitation.



- a description of the circumstances under which each mitigation option would be considered and a commitment to mitigation implementation; and
- provisions for follow-up on effects accuracy and on mitigation effectiveness and a commitment to implement additional measures based on follow-up results.

Response 61:

Refer to Response to Comment 60 above.

3.4.4 Caribou

3.4.4.1 Boundaries (EIS/CSR Section 6.3.1)

Comment 62:

The total area (km²) should be indicated.

Response 62:

Project boundaries for caribou encompass the “traditional” home range of the MMCH, an area of 40,380 km². Refer to Figure 6.11 in the EIS/CSR.

Comment 63:

The statement on consistency of calving areas does not seem confirmed by information presented on the following page. If 60 % of females calve less than 15 km from previous calving locations and >30 % were less than 5 km from previous calving locations one would conclude a relatively high site fidelity given that 3 of the 6 collared animals moved >100 km in the approximately six month monitoring period. The issue of scale is not adequately addressed so interpretation of site fidelity data in relation to the impact area is difficult. Also, no indication is provided regarding the degree of movement exhibited by females within the calving grounds.

Response 63:

Unlike barren ground caribou, woodland herds do not tend to have a single calving ground which is used every year. Rather, woodland caribou females may travel to, and calve in, several areas within the herd’s range where particular landscape features (bogs, bare hills, forest stands) provide the forage, cover, and



opportunities for escape required during calving and post-calving periods. Woodland caribou (including the MMCH) may show relatively high fidelity to several such general calving areas within their range, and individual females may return to a particular general area each year to calve. As stated in the EIS/CSR (Section 6.3.3.3: Migration Patterns), telemetry monitoring of the MMCH in 2002 showed that two of the three collared females each traveled close to 100 km in different directions to calve in different parts of their range. A third collared female moved only a short distance to calve in a third area of the range.

Although woodland caribou females usually return to the same general portion of the range to calve, at the onset of calving they disperse and become solitary. They display varying degrees of attraction to specific calving sites that were occupied the previous year; some choose locations close to that of the previous year, others choose locations that are not at all close to the area they selected the previous year. There is no consistency in selecting the same specific calving location from year to year.

A number of studies have examined successive-year calving locations in woodland caribou. As reported in the EIS/CSR, Hearn and Luttich (1990) found that radio-collared MMCH females calved from less than 5 km (32 percent) up to 15 km (61 percent) from the calving location of the previous year. Schaefer et al. (2000) reported that the mean distance between the current and previous year's calving location of Red Wine caribou herd females was 23.1 ± 3.1 km. The most intense period of fidelity for female caribou from the Red Wine herd actually occurred during post-calving, when females returned as close as 6.7 km to locations occupied the previous year (Schaefer et al. 2000). Brown and Theberge (1985) recorded the following results after monitored calving locations of 11 radio-collared females from the Red Wine herd over three successive calving periods:

- 55 percent returned to within 10 km of the previous year's site each year;
- 36 percent returned to within 10 km of the previous year's site in two of the three years; and
- 9 percent calved in a different location each year.

The measure of woodland caribou fidelity to calving locations reported in the literature has been year-to-year comparisons only. This poses difficulties in assessing potential effect of development on calving. It is possible that females could move progressively away from the original calving site at annual increments, and be considerably distant from the original site after a few years. There would be no indication of this in year-to-year comparisons. One researcher, whose studies of site fidelity have been year-to-year, acknowledged that while it is possible that females exhibit some 'drift' over multiple years, his sense of this matter was that drifting is not a common occurrence (J. Schaefer, pers. comm.).

In order to interpret the relationship of site fidelity to the potential effect of the project on caribou, certain spatial scale information is required. For example:



- the intensity of site fidelity;
- area required by the female during calving;
- density of females in the calving area;
- amount of movement exhibited by females within the calving area; and
- the areas where potential caribou/development interaction will occur.

Some of this information is available: general data on site fidelity (from the literature); areas of potential caribou/development interaction (from the EIS/CSR (JW/IELP 2003) and Caribou Component Study (Otto 2002a)). Some density data are also available from the Caribou Component Study (Otto 2002a). However, the small sample size of collared animals in the 2002 and 2003 telemetry studies of the MMCH prevented the collection of an adequate amount of information on site fidelity and movement within the calving area.

Fidelity to a particular space may confer individual ecological benefits, such as familiarity with resources and avoidance of predators. It is possible that animals moving further afield will encounter increasingly novel habitats and potentially experience reduced fitness (Schaefer et al. 2000). However, the supposition that site fidelity may confer reduced predation risk to females and their calves has not been tested (Schaefer et al. 2000). Mahoney and Schaefer (2002) and Nelleman and Cameron (1998) indicate that if disturbance occurs in part of a herd's range, caribou (including calving females) are known to relocate to undisturbed portions of the range. No information on the productivity of relocated animals was provided.

3.4.4.2 Methods (EIS/CSR Section 6.3.2)

Comment 64:

The study area is very narrow. Given that caribou are mobile and that the initial telemetry data indicates considerable variability in movement patterns, a 20 km study area (as opposed to 2 km) centered on the highway would be more appropriate. More information should be presented here on the history and historic range distribution of the herd. Local traditional knowledge should have been incorporated into the discussion. There is very little empirical data presented on movement parameters. The terms 'near,' 'relatively sedentary' and 'widely dispersed' are used often, without quantification of the distances involved. Without more specific information, assessing the potential effects is not possible.

Response 64:

The 2-km wide zone was considered to be the zone of influence (i.e., the likely extent of anticipated physical, visual, and auditory influences of the project on caribou). The assessment of project effects on the MMCH extend to their entire range.



Sections 6.3.3.1 (Herd Range) and 6.3.3.2 (Herd Abundance) of the EIS/CSR provides a reasonable amount of historic information on the distribution and abundance of the MMCH. The study team was not presented with an opportunity to discuss traditional knowledge of the herd's range and abundance with local aboriginal groups.

Armitage and Stopp (2003) provide a summary of Innu traditional knowledge of the herd. Historically, a large calving area was known to extend from the headwaters of the English River south to the Eagle River. Calving also took place in the area around Crooks Lake and Eagle Lake. Otto (2003) indicates that calving continues to take place in these areas.

Historic data on MMCH distribution from Science Division files reveal that the eastern Mealy Mountains and the Strand-Flatwaters Brook areas contained the highest densities of caribou in winter (Otto 2003). The historic distribution also included the presence of smaller groups of caribou in the region extending from the Kenamu River, east through the Mealy Mountains, and along the southern shore of Lake Melville (Otto 2003).

Comment 65:

The study was conducted by the Science Division, not the Inland Fish and Wildlife Division. VHF collars were used in the study, not satellite collars. There were four females collared and two males collared, not six females.

Response 65:

As noted previously in this addendum (i.e., in the response to Comment No. 1 in Section 3.0 of this addendum), the caribou study was conducted by the Science Division of the Department of Tourism, Culture and Recreation. Therefore, the fifth sentence of Paragraph 1, Section 6.3.2 is amended to read: *Data on spring distribution, and calving and post-calving distribution of the MMCH in 2002 (March 26 to August 31) were obtained from the study on caribou conducted by the Science Branch of the Department of Tourism, Culture and Recreation.*

The sixth sentence of Paragraph 1, Section 6.3.2 is amended to read: *VHF collars were fixed to four female and two male caribou, and the movement patterns of each individual were recorded from March to August 2002.*



3.4.4.3 Herd Abundance (EIS/CSR Section 6.3.3.2)

Comment 66:

The survey information indicates five discrete groups were located around Park Lake and two smaller groups were located at the coast. The number and composition of these groups should be provided. More detailed information on the dates when observations were made, the number of hours spent flying, the numbers of animals seen in each location, etc. would facilitate the assessment. A comparison of the survey and classification results for this herd with information from other woodland caribou herds in the area and from historic classification results for this herd with information from other woodland caribou herds in the area and from historic classifications conducted on the MMCH would provide a better background against which to judge current information. It is unclear why a male:female sex ratio of 1:2 would suggest high survival rates or how this would necessarily result in a large increase in population size. More information is required on other demographic parameters such as birth rates, recruitment rates and mortality rates in order to make conclusions regarding the population trajectory of the herd.

Response 66:

The number and composition of these groups, and the dates on which the observations were made, can be found in the documents (in particular, Appendix 1 of Otto 2002a). The following is information on group size, location, and dates for the spring 2002 classification (Otto 2003):

Date	Group Size	Latitude	Longitude
April 6	4	53.7	57
April 6	29	53.3	55.9
April 6	17	53.2	56
April 7	14	53.9	57.3
April 7	55	53.9	57.2

No data are available on the specific lengths and duration of the flight transects. During the surveys, much time was spent outside the planned transect, slowing or circling to inspect animal sign (Otto 2003).

Historical population estimates for the MMCH were provided in Table 6.7, Section 6.3.3.2 (Herd Abundance) of the EIS/CSR. No reliable older historical classification data for the MMCH are available. The more recent historical classification information is provided below (Otto 2003). The 2002 spring classification data (Otto 2002b) have been included.



Year	Season	Stags	Does	Calves	Stags/ 100 does	Calves/ 100 does	% Calves
1981	Winter	118	227	86	52	37.9	20
1985	Spring	227	359	172	63.2	47.9	22.7
1985	Fall	46	118	37	39	31.4	18.4
1987	Winger	431	698	242	61.7	34.7	17.7
1989	Spring	218	420	89	51.9	21.2	12.2
1990	Spring	398	725	125	54.9	17.2	10
1992	Spring	98	291	35	33.7	12	8.3
1994	Spring	119	290	62	41	21.4	13.2
2002	Spring	28	56	34	50	60.7	28.8

A literature search for historic classification information on other woodland caribou herds in the area was conducted. No relevant additional information was found.

The male:female sex ratio of 1:2 suggests that survival rates for the MMCH are high because it has been generally observed that female caribou have a natural longer life span than males. Maximum longevity for female caribou approaches 20 years (oldest known age for a female caribou in Labrador is 16 years), compared to 10 to 12 years for males (Otto 2003). As caribou survive to adulthood, sex ratios will skew to favour females. When herds are subjected to predation or some other causative agent of premature death, males are a more likely target than females. From 12 months of age onward, Alaskan male caribou are more vulnerable to mortality than are females. Some yearling males leave the relative safety of the cow-calf segment of the herd to join the adult bulls (Skoog 1968). In addition, male characteristics such as fighting, lack of alertness, and a tendency to remain alone or in small groups of stags, have an adverse effect on survivorship. If sex ratios approach 1:1, the inference can be that survival rates are relatively low, with few animals surviving beyond 10 to 12 years (Otto 2003). Thus, the usual shorter life span of males is less important to the capacity of the herd to expand than is the longer life of females (Otto 2003).

The only information available on other demographic parameters such as recruitment rates and mortality rates of the MMCH are the historic classification data provided above (Otto 2003; 2002b). From 1981 to 1987, the percent calves among the animals classified surpassed the 15 percent calf recruitment considered by Bergerud (1994) as being necessary to maintain herd numbers. The percent calves declined between 1989 and 1992, but was climbing toward the 15 percent level by 1994 and reached 28.8 percent in 2002. This would normally indicate a herd whose population is increasing. The presence of yearlings in the spring would probably be a good measure of recruitment to the herd; However, as indicated in the EIS/CSR and



in Otto (2002b), since data such as the age structure of the herd are unavailable, the status of the population is questionable.

3.4.4.4 Migration Pattern (EIS/CSR Section 6.3.3.3)

Comment 67:

This section needs clarification. Only six animals were collared. Number, rather than percentages, should be used here. The 70% of the locations that were more than 40 km north of the highway may well represent only two or three animals. Different symbols should be used for each of the animals to facilitate the assessment of movement patterns. An indication of the actual date when each point was collected would facilitate the evaluation of movement rates.

Response 67:

The number of relocations per collared animal ranged from seven to nine. Four animals (one male and three females) represented 70 percent of the locations 40 km or more north of the highway. Twenty percent of locations within 40 km of the highway, on the north side, were of three animals (one of the females from the 70 percent group, plus another female and a male) and 10 percent of locations south of the highway were of two animals (the second female and the male that also represented most of the relocations in the 20 percent group).

During the May 29 to August 31 period discussed here, the 70 percent group ranged over an area approximately 125 km (east-west) by 35 km (north-south). The 20 percent group mostly occupied a 50 km x 25 km area east of Park Lake; one relocation (the female that was also south of the highway) was recorded near the Kenamu River. The 10 percent group ranged from Cartwright Junction for approximately 60 km toward the south-west; the north-south dimension of this area was approximately 35 km.

3.4.4.5 Existing Knowledge (EIS/CSR Section 6.3.6)

Comment 68:

The literature review for this section is not complete. There is a significant body of recent literature on the impacts of both linear and other developments on caribou. The more recent literature indicates effects of development that are subtle but that have the potential to result in population level changes in caribou herd dynamics. Information from this more recent body of literature should be included in the EIS/CSR. As well, many of the studies on caribou in Newfoundland have been conducted on populations that were increasing.



The effects of development on a caribou population that is decreasing or stable may be very different than the effects observed on a population that is increasing.

Response 68:

Recent literature does not contribute significantly to the general, and long-held, views regarding the basic behavioural response of caribou to linear and other developments. However, recent studies have been more focused on particular aspects of the response (i.e., site fidelity of female caribou (particularly during calving), individual versus group response, interactions across space and time). In addition, where most of the earlier understanding of caribou/development interactions was based on studies of barren-ground animals, some recent work has been with woodland/sedentary caribou.

In the recent papers which discuss caribou/development interactions, the developments being assessed for their effects on caribou are generally characterized by complex infrastructure, broad disturbance footprints, and intensive activity. This contrasts with the single linear character of the TLH - Phase III project.

The following text is added to the end of Section 6.3.6 of the EIS/CSR:

Farnell and Gardner (2003) review the status of the Chisana caribou herd, a rapidly declining woodland caribou herd that ranges across the Yukon-Alaska border. The range of the herd lies in a protected area where there are no roads or development and no hunting. Herd numbers fell from approximately 1,800 animals in the 1980s to less than 275 animals in 2003. The calf recruitment rate dropped from 39 per 100 cows in 1988 to 8 per 100 in 1989, averaging 6 per 100 cows since that time. In 1992, only one calf was observed. Older caribou now account for more than 70 percent of the herd.

Over this same period, the male:female sex ratio declined from 36.4 stags/100 cows in 1987 to 17.2 stags/100 cows in 1999. Although wolf density has not changed since the late 1980s, predation by wolves, grizzly bears, coyotes, and golden eagles exacerbated the decline. Weather and poor forage quality appeared to also be factors in the poor calf production and survival. It was concluded that, if these patterns of survival persisted, the herd would be extirpated or nearly extirpated in the near future.

Mahoney and Schaefer (2002) investigated the effects of hydroelectric development on the movements and space-use of animals from the Buchans Plateau Caribou Herd (BPCH) in west-central Newfoundland. The Star Lake project was constructed directly in the herd's migratory pathway, between its calving/summer range in the north and its winter range in the south. Patterns of range use, site fidelity, and migration timing of radio-collared caribou were compared before, during, and after project construction. Relative timing of migration to, and departure from, the calving and summer grounds before the project was individual-specific



and was predictable. This predictability was less certain during development. The year-to-year consistency of fall and spring migration among individuals was apparent before and after construction, but was not as consistent during construction.

Prior to construction, more than 50 percent of the collared caribou were found within 3 km of the site each year. During construction, less than 25 percent of the collared animals were located within 3 km of the site. This situation persisted until two years after construction. The variation in calving site fidelity observed during the study was attributed to year-to-year differences in snowfall. Mahoney and Schaefer (2002) concluded that the development caused a temporary disruption of migration timing during the construction period, and may cause longer-term diminished use of the range immediately surrounding the project site. The behaviour by the BPCH after construction is consistent with previous studies in that caribou appeared to be more sensitive to the human activities associated with construction, traffic, and noise than to the infrastructure itself. However, it was hypothesized that disruption of movement might be harmful with respect to herd demographics, where human activities are protracted in either time or space (Mahoney and Schaefer 2002).

Schaefer et al. (2001) examined the spatial and temporal changes in range use and mortality within the Red Wine Mountains Caribou Herd (RWCH), a Labrador woodland population that declined by approximately 75 percent from the 1980s to the 1990s. The study revealed that the RWCH could be broken down into four subpopulations, which were disproportionately affected by the decline. The northern and western subpopulations (which comprised 50 to 60 percent of the Red Wine population in the early 1980s) displayed the greatest range overlap with the George River Caribou Herd (GRCH) and lost animals to this herd. These subpopulations experienced a comparative reduction in activity, increased mortality, and a decline in calving activity.

The subpopulations with the least overlap on the GRCH range displayed a reverse pattern. The southern subpopulation comprised over 50 percent of Red Wine animals in the early 1990s, exhibited less mortality, and had greater calf production. The eastern subpopulation showed a mixed pattern of change in that it showed an increase in calf production and overall population, although mortality increased. This mortality increase was likely the result of the availability of alternative ungulate prey (moose), which led to heightened incidental predation by wolves. Thus, the population decline of the RWCH was associated with predation, reduced survival of adult females, lower recruitment, and emigration to the migratory GRCH.

Dyer et al. (2001) evaluated the response of woodland caribou to petroleum development in northern Alberta. Infrastructure associated with such development included a dense network of roads and seismic lines, as well as numerous wellsites.



The level of avoidance of infrastructure appeared to be related to the level of human activity present. The maximum avoidance distances recorded for wellsites were 1,000 m and for roads and seismic lines, 250 m. Avoidance of roads was highest during late winter (the period of highest traffic levels with 600 to 800 vehicles per day) and lowest during summer (less than 100 vehicles per day). Road avoidance distances were also near the maximum during the calving period. However, in all time periods and in all habitat types, the use by caribou of habitat within 250 m of roads was not substantially different from use of habitat 3,000 m from the road.

Dyer et al. (2001) point out that avoidance behaviour may result in functional habitat loss for caribou. Using the avoidance distances determined by this study, and overlaying those distances on the infrastructure network, it was calculated that 48 percent of the study area could be used less than expected by caribou in winter (the period of greatest avoidance). If caribou were to be displaced into less suitable habitat, lower productivity may result. Displacement may also lead to crowding into undisturbed areas, which may make caribou distribution more predictable in time and space and thus make them more vulnerable to predation and human hunting. The spacing-out of females during calving provided a reduced predation risk. The study acknowledged that linking habitat loss to declines in woodland caribou populations remains controversial. For example, after many years of industrial development on Alaska's North Slope, herd-level effects from developments on caribou have not been detected (Dyer et al. 2001).

Smith et al. (2000) examined the responses of radio-collared migratory woodland caribou to winter timber harvesting on the herd's range in west-central Alberta. The size of the winter range changed very little throughout the 15-year study period, although individual home range size was reduced. However, the distribution of caribou relative to progressive timber harvesting did change. Animals moved away from active cut blocks, followed by a partial return to the pre-logging distribution after six years of logging. Daily winter movement rates were reduced as logging progressed, primarily because the landscape was becoming increasing fragmented by roads and cut blocks. Although there was no avoidance of fragmented areas during the early stages of logging activity, there was considerable avoidance of such areas after 12 years of harvesting. By this time cut blocks made up 3.6 percent of the study area, and 11 percent of the winter range was fragmented. While it was acknowledged that snow depths and wolf predation may also have influenced movement rates, the highly fragmented winter habitat was considered to be a major factor in reducing both home range size and movement rates, and may have compromised the "spacing out" anti-predator strategy of caribou.

Schaefer et al. (2000) evaluated consecutive-year site fidelity (the proportion of animals returning to a specific site or range) of satellite-tracked woodland/sedentary (RWCH) and migratory caribou GRCH at two spatial scales: total herd range and seasonal range. At the total range scale, both sedentary and migratory caribou displayed site fidelity from calving (late May) to breeding (late October), despite a 30-fold difference



in size of their population ranges. The most intense fidelity occurred during post-calving when, on average, sedentary and migratory females returned to as near as 6.7 km and 123 km, respectively, of locations occupied the previous year. The 123 km distance can be considered to be a display of fidelity only because of the scale. The designation of how close an animal must return to its previous location is often arbitrary.

At the seasonal range scale, woodland caribou still displayed fidelity from calving to breeding, although not during winter. The mean distance between consecutive-year locations of individuals during winter was approximately 50 km. Barren ground caribou exhibited fidelity at the seasonal range scale only during the fall breeding period. Although migratory females returned to their traditional calving grounds each year, they did not select precise locations within these grounds (average distance from the previous year's location was 123 km). During winter, average distances between consecutive-year locations of individual barren ground caribou were 400 to 450 km. Site fidelity may confer reduced predation risks to females and their calves. However, this has not been tested (Schaefer et al. 2000). Nevertheless, it can be surmised that as females move further afield to calve, they may encounter increasingly novel habitats and potentially experience reduced fitness. However, in this study, no association was observed between reproductive success and the strength of calving site fidelity (Schaefer et al. 2000).

Duchesne et al. (2000) assessed the effects of ecotourist visits during winter on the behavioural time budgets of woodland caribou in the Charlevoix World Natural Heritage Biosphere Reserve, Québec. The Charlevoix herd is the only successful introduction of caribou in the presence of wolves in North America. Skiing or snowshoe tour groups of 5 to 19 people visited the caribou once a week for 11 weeks (January to March). A tour guide instructed the group to remain close together and to avoid loud talking or rapid movements. Each tour lasted an average of 39.3 minutes. The group viewed caribou from a distance of 10 to 15 m.

Caribou did not leave the wintering area because of human presence, although they did abandon the range twice in response to the presence of wolves. During the early part of the study, particularly with the larger tour groups, the animals spent less time foraging and more time in a state of alertness. After three weeks, the caribou were spending less time in a state of alertness and more time foraging when the tour groups were present. Duchesne et al. (2000) suggested that, although the number of visits was low, the caribou appeared to habituate to human presence.

James et al. (2000) examined the hypothesis that linear corridors would increase human harvest and predation pressure on woodland caribou in northeastern Alberta. Generally, the trend within the caribou population studied was to avoid the large number of linear structures in the region. However, there was no evidence that habitat was a limiting factor for caribou in the study area. In terms of increased pressure on caribou, it was found that caribou occupying habitat near linear corridors were at higher risk of predation by wolves than



were caribou farther from the corridor. Mortalities caused by humans were not substantially greater closer to corridors.

Bradshaw et al. (1997) evaluated the effects of simulated petroleum exploration (i.e., loud noise produced by seismic surveys) on the movement and behaviour of radio-collared woodland caribou in a two-year study in northeastern Alberta. The noise (ranging from 90 to 110 decibels measured approximately 2 m away) was produced by a propane canon. These surveys involve an unpredictable series of events, a situation which is considered to be most disturbing to caribou. Exposed caribou moved away from the sound considerably faster than did control animals (2.3 km/hr versus 1.6 km/hr), but not substantially farther away (i.e., the linear displacement caused by the sound was not substantially when compared with the controls). Also, the disturbances did not substantially affect the proportion of time allocated to feeding. However, the study cautioned that the effects of disturbance are difficult to evaluate for caribou because range shifts tend to occur naturally over decades. The cumulative effects of repeated encounters with noise disturbance may greatly alter the use of traditional range (Bradshaw et al. 1997).

Nellemann and Cameron (1998) investigated the changes in distribution and range use of calving barren-ground caribou faced with an increasing density of roads in an oilfield development area in Prudhoe Bay, Alaska. The greatest effects of oilfield development on caribou are attributed to initial construction of the road complex and related facilities. Caribou density declined by 63 percent at road densities of 0.0 to 0.3 km road/km² and by 86 percent at road densities of 0.6 to 0.9 km road/km². At the latter road density, cow-calf pairs were virtually excluded. The avoidance response detected in the study may be due to the preponderance of females and calves in the populations surveyed. Males and yearlings did not display such avoidance of these areas.

The rugged terrain in the Prudhoe Bay study area was strongly preferred for calving. As availability of such terrain declined, caribou did not abandon these portions of the range. Rather, they intensified their use of the preferred patches. However, as opportunities for optimal foraging continued to diminish, there was a redistribution of some calving activity from the oilfield development site to areas of undisturbed rugged terrain farther inland. While this redistribution could favor foraging, it might result in higher rates of predation (Nellemann and Cameron 1998).



3.4.4.6 Mitigation (EIS/CSR Section 6.3.7)

Comment 69:

More information should be provided on the mitigation associated with blasting. How will the proponent determine if caribou are in the area? What criteria will be used to halt activity in the area? What area will be examined for caribou? Will the mitigation be applied over the entire construction period?

Response 69:

An example of a potential blasting mitigation strategy that may be suitable for application to the construction phase of the TLH - Phase III was developed by the Wildlife Division and Newfoundland Labrador Hydro for use during construction of the Upper Salmon hydroelectric development. A synopsis is provided below.

The Upper Salmon strategy was a response to the concern over blasting during the calving and post-calving periods (May-July), spring migration (May), and fall migration (November). The intent was to protect “significant” numbers of caribou which might be in close proximity to a proposed blast. There were three elements to the strategy:

- selecting a “critical zone(s) ” distance around the blast;
- establishing criteria (number of animals within the “critical zone”) for activating the strategy; and
- establishing methodology to accurately determine the number of animals in the “critical zone(s) ”.

It was recognized that the life cycle activities were not equally sensitive (i.e, calving versus migration). Hence, zone size varied during the year. Zone A surrounded the worksite and Zone B surrounded Zone A. The sensitivity criteria for Zones A and B, by period, are shown below:

Period	Sensitivity Criteria			
	Zone A		Zone B	
	Worksite Radius	Caribou #'s	Worksite Radius	Caribou #'s
Calving	0.75 km	1% of herd	3.00 km	5% of herd
Post-Calving	0.50 km	1% of herd	2.25 km	5% of herd
Migration	0.25 km	1% of herd	1.50 km	5% of herd

The differences in the scale of activity and the demographics of the caribou between the two developments (Upper Salmon and TLH - Phase III) suggest that a less comprehensive strategy would suffice for highway



construction. The Upper Salmon development was quite intensive and was located in the middle of traditional range heavily used by animals from the Grey River herd and, to a lesser extent, from the Sandy Lake herd, during post-calving and rut. Together, these herds numbered a little over 5,000 animals at the time

The MMCH is possibly only a third (or less) the size of the Grey River herd. The highway is generally located at the southern boundary of the herd's range. Most of the herd's activities throughout the year are north of the highway, and the animals are generally dispersed in small groups over several thousand square kilometres. The great majority of the relocations of radio-collared animals, as well as aerial survey observations of uncollared caribou, confirm this. Pathways of movement to seasonal range are also mostly north of the highway, and the predominant direction of travel is east-west, and generally does not intersect the highway route.

Based on the results of previous surveys and on historical knowledge of the MMCH's distribution (Otto 2002b), 80 percent of the TLH - Phase III lies within the low density stratum of animal occurrence that comprises approximately 83 percent of the historic range. A 50-km section of the proposed route just east of the Kenamu River falls inside a high density stratum. The sensitive calving and post-calving periods will be the focus of blasting mitigation during highway construction. Ground observations by the project monitor and other project personnel in a 0.75-km radius around the blast site, and consultation with Science Division officials, will provide the information on caribou presence in the area. The work stoppage and work alert protocol used will be the same as that used at the Upper Salmon hydroelectric project. The blasting mitigation strategy will be applied for all periods of blasting over the entire construction period.

The list of specific mitigative measures in Section 6.3.7 and Table 6.9 of the EIS/CSR are amended by adding the following mitigative measures:

- blasting areas will be surveyed for caribou and other wildlife species, if any wildlife are observed in the immediate area, blasting activities will be postponed;
- guidelines for mitigating effects of blasting activities on wildlife will be developed in consultation with Inland Fish and Wildlife Division;
- uncontrolled blasting caused by failed discharges or otherwise will be reported immediately to the appropriate authority; and
- where uncontrolled blasting results in degradation to terrestrial habitats, mitigative measures as recommended by the regulatory agency responsible will be implemented.

Refer also to responses provided to Comments No. 24 and 25 in Section 3.2.10 fo this addendum.



3.4.4.7 Environmental Effects Assessment (EIS/CSR Section 6.3.8)

Comment 70:

Without better information on habitat selection, habitat use and movement patterns the assertion cannot be accepted that the habitat at the periphery of the range (which cannot currently be defined with any accuracy) is marginal or less critical than other habitat. Caribou use different portions of the range during different seasons. Critical range areas may lie at the periphery of the entire range area.

Response 70:

Better information on habitat use and movement patterns would certainly provide answers to the question of preferred range. However, the available information suggests that the MMCH, a population that may be stable or in decline, currently appears to occupy the central part of its historic range. Skoog (1968) proposed the “center of habitation” idea, that the central portion of a herd’s range was the focus of its activities and the most favorable portion of its range during periods of low numbers. When or if the MMCH increases, the herd would expand to use more marginal parts of the traditional range; however, the center of habitation would remain the focal point. Peripheral areas would come into use when MMCH numbers increase, and such areas would become important (perhaps even critical) at that time. Perhaps the center of habitation/peripheral area concept cannot be readily applied to the more sedentary, solitary, non-aggregating nature of woodland caribou.

3.4.4.8 Construction (EIS/CSR Section 6.3.8.1)

Comment 71:

Recent work by Schaefer et al (2002) indicates that caribou may not habituate quickly to disturbance. The majority of the Mealy Mountain Caribou range has been previously undisturbed. Construction and operation activities associated with the highway are going to introduce a significant new component to the caribou range. Issue can be taken with the conclusion that caribou in disturbed areas will select an alternate undisturbed site and that no reduction in herd productivity is anticipated. If this conclusion is based on work that has been conducted elsewhere that clearly demonstrates there is no decrease in caribou productivity associated with development of a similar nature, that study should be cited explicitly and the data on pre- and post- development productivity estimates should be provided.

Work done by Hill (1985) and Mahoney (1985) were on woodland caribou in Newfoundland. During this time, Island caribou populations were increasing rapidly. The population status of the Mealy Mountain Herd



remains unclear and the herd is designated as “Threatened.” The scientific basis for concluding that MMCH will likely reoccupy areas that were disturbed during construction based on data from Island populations in an expansion phase is weak. To verify this assertion, data from more recent studies on animal response to disturbance for declining caribou populations should be used.

Data on only six animals, four females and two males, does not provide sufficient information on which to base any conclusions regarding habitat use patterns or the potential effects of the road, particularly during the sensitive calving and post-calving periods.

Response 71:

The EIS/CSR pointed out that the construction and operation of the TLH - Phase III would introduce a new component to the range of the MMCH. It is acknowledged that research by Hill (1985) and Mahoney (1980) (referred to as Mahoney (1985) in Comment 71, indicated that herds were increasing. Studies by Dyer et al. (2001), James and Stuart-Smith (2000), and Bradshaw et al. (1997) show that the general behaviour of caribou to linear development is similar whether the population is increasing or decreasing. This general behaviour includes the ability, in most cases, to habituate to the disturbance. This may not, and perhaps rarely does, occur quickly (that is, in a matter of days). Habituation implies that a continued exposure over a period of time, perhaps weeks or months, is involved.

Mahoney and Schaefer (2002) (referred to as Schaefer et al. (2002) in Comment 71 suggested that the primary adaptation of caribou to unfavourable disturbance of the herd’s range may be to relocate to undisturbed habitat, if available. Undisturbed habitat would appear to be available to the MMCH. Nellemann and Cameron (1998) observed the redistribution of calving caribou from disturbed sections of range to undisturbed areas farther away. No pre- and post-development productivity estimates were provided in these studies. However, Bergerud et al. (1984) concluded that there was no convincing evidence that the eight caribou herds investigated in their study showed any decline in productivity from disturbance activity and habitat alteration. Northcott (1985) indicated that although caribou numbers declined in the Upper Salmon Development Area during the construction period, productivity of the Grey River herd was not affected.

3.4.4.9 Environmental Effects Evaluation (EIS/CSR Section 6.3.9)

Comment 72:

The conclusion that the residual environmental effects will be minor (not significant) is not well substantiated by the information presented in the EIS/CSR.



Response 72:

Refer to Response to Comments No. 68 and 71.

Comment 73:

Table 6.9 indicates that the level of confidence in the effects prediction is high. Based on the information presented, the evaluation is debatable. The Caribou Component Study submitted for the highway indicates there is insufficient information to assess effects, therefore the conclusion of a high level of confidence in the evaluation is unsubstantiated.

Response 73:

The Caribou Component Study (Otto 2002a), the Caribou Study Progress Report (Otto 2002b) and the addendum to the Caribou Component Study (Otto 2003) reported that the patterns of habitat use exhibited by the radio-collared MMCH animals, including during the calving and post-calving periods, were consistent with the historic habitat use patterns of the herd. Also, there is considerable literature on the reaction of both migratory and sedentary/woodland caribou to linear structures and other developments. This body of literature, combined with the experience of the study team, allows for a high level of confidence in the evaluation of residual effects.

3.4.4.10 Cumulative Environmental Effects (EIS/CSR Section 6.3.10)**Comment 74:**

More discussion needs to be provided on options for mitigating the effects of increased access on caribou populations. According to the opinions of resource agencies resources available to agencies for enforcement are limited and the potential for adverse effects does exist.

Response 74:

Refer to Appendix E of this addendum for further discussion on this subject.



3.4.4.11 Environmental Monitoring and Follow-up (EIS/CSR Section 6.3.11)

Comment 75:

A monitoring program must be developed to evaluate the effects predictions generated in the EIS/CSR. At a minimum, evaluation of habitat use must be made for calving and post-calving both pre-construction and post-construction. As well, a monitoring program should be developed to assess the ability of animals to cross the highway once it is constructed. The Inland Fish and Wildlife Division should be consulted for the development of appropriate monitoring protocols.

Response 75:

With respect to monitoring, refer to the response in Comment 44 for further information. Additional survey work on caribou was carried out by the Science Division of the Department of Tourism, Culture and Recreation from June to September 2003, specifically to provide information on herd movements during the calving and post-calving period.

3.4.5 Furbearers

3.4.5.1 Mitigation (EIS/CSR Section 6.4.7)

Comment 76:

Mitigation should specifically provide for surveys to be conducted for active beaver ponds prior to each construction season. A 30 m treed buffer should be maintained on all active beaver ponds.

Response 76:

WST has committed to conducting an annual pre-construction survey for active raptor nests. Active beaver ponds within 100 m of the highway can also be identified during this survey. Field personnel will also be instructed to note any active ponds in the logbook with any other wildlife sightings. Where topography allows, a 30-m treed buffer will be maintained on any active beaver ponds.

The list of specific mitigative measures in Section 6.4.7 and Table 6.11 of the EIS/CSR are amended by adding the following mitigative measures:



- *the annual pre-construction survey for active raptor nests will also involve a survey for active beaver ponds within 100 m of the highway;*
- *where topography allows, a 30-m treed buffer will be maintained on any active beaver ponds; and*
- *field personnel will also be instructed to note any active beaver ponds in the logbook along with any other wildlife sightings (the Inland Fish and Wildlife Division will be consulted for direction on the development and maintenance of the logbook).*

3.4.5.2 Environmental Effects Evaluation (EIS/CSR Section 6.4.9)

Comment 77:

Table 6.11 indicates that Environmental Effects Evaluation of construction and operation is Not Significant (Minor). Relate this conclusion to the finding described in the Tourism and Recreation Component Study that tallymen reported the disappearance and growing scarcity of certain species along a corridor 10 km wide on both sides of the main road system for the La Grand hydroelectric development. Clarify also why the Environmental Effects Criteria Ratings describe effects as irreversible, considering that effects have been described as Not Significant (Minor).

Response 77:

The results presented in Table 6.11 refer specifically to the effects analysis carried out on furbearers in the vicinity of the proposed TLH - Phase III preferred route. The conclusions of the analysis are not immediately comparable to the finding described in JW (2003b). The finding regarding tallymen observations presented JW (2003b) in the Tourism and Recreation Component Study, is based on anecdotal information and opinions. No information was available on whether formal baseline surveys were conducted before the road was constructed or follow-up monitoring conducted after the road was operational. Without supporting data of this nature, the statement does not provide support for any other conclusion regarding waterfowl and the TLH - Phase III preferred route than what has already been determined.

While the effects on furbearers for construction and operation of the highway were determined to be irreversible, the magnitude (i.e., nature and degree) of the predicted environmental effect was determined to be low and the area over which the effect was predicted to occur was determined to be relatively small compared to the large area crossed by the highway. Therefore, the overall effect on furbearers was determined to be not significant (minor).



3.4.6 Fish and Fish Habitat (EIS/CSR Section 6.5)

3.4.6.1 General Comments

Comment 78:

The opening statement of this section says ‘several species of fish are present....’ There are 20 species listed.

Response 78:

The opening statement of this section is amended to read, “*As many as 20 species of fish are present in the numerous lakes, ponds, rivers and streams of the region; however, only half that many, or less, are common.*”

Comment 79:

Baseline information for fish and fish habitat is not well quantified. Similarly, the value of this resource to the outfitting industry and its contribution to the local economy is not adequately characterized. To assume that enforcement agencies will have adequate resources in place after the highway is constructed to monitor fishing activities may not be realistic. Further collection of baseline information to quantify the effects, and more comprehensive mitigative measures to ensure the protection of this resource, is required.

Response 79:

The outfitting industry is described under the section on resource use within the limits of available information (Section 6.12 in EIS/CSR). Information on the value of the fish resource to this industry is not available, nor is the value to the local economy. This could be considered a data gap as an economic analysis of the outfitting industry has not been conducted.

“To assume that enforcement agencies will have adequate resources in place after the highway is constructed to monitor fishing activities may not be realistic” is speculative and has not been supported by discussions with DFO.

The VEC in this section of the EIS/CSR is fish and fish habitat. Further baseline information, mitigative measures and assessment of the outfitting industry is not appropriate in this section as that is a different VEC and the effects on one VEC could be positive while the same effect could be detrimental to another VEC. Resource use is addressed in other sections of the EIS/CSR (e.g., Sections 6.12 and 6.14).



Comment 80:

The EIS/CSR does not describe key features of the area's recreational fishery and use the precautionary assumption that the recreational fishery's ability to compete on these features is fragile. These features include: fish size, variety and catch rate together with length of the fishing season; pristine surroundings; level of angler crowding and type and quality of services. It also does not discuss the level to which these features can be degraded and still maintain the viability of the lodges in the area. Specifically, a description of the trophy nature of the brook trout stocks on the Eagle River Plateau, their fragility and the likelihood that increased access will attract sufficient fishing effort to threaten their sustainability is required.

Response 80:

Again, this comment relates to a different VEC (i.e., anglers and outfitting as resource user groups).

Ninety-five percent of the recreational anglers in Labrador were resident, based on data from 2000. This proportion is up from 84 percent in 1995 and 84 percent in 1990. The relative value of fish size, variety and catch rate, pristine surroundings, level of angler crowding and type and quality of business are all subjective and data have been collected through surveys conducted by DFO. Residents of Labrador placed the highest value equally on water quality and the absence of pollutants in fish. Angler crowding was the next highest concern, followed equally by places to fish from shore and the size of fish. The lowest rating of the factors offered in the survey was for natural beauty of the area. Three percent of anglers were non-resident (foreign), and presumably made up most of the outfitter clientele. These people put the highest value equally on water quality and lack of crowding, followed equally by natural beauty and lack of pollutants in fish, followed by size of fish and then places to fish from shore. The remaining anglers were non-resident Canadians whose choices fell between the other two groups.

The thrust of the comment then switched to the viability of lodges. It is difficult to speculate on the level to which these features can be degraded, if in fact they will be, and still maintain the viability of the lodges in the area. Many of the lodges are quite removed from the route so the degree of degradation of service or feature many vary from nil to some greater value. The integration of this with a comment on the viability of outfitter operations is confusing because most anglers do not avail of outfitter camp services.

In regard to fish and fish habitat, specific information is not available on the trophy nature of brook trout stocks on the Eagle River Plateau. Information is being obtained from a sampling program by Inland Fish and Wildlife Division in a program that was started in 2003 and will continue in the next few years. Preliminary data on the 2003 results are not yet available. The fragility and sustainability of these stocks have not been determined.



Increased access to fish resources has been predicted to occur, and this would be a positive effect for resource users (i.e., recreational anglers). DFO has recognized that overexploitation of the brook trout resource could be a threat to the sustainability of some localized stocks and they have accordingly commenced program modifications to regulate and mitigate that possibility. The deficiency statement provided to WST in April 2003 states: *Regarding the need for increase management measures to address potential effects on fish resources, DFO recognizes that new management approaches will be required to address the issues arising from Phase III of the Trans Labrador Highway. A regulatory amendment which will allow individual species management (in contrast to the current multi-species approach) is anticipated to be in place this year, and this will be a key component of DFO's management strategy for this area. In the fall of 2003, DFO will begin consultations with user groups, including aboriginal groups, in the development of its new five year management plan. DFO commits to the maintenance of aboriginal access to the resource for food, social and ceremonial purposes. The department has already had preliminary discussions in Goose Bay with the Labrador Salmonid Advisory Committee, which represents all major user groups. Key items discussed included the need for the development of a long-term management plan prior to the completion of the highway, monitoring and enforcement capacity, and the importance of education and public awareness in reducing the potential for detrimental effects on the fishery.*

Comment 81:

Potential environmental effects and mitigation have been described. While DFO is in agreement that the measures listed will reduce the potential for environmental effects, there are additional measures that should be considered in addressing Section 6.1 of the Guidelines, as follows:

- with respect to culverts, while pipe arch culverts are preferred to cylindrical culverts, bottomless arch culverts are the preferred type from a fish and fish habitat perspective. Clear span bridges are preferred to those requiring in-river pilings. Culverts must provide passage for all species and life stages that could be present at each crossing to avoid habitat alienation.
- an additional item should be added - appropriate measures will be taken to control sedimentation. Roads by their nature tend to channelize and concentrate runoff and promote erosion, particularly in the approaches to the stream crossings. It will be important that the appropriate mitigations are undertaken both during construction and afterwards to minimize sediment problems. There will need to be consideration for bank erosion at the road crossings and the appropriate bank stabilization conditions provided. Guidance on these items is contained in Gosse et al (1998), particularly in the section on Linear Development.
- there is a growing awareness that road crossings and the associated 'rights-of-way' can increase the amount of sunlight reaching a stream and this can contribute to stream warming. This can be



exacerbated in smaller streams. Consideration should be given to keeping the clearances and rights-of-way to a minimum and maintaining as much natural riparian vegetation as possible.

Response 81:

The following text in the EIS/CSR has been amended to read.

6.5.7 *Mitigation*

WST is committed to minimizing adverse environmental effects of the project. Regulations, guidelines, codes of good practice, mitigation and environmental protection measures specifically related to the protection of fish and fish habitat are integral parts of the project description and environmental protection planning, and are outlined or detailed in Section 3.9.3 and include:

- *watercourse crossing installation carried out in the dry by diverting or pumping water around the construction area;*
- *pipe arch culverts will be used on many streams;*
- *culverts installed in fish bearing waters will be countersunk to maintain a water depth in the pipe and to reduce any drop at the outlet;*
- *culverts will provide fish passage in accordance with DFO guidelines;*
- *where the existing stream gradient warrants, baffles will be installed in the corresponding culverts to maintain a water depth to facilitate fish passage and to provide shelter from flow for smaller fish;*
- *all instream work will be carried out between June 30 and September 1, unless otherwise approved by DFO, to avoid sensitive periods for fish;*
- *fish will be removed from de-watered areas and returned unharmed to the watercourse;*
- *fording activities will be minimized or avoided, where possible;*
- *the clearing width for the road right-of-way will be 30 m, with efforts made to reduce this width as necessary, in particular around watercourses;*
- *appropriate measures will be taken to control sedimentation, including:*
 - *a 20-m buffer will be maintained along watercourses wherever possible;*
 - *at crossing locations, riparian areas that must be disturbed will be stabilized to control erosion;*
 - *during the clearing of the right-of-way, a temporary buffer zone will be left in place at each stream crossing until such time as the crossing is constructed;*
 - *measures will be taken to reduce the effects of channelization of ditch flows and subsequent erosion and sedimentation at stream crossings (e.g., ditch runouts, takeoff ditches, and rock check dams);*



- ARD potential will be investigated along the highway route to identify areas of potential acid generation and areas of acceptable source material and additional measures will be defined based on the results of the initial investigation;
- adherence to regulations, guidelines, codes of good practice;
- follow-up inspections verifying culvert installation and operation; and
- details provided in EPP.”

Table 2.7 of the EIS/CSR of mitigative measures is amended to include,

Table 2.7 Environmental Protection Measures (Highway Construction)...amended to include,

Construction Activities		Environmental Protection Measures	
1	Vegetation Clearing	1.16	<i>The RLU 80 highway will have a right-of-way width of 40 m. The clearing width will be 30 m, with efforts made to reduce this width as necessary, in particular around watercourses.</i>
6	<i>Installing Watercourse Crossing Structures and Instream Activities</i>	6.11	<i>Measures will be taken to reduce the effects of channelization of ditch flows and subsequent erosion and sedimentation at stream crossings (e.g., ditch runouts, takeoff ditches, and rock check dams).</i>
		6.12	<i>Culverts will provide fish passage in accordance with DFO guidelines.</i>

Appropriate measures are included in the mitigation measures to control sedimentation, and the above amendments are added as suggested.

To facilitate fish passage, DFO guidelines note the requirement for site-specific considerations for the species and life stages present. Although the DFO guidelines do not provide a framework for species-specific adaptation of culvert design, such a framework is provided in other jurisdictions (e.g., the State of Washington (Washington Department of Fish and Wildlife 1999)).

3.4.6.2 Boundaries (EIS/CSR Section 6.5.1)

Comment 82:

The description of ecological boundaries states that temporal boundaries are year-round for brook trout and only seasonal for anadromous species. This is incorrect as anadromous juveniles are present year-round.

Response 82:

Agreed. The statement of the temporal boundaries is amended to read: *Temporal boundaries are year-round for brook trout, other resident species, and pre-smolt stages of anadromous species (Atlantic salmon,*



Arctic char and sea-run brook trout). Otherwise, the adults of anadromous species are seasonally present in the study area.

Comment 83:

Figure 6.2.1 should show watershed boundaries. Also the Churchill River, Traverspine River and Otter Brook should be labelled. The Eagle River appears fragmented in two places to the north of the area between crossings #78 and #79; this should be corrected.

Response 83:

The figure has been updated to include the river names and the watershed boundaries as shown on Figure 1.1 of the Fish and Fish Habitat Component Study, and Figure 7.18 of the EIS/CSR for the outfitter route.

3.4.6.3 Methods (EIS/CSR Section 6.5.2)

Comment 84:

Fish habitat surveys/habitat characterization were not conducted at all sites, because at some sites the stream could not be seen and for some there was no place to land.

Response 84:

Agreed. Additional site-specific fish habitat information can be obtained when the route alignment is surveyed. The crossing site will be more accurately located and accessible at that time.

Comment 85:

It is stated that 'because actual engineering surveys have not been completed, detailed design information is not available and precise watercourse crossing sites have not been confirmed.' DFO recognizes this, however the EIS/CSR should address how the proponent intends to provide the stream crossing information as required in Section 3.6 of the Guidelines. DFO recommends that the proponent provide basic design information and precise watercourse crossing locations as soon as this information becomes available. This will allow Fisheries and Oceans Canada the opportunity to identify areas of potential concern, to address any possibilities for re-design or relocation of crossings if warranted, and to initiate discussions concerning special protection measures for these areas. Depending on the type of habitat present, the proposed crossing structure (culvert type, bridge), i.e., whether there is to be any infilling, there is the potential for HADD at



some locations. If it is determined that a HADD will likely result, the proponent must provide a precise quantification of the habitat, and DFO must decide if the HADD should be authorized and can be compensated for. Issuance of a Section 35 (2) *Fisheries Act* authorization will not occur until a compensation agreement is developed between the proponent and DFO. Given the time requirements for these steps to take place, the requirement for the proponent to provide the needed information to DFO in a timely manner is strongly emphasized. It is also recommended that the proponent meet with DFO prior to the collection of site-specific information at surveyed stream crossings.

Response 85:

WST agrees with this comment. No amendment to the EIS/CSR is required.

3.4.6.4 Existing Environment (EIS/CSR Section 6.5.3)

Comment 86:

The barriers to fish migration in Table 6.12 is incorrect. The barriers listed for Paradise River are not barriers for the area of the watershed where the Phase III highway is to be located and so are irrelevant in the current context. Muskrat Falls is not a barrier to eels and is also irrelevant to Phase III as it is above the crossing. During summer low flows, Muskrat Falls may not be a barrier to other species as well.

Response 86:

Again, the information in the table was taken, and cited, from Anderson (1985). Agreed, the areas involved have little relevance to the crossing sites. The following text is added to Section 6.5.3 of the EIS/CSR: *Sea-run salmon do make it to some of the proposed crossings of the Churchill River, Kenamu River, Eagle River and Paradise River.*

Muskrat Falls is considered a barrier under most conditions. Eels may be excepted as they are able to get around barriers that stop all other species. Speculation regarding conditions at Muskrat Falls under which fish can pass upstream has not been confirmed in published reports. The accessible area to upstream migrating fish is relevant, should a watercourse crossing be found to be a partial or total obstruction.



3.4.6.5 Description of Watersheds (EIS/CSR Section 6.5.3.2)

Comment 87:

The crossing type should be indicate in the “Comment” column, specifically for the proposed bridges and pipe arches.

Response 87:

The locations of pipe arches and bridges are provided in figures that accompany the project description. The tables in Section 6.5.3.2 of the EIS/CSR are amended to include the description of the crossing type.

Comment 88:

There are some errors in transferring information from the Fish and Fish Habitat Component Study to tables in this section. For example, Crossing 8 information states it is 0-2 m wide, yet Table 6.17 states it is 2-5 m wide and there are other discrepancies. In Table 6.20, crossing 48 is 2-5 m wide, whereas in the Component Study it is said to be 5-20 m wide. For Eagle River, there are 14 crossings with a basin area of less than 2 km².

Response 88:

During the aerial survey of crossing # 8, the width of the stream was estimated to be 2 m, as indicated on the front page of the data sheet. The subsequent ground survey confirmed that the actual width was 2.2 m, as indicated on the back of the data sheet. Since the actual width was 2.2 m, the stream was included in the 2 to 5 m category in Table 6.17 of the EIS/CSR.

The reference to crossing number 48 in table 6.20 as being 2 to 5 m wide is an error. The width is actually 5 to 20 m, as indicated on the data sheet of the component study. The EIS/CSR is amended accordingly.

3.4.6.6 Fish Surveys (EIS/CSR Section 6.5.3.3)

Comment 89:

The statement is made that ‘DFO have made a preliminary determination that the planned highway construction methods are not likely to result in a harmful alteration, disturbance or destruction (HADD) as described under Section 35 (2) of the *Fisheries Act*.’ (Note that the word ‘disturbance’ is incorrect, it should



be ‘disruption.’) This statement could be interpreted as DFO having already made a decision on HADD in advance of the EIS/CSR, which is not the case. Such a decision can only be made when the exact crossing locations are determined, as noted elsewhere, and DFO has reviewed site-specific habitat information and the designs of the crossing structures. As noted earlier, infilling could result in a HADD and require an Authorization. In discussions with the proponent in May of 2002, DFO advised that the proponent should make the assumption that all crossing locations will be in fish habitat and that any of the species known for the particular watershed could be present at each location. Also, DFO was willing to proceed without fish survey information at crossing locations on the assumption that the proponent would design and construct stream crossings in such a manner as to avoid HADD.

Response 89:

WST agrees with this comment. No amendment to the EIS/CSR is required.

3.4.6.7 Fish Species (EIS/CSR Section 6.5.3.4)

Comment 90:

While it is agreed that Atlantic salmon and brook trout are most widely distributed and potentially most likely to be affected by the project, the discussion should not be limited to these two species only, as per Section 4.1 of the Guidelines. Summaries should be presented for other species as well. There has been limited, or no consideration, given to other species. It is recognized that information is sparse for much of the area, however there are other sources besides Anderson (1985) that could have been used, e.g., Labrador Hydro Project for Churchill River, outfitters, TEK, local residents, DFO scientists, etc.

Response 90:

Section 6.5.3.4 of the EIS/CSR is amended to include the following species summaries:

Arctic Charr

Arctic Charr has the most northerly distribution of any freshwater fish. Charr can be found in inshore marine waters, lakes and rivers. Arctic charr do not usually range far inland except in large rivers. In Arctic waters, charr spawn in autumn, usually in September or October. Farther south, charr may spawn as late as November or December.



Charr spawn over gravel or rocky shoals in lakes or in quiet pools in rivers, at depths of 1.0 to 4.5 m. Spawning takes place in the day at temperatures approximately 4°C. The eggs develop, buried in the gravel over winter. Hatching is thought to occur around April 1, but emergence from the gravel probably does not occur until break-up of the ice. At that time fry are approximately 25 mm in length. Arctic charr may either be anadromous, moving downstream to sea in the spring and returning in autumn, or they may remain permanently in fresh water as landlocked or resident forms. Young anadromous charr move out of the rivers and downstream to sea when 152 to 203 mm in length. Growth rates vary greatly among different populations but, in general, growth is slow. On average, full size is attained at 20 years of age, and although some have lived as long as 40 years they did not become much larger than 20-year-old fish. The average weight of sea-run charr is approximately 0.9 to 4.5 kg. Arctic charr are carnivorous and have an exceedingly varied diet, they seem able to exploit any smaller creature that appears in their habitat.

Lake Whitefish

The rate of growth of lake whitefish varies from lake to lake but, in general, is quite rapid. Whitefish have been known to live in excess of 20 years and attain weights in excess of 9 kg in the Great Lakes. Lake whitefish usually spawn in the fall in November and December, but date of spawning varies from year to year, even in the same lake. Spawning usually occurs in shallow water at depths of less than 7.6 m, but spawning in deeper water has been reported. Spawning often takes place over hard or stony bottom, but sometimes over sand, with eggs and sperm being deposited more or less randomly over the spawning grounds. The lake whitefish is a cool-water species that move from deep to shoal waters in early spring and back to deeper water as warming occurs. Adult fish are mainly bottom feeders, consuming a wide variety of bottom-living invertebrates and small fishes. Food varies from region to region, but aquatic insect larvae, molluscs and amphipods are primary foods.

Northern Pike

Northern pike is primarily a freshwater fish but has been known to enter weak brackish water. The northern pike is a spring spawner and spawning takes place immediately after ice out, when water temperatures are 4.4 to 11.1°C. Spawning takes place in daylight hours on heavily vegetated floodplains of rivers, marshes and bays of larger lakes. Eggs are scattered at random and remain attached to the vegetation of the area. Eggs typically hatch in 12 to 14 days and the young often remain attached to the vegetation and feed on the stored yolk for another 6 to 10 days. After the yolk is absorbed, young pike feed heavily on larger zooplankton and immature aquatic insects for 7 to 10 days. At that time, pike begin eating fish and by the time the young pike reaches 50 mm in length, fish become the predominant food item.



Lake Trout

Lake trout are relatively fast growing and long lived and are typically found in deep water lakes. Spawning occurs mainly in October, but may occur as early as September in the north and as late as November in the south. Spawning occurs mostly in lakes over rocky shallows, but in rare instances may occur in rivers. Eggs and sperm are extruded over rocky bottom and the fertilized eggs fall into the crevices between rocks. Usually four to five months are required for incubation and hatching usually occurs in March or April. The young usually seek deeper water within a month or so of hatching (after the yolk sac is absorbed). After spawning, lake trout disperse throughout the lake at various depths and remain dispersed throughout the winter months. In spring, they often inhabit the surface waters immediately after break up of ice. As the surface waters warm, lake trout move to cooler, deeper waters. Lake trout are predaceous and feed upon a broad range of organisms, including freshwater sponges, crustaceans, aquatic and terrestrial insects, many species of fish and even small mammals.

Smelt

The smelt is an anadromous species that ascend freshwater streams in spring to spawn. Spawning may last up to three weeks, but the peak seldom lasts more than a week. Spawning can occur in streams or on gravel shoals in lakes. The eggs become adhesive shortly after extrusion and attach to bottom gravel. Eggs typically hatch in two to three weeks, depending on temperature. The young are approximately 5 mm long at hatching and may be 50 mm long by August, where they can be found close to shore along sand and gravel beaches. Sexual maturity can be reached as early as two years of age and the life span is approximately six years. A maximum length of approximately 356 mm is attained in maritime coastal waters, but landlocked fish may only attain a size of 102 mm. Adult smelt are essentially schooling, pelagic fishes inhabiting mid waters of lakes or inshore coastal waters. Smelt are carnivorous and feed on crustaceans (amphipods, ostracods), aquatic insect larvae, aquatic worms and other small fish.”

The comment also lists additional sources of information on fish in the study area. The Labrador Hydro Project documents have not been released for public use and are not available, although the information would presumably be limited to the Churchill River. DFO scientists have been contacted and those discussions confirmed that there is not a lot of published information on the inland areas of the proposed TLH routes. The ability to collect traditional ecological knowledge is limited through agreements between the provincial government and aboriginal groups.

Comment 91:

It is stated that brook trout have a similar life cycle and seasons to Atlantic salmon. This is inaccurate since brook trout life cycle and their habitat utilization are actually quite different than for Atlantic salmon. As



an example, salmon remain at least one full year at sea while migratory brook trout return to freshwater and overwinter after only a couple of months at sea. While as stated, population status of brook trout is poorly known, it can be deduced from catches in the small existing angling fisheries that populations of large sized trout exist in many of the lakes and streams proposed to be crossed by the highway. Also, since most of the fish populations are probably lightly exploited, the standing stock should be equivalent to the carrying capacity of the habitat.

Response 91:

Agreed that the comparison with salmon is oversimplified, therefore the sentence has been shortened to state: *They tend to be smaller and their habitat preferences are correspondingly shifted (Table 7.29).*

No primary data were collected from the field studies; however, it is agreed that large trout exist in many of the lakes in the area. It could be misleading to comment that “that populations of large sized trout exist in many of the lakes and streams proposed to be crossed by the highway” in that the route will not cross or come in close proximity to many lakes. That being said, it will not preclude access from the highway to some of the large lakes in the area, even if moderate distances are involved.

The statement that standing stock may be considered to be equivalent to carrying capacity is also probably correct; however, the standing stocks are not known for any of the lakes or streams. No additional changes have been made to the EIS/CSR.

3.4.6.8 Existing Knowledge (EIS/CSR Section 6.5.6)

Comment 92:

The information in Table 6.24 needs to be updated to reflect more current information. Migration times for the anadromous fish species is earlier than July 1 and later than end of August in Labrador. Trout, charr and salmon of adult and smolt stage migrate out in early spring around the ice breakup time. Charr, trout and salmon adults migrate into rivers in Labrador earlier and later than stated; also juvenile charr and trout migrate into rivers in late summer and fall (September and October). See DFO’s Canadian Stock Assessment Secretariat website at http://www.dfo-mpo.gc.ca/csas/Csas/English/Index_e.htm.

Response 92:

The information in the table was published relatively recently (i.e., 1997) and there is not a lot of new information published on which to base an update. With regard to timing of migrations, Reddin et al. (2000)



report on a counting fence study on Paradise River that ran from mid-July to early September in 1998, and from mid-June to late September in 1999. Based on one year's early season data, 100 percent of the brook trout migrated June 20 or later and 92 percent of Atlantic salmon migrated after June 30. Similarly, 97.7 percent of brook trout and 98.7 percent of Atlantic salmon had migrated by the late date indicated in the table. No charr data were obtained from the fence. Recognizing that the published data are sparse, but that the investigators may have knowledge on the apparent timing of migration, the EIS/CSR is amended to read, *The information in the table is general and localized variation in timing may be encountered in areas of Labrador.*

Comment 93:

Observations from Exxon Valdez are irrelevant here as the highway is crossing freshwater not marine. Salmon and trout parr do not feed on phytoplankton, they feed on invertebrates that are in the stream or fall into the stream from surrounding vegetation. Therefore, some feeding occurs on the surface meaning that an oil spill would be problematic for salmonids.

Response 93:

Two points can be made with regard to the comment on the relevance of the *Exxon Valdez*. The EIS/CSR stated: *There is little documentation concerning the effect of these contaminants on adult freshwater fish. Observations following the Exxon Valdez spill suggest that the Pacific salmon population in the area was not adversely affected by the presence of oil on the water surface (Baker et al. 1991)*. The statement was in part to note the absence of existing knowledge with regard to freshwater. The marine experience is relevant to this assessment as both the Eagle and Paradise rivers empty into a marine bay, which could be affected by an accidental release of hydrocarbons. No amendment is made to the EIS/CSR.

Agreed that salmon and trout parr do not feed on phytoplankton. The EIS/CSR states that hydrocarbon contamination, *...cause an effect upon levels of resident phytoplankton. This would reduce net primary productivity...* Primary productivity is one of the foundations of freshwater foodwebs along with terrestrial inputs of plant debris and animals (i.e., insects and the like). It is agreed that ingestion of hydrocarbons through surface feeding would likely have adverse effects on salmonids.



3.4.6.9 Mitigation (EIS/CSR Section 6.5.7)

Comment 94:

The third bullet “culverts will be countersunk where required to maintain...” should be changed to delete the phrase ‘where required.’

Response 94:

The term “where required” is included as, although none of the stream crossings were characterized as being on a steep gradient, or being in non-fish bearing waters, it is conceivable that in some cases countersinking would not be required. A crosscut road alignment on a hillside could require the installation of cross-drainage culverts that will only carry water during wet seasons and following storm events. These would not be in fish habitat and countersinking the culvert would not be undertaken. The meaning of the statement in the EIS/CSR is clear, the commitment by WST is clear, and the text is not amended.

Comment 95:

Construction personnel must not fish while on site. Survey work being conducted by the proponent and the Inland Fish and Wildlife Division is attempting to determine pre-access fish population inventory. Fishing by construction personnel will invalidate survey results. The possibility of closing the area to fishing during the construction phase should be explored with resource management agencies.

Response 95:

The statement that construction personnel must not fish while on site begs the question ‘on what authority can this be enforced?’ Since the construction sites are not “closed” areas, such as the Voisey’s Bay site where the project has control over who can come on site and what they can/cannot do while onsite, WST will not be able to ban fishing or trapping along the constructed route. The route must remain open as many of the construction personnel will commute from communities. Obviously, during work hours, WST and contractors can restrict activities of the workforce, but there is no authority to do so at other times.

“Fishing by construction personnel will invalidate the survey results” is speculative. Assessments, populations studies and follow-up have been conducted in many cases under conditions of existing fish harvesting (e.g., Granite Canal Hydro Project) and newly accessed fish harvesting (e.g., Cat Arm Hydro Project and Star Lake Hydro Project). Charr migration studies at Voisey’s Bay were conducted during commercial harvesting of charr in the area and fish migration studies on the Churchill River were conducted



without a suspension of recreational fishing. Fishing by mine personnel on the Cinq Cerf River was stopped, as a result of closure of the river to all angling for other reasons.

Construction of the road will progress at a rate that will make it difficult to designate a ‘no fishing’ area that can apply only to construction personnel.

Refer also to response to Comment No. 116 in Section 3.4.11 of this addendum.

3.4.6.10 Construction (EIS/CSR Section 6.5.8.1)

Comment 96:

Reference is made to Gosse et al (1998) and WDFW (1999) with respect to proper culvert installation and provision of fish passage. DFO stresses the importance of implementing appropriate mitigative techniques to reduce or eliminate potential negative effects to fish and fish habitat, and acknowledges the proponent’s statement that all crossing structures will be designed and installed to provide fish passage (unless there is clear evidence that the culvert is not located in fish habitat).

Response 96:

Agreed. The EIS/CSR is not amended.

3.6.4.11 Environmental Effects Evaluation (EIS/CSR Section 6.5.9)

Comment 97:

Table 6.25, the Environmental Effects Summary - Fish and Fish Habitat requires additional explanatory justification. Construction and operation effects are proposed to be of nil to low magnitude, of not significant (minor) significance and confidence levels are described as high. These characteristics seem inconsistent with statements on pages 268, 270 and 285 which indicate that the status of both the Labrador salmon stock and the brook trout population in the study area is poorly known. The strong drawing power associated with world class trophy brook trout and internationally competitive catch rates for salmon together with the 120,000 residents who could be interested in fishing these newly accessible stocks would seem to point to different characterization of effects than those provided. The predicted environmental effects should also be placed in the context of statements elsewhere in the EIS/CSR that while provincial angling effort declined by nearly half since 1990 the Labrador effort nearly tripled, and that angling activity has increased (as much as tripled) with the completion of Phase II of the Trans Labrador Highway. Such



comments suggest that one should expect dramatic increase in fishing effort and catch of trophy trout and salmon in the study area following highway construction. The Environmental Effect Summary appears to have omitted consideration of the fishery entirely.

Response 97:

The environmental effects discussed in this section are in regard to the VEC - Fish and Fish Habitat and the conclusions are drawn on that basis. The populations being assessed are those of the broad region and not specific communities in a single pond or stream. Given that there is not a lot known of specific standing stocks and populations at locations along the route, the potential effects that may occur are not predicted to have widespread effects due to the Population Type 3 (i.e., species that have a widespread distribution pattern and very small proportion of their population confined at any one time within a given zone of influence). Even with the unknowns, an apparently severe local effect will not tip the scales for the overall population.

The strong drawing power associated with world class trophy brook trout and internationally competitive catch rates for salmon will potentially lead to increased angling pressure at some locations and possibly more widespread along the road route. This has been included in the assessment of potential effects.

Speculation that 120,000 residents could be interested in fishing these newly accessible stocks is extreme, as this scenario would have all anglers in the province looking to pursue these stocks. The number of retained salmon in SFA 2 was reduced from four to two (Class III designation) in anticipation of increased angling pressure associated with TLH - Phase II (DFO 2002). This was considered successful in addressing the issue.

Furthermore, the deficiency statement provided to WST in April 2003 states: *Regarding the need for increase management measures to address potential effects on fish resources, DFO recognizes that new management approaches will be required to address the issues arising from Phase III of the Trans Labrador Highway. A regulatory amendment which will allow individual species management (in contrast to the current multi-species approach) is anticipated to be in place this year, and this will be a key component of DFO's management strategy for this area. In the fall of 2003, DFO will begin consultations with user groups, including aboriginal groups, in the development of its new five year management plan. DFO commits to the maintenance of aboriginal access to the resource for food, social and ceremonial purposes. The department has already had preliminary discussions in Goose Bay with the Labrador Salmonid Advisory Committee, which represents all major user groups. Key items discussed included the need for the development of a long-term management plan prior to the completion of the highway, monitoring and*



enforcement capacity, and the importance of education and public awareness in reducing the potential for detrimental effects on the fishery.

3.4.7 Species at Risk (EIS/CSR Section 6.6)

3.4.7.1 General Comments

Comment 98:

It is unclear why the consideration of species of special conservation concern (includes floral and faunal species listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), identified as S1, S2 and S3 by the Atlantic Canada Conservation Data Centre (ACCDC), designated in provincial listings, or of otherwise high conservation priority) is limited to two bird species. It is expected that the EIS/CSR would address any floral or faunal species of special conservation concern that could be adversely affected by the proposed highway. In support of this, it was indicated in the Guidelines for both floral and faunal species of special conservation concern that “available data, survey results and detailed mitigation measures that demonstrate a special emphasis on avoidance of environmental effects is to be include.” As it stands, consideration of species of special conservation concern is inadequate.

Response 98:

As noted in Section 6.6, WST is aware of a number of species given designation by COSEWIC and under the provincial *Endangered Species Act*. Of these identified species, it was indicated that woodland caribou were discussed under a separate chapter (Section 6.3 of the EIS/CSR) and that other species at risk, including Barrow's goldeneye, peregrine falcon, eskimo curlew and wolverine, were not likely to be found in the project region. Therefore, they were not given specific consideration in the species at risk chapter. The above noted species were discussed in the context of the assessment of project effects on waterfowl (Section 6.2 of the EIS/CSR), raptors (Section 6.1 of the EIS/CSR) and furbearers (Section 6.4 of the EIS/CSR).

Flora species at risk were not specifically included in the Species at Risk chapter as any such species occurring along the highway route will not be identified until a field study is completed following final determination of the highway alignment. Following discussion with the botanist (N. Djan-Chekar) at Inland Fish and Wildlife Division of the Department of Culture, Tourism and Recreation, it was agreed that the rare plant survey would be conducted prior to beginning construction in order to identify any sensitive sites that could be disturbed by construction. This is the same type of procedure used for the environmental assessment for TLH - Phase II (Red Bay to Cartwright). As a result of the rare plant surveys conducted for that phase of the TLH, alignment alterations were made to avoid some areas supporting uncommon plant



species. Appendix F of the EIS/CSR outlines the results of a review to identify potential rare plant sites along the TLH - Phase III preferred route. Refer to the response to Comment No. 30 in Section 3.3.1 of this addendum for the methodology that will be used to conduct the rare plant survey.

Comment 99:

Appendix F clearly establishes that many rare plant species may be present within the right-of-way, and identifies 33 areas that should be surveyed. However it appears that these surveys have not been conducted, and there is no analysis of the potential effect of the highway on plant species of special conservation concern. The number of sites potentially supporting rare plants highlights the importance of conducting surveys in those areas. The results of surveys and appropriate analysis of potential effects on rare plants should be included in the EIS/CSR if conclusions regarding the likelihood and significance of effects on floral species of special conservation concern are to be supported.

Response 99:

Refer to the response to Comment No. 98 in Section 3.4.7.1 of this addendum. Section 6.6 (Species at Risk) of the EIS/CSR makes no conclusions regarding the likelihood or significance of effects on floral species of special conservation concern.

3.4.7.2 Mitigation (EIS/CSR Section 6.6.7)

Comment 100:

Additional information should be provided on methods to be used for locating active short-eared owl nests within 800 m of the highway route alternatives.

Response 100:

No dedicated surveys for active short-eared owl nests within 800 m of the highway will be conducted. Rather, prior to construction each day, the right-of-way will be canvassed for any active migratory bird nests. In the event such a nest is found, it will be left undisturbed until nesting is completed. The list of mitigative measures for short-eared owl in Section 6.6.7 and Table 6.26 of the EIS/CSR are amended by adding the following:

- prior to construction each day, the right-of-way will be canvassed for any active migratory bird nests; and
- any short-eared owl nests found will be left undisturbed until nesting is complete.



3.4.8 Geomorphology

3.4.8.1 Environmental Monitoring and Follow-up (EIS/CSR Section 6.7.11)

Comment 101:

The EIS/CSR provides an overview of acid-generating rock considerations, identifies avoidance as the preferred mitigation option, and indicates that the proponent is committed to carrying out a field investigation, prior to the start of construction to further define the acid generation potential along the route. In many cases, however, the EIS/CSR defers specific procedural information to the environmental protection plan. Therefore, the EPP should be submitted to Environment Canada for review and confirmation that the sampling protocol, and proposed methods for dealing with acid-generating rock, are appropriate and will allow adverse effects to be avoided. Similar to other highway projects in the region, and other projects involving acidic material, Environment Canada is prepared to discuss proposed site-specific management approaches when the presence of acid-generating rock is suspected or discovered.

Response 101:

As noted in Section 2.10.4 (EPP) in the EIS/CSR, WST will prepare an EPP for each construction phase (i.e., section of the highway) to be constructed during a field season. The EPPs will be specific to each section of highway being constructed and will include information on appropriate measures for handling potential acid-generating rock. WST is committed to developing each of the EPPs in consultation with the appropriate regulatory authorities, including the Department of Environment, DFO and Environment Canada, and each EPP will be subject to government review and comment prior to construction.

3.4.9 Water Resources

3.4.9.1 Watershed Areas (EIS/CSR Section 6.8.3.1)

Comment 102:

For ease of review, information on the bridge or culvert size and approximate width of stream should be located in the same table (Tables 6.29 through 6.38). It would appear that there may be infilling associated with a number of crossings, e.g., crossing #22 has a width of >20 m, yet the proposed crossing is a 5 890 x 3 710 pipe arch; crossing #73 is 90 m wide, yet the proposed crossing is a bridge with 2 x 30 m spans; crossing #79 is 40 m wide, with a 20 m span bridge proposed. As noted previously, DFO requires site-



specific habitat information at all locations where infilling is proposed in order to make a HADD determination.

Response 102:

As stated previously, the sizes of the proposed culverts have been determined by the water flow requirements and not the stream widths. The sizes are minimum sizes and the sizes may be increased in final design to address a number of factors. The crossing sites that were surveyed were located largely from topographic map information along the preliminary route alignment.

The culvert sizes could be displayed adjacent to the stream habitat information, but this could lead to confusion. As stated in the comment, there appears to be a requirement for infilling at some locations and infilling could have a potential HADD - but to conclude this at this stage is premature. WST has committed to consultation with DFO on these matters when the appropriate detailed route information is available.

Comment 103:

In Tables 6.34 to 6.38 define “T” and “P” in the last column. Is it Total and Partial?

Response 103:

The codes are for total and partial in Tables 6.34 to 6.38. A legend to denote this has been added to each of the tables.

3.4.9.2 Water Quality (EIS/CSR Section 6.8.3.2)

Comment 104:

There is no QA/QC information for the water chemistry results. A description of water sampling protocols is also useful information that should be included.

Response 104:

The laboratory routinely subjects 10 percent of the samples to a duplicate analysis and only issues results if the QA/QC is within acceptable limits of variation. This was done in this study and the duplicate analysis results were issued. However, only the primary results are used in the data reporting and interpretation.



Standard methods were used to collect the water samples. The following text is added to the EIS/CSR, “*The samples were obtained as surface grab samples collected in a manner similar to that described by Environment Canada (1995).*”

Comment 105:

Tables 6.41 to 6.45 are summaries of water chemistry results. However, there are no results for specific samples. Hence, results of analyses, sample numbers and date sampled should be included in an appendix. This information will be useful for future sampling activities if the need arises.

Response 105:

Water samples were collected between September 26 and October 1, 2002. The individual sample results are appended to the Fish and Fish Habitat Component Study. The EIS/CSR is not amended.

3.4.9.3 Salt Loading (EIS/CSR Section 6.8.3.3)

Comment 106:

It is noted that road salt is typically ineffective for the climate in the project area, and would only be applied as less than 5% of a sand/salt mixture to improve manageability during freezing. However, it is also noted that salt may be stored on site at a number of locations along the proposed highway and at maintenance depots. Since storage areas have been acknowledged as primary sources of salt contamination in the environment, estimated volumes of salt to be stored and storage design criteria should be identified and provisions for avoiding adverse effects described.

Response 106:

The following text is added to Section 6.8.3.3 of the EIS/CSR: *Salt (approximately 1,250 tonnes in 25,000 tonnes of sand) will probably be stockpiled at Cartwright Junction to service both Phase II and Phase III of the highway.*

The stockpile of sand/salt will be covered to prevent water penetration and leaching of the salt.



3.4.10 Wetlands

3.4.10.1 **Boundaries (EIS/CSR Section 6.9.1)**

Comment 107:

The objective of *The Federal Policy on Wetland Conservation* is mentioned. However, the goal of the “No Net Loss” of wetland function advocated in the policy is not included in the discussion. The goal of “No Net Loss” is fundamental to the effectiveness of wetland conservation efforts, given the cumulative effect of developments and related activities on wetland function. Indeed, the North American Wetlands Conservation Council (Canada) recommends the adoption of “No Net Loss” goals in project management. The “No Net Loss” approach to addressing effects on wetlands should be reflected in the EIS/CSR.

Response 107:

The concept of “no net loss” to address effects on wetlands as a result of development and related activities may potentially be applied in areas where remaining wetland habitat is limited, or where a single discrete wetland that is regionally rare or of particularly high habitat value, will be completely removed. However, it would not be feasible to apply the concept to wetlands in the vicinity of the proposed highway in Labrador for a number of reasons. The proposed highway route avoids wetlands wherever possible and, in areas where the amount of wetland is so great that the highway cannot avoid being routed through a wetland, no single wetland will be completely removed as a result of highway construction.

There are approximately 333,132 km² of wetland (defined as lichen scrub/open bog, open bog, string bog and tree bog) within a 30-km corridor along the proposed highway alignment. The amount of wetland that will be removed is 230 ha, representing approximately 0.0006 percent of the wetland within that corridor and the wetland types that will be affected by highway construction are considered well-represented in the region. Finally, species such as waterfowl or caribou that are dependant on wetland habitat types for part of their life cycle may not return to the same wetland area in consecutive years due to the sheer amount of wetland habitat in this region of Labrador. As a result, it would be difficult to predict the use of specific wetland areas by wildlife from one year to the next or to rate the value of a particular wetland in the context of many wetlands, all of relatively low productivity. Similarly, wetlands along the proposed highway route have little or no history of human use.



3.4.10.2 Existing Environment (EIS/CSR Section 6.9.3)

Comment 108:

No evaluation of wetland function (e.g., hydrology and habitat) appears to have been conducted. The Guidelines require that the description of the present environment must include wetland resources, including location, size and class of any wetland within a predicted zone of influence and conduct of a wetland evaluation using a comprehensive valuation methodology that assesses component, functional and attribute values. Without this evaluation, the conclusion that the highway will not have a significant effect on wetlands and wetland function cannot be reasonably supported, especially given the scale of the project, the total area of wetland directly destroyed, and the effect to wetland function caused by potential changes in hydrology.

Response 108:

An evaluation of wetland function as wildlife habitat was completed during five waterfowl surveys conducted in 2002. Wetlands with the highest density of waterfowl were identified in the Waterfowl Component Study (JW/MLP 2003b) and in Section 6.2 of the EIS/CSR. None of these wetlands is crossed by the highway. An evaluation of wetlands within 100 m of the proposed highway alignment was conducted. The location of each wetland and its class was mapped and included in the EIS/CSR. As well, detailed ground surveys were conducted on representative wetlands to determine the vegetation associated with each class. There were 345 distinct wetland areas within 100 m of the centre line of the proposed highway. On each of these areas, it would be impossible to conduct a detailed wetland evaluation of the type suggested in the Wetland Evaluation Guide (North American Wetlands Conservation Council 1992). The Guide is designed for evaluating single wetlands and their value relative to the importance of a proposed development in an urban or rural setting and is not appropriate to evaluate wetlands at the scale associated with the TLH - Phase III development.

As was noted in the EIS/CSR, a total of 2.3 km² of wetland (defined as lichen scrub/open bog, open bog, string bog and tree bog) will be removed as a result of highway construction. There are approximately 333,132 km² of wetland (defined as above) within 30 km on either side of the proposed highway alignment. The amount of wetland that will be removed represents approximately 0.0006 percent of the total wetland within a 30-km corridor of the proposed highway route. The loss of habitat and the effect on wetland function by potential changes in hydrology in the region will be minor. As well, WST will use construction methods that are appropriate to maintain hydrological function of wetlands adjacent to the highway. Refer to response to Comment No. 111 in Section 3.4.10.3 of this addendum for discussion on the appropriate technologies.



Comment 109:

The absence of a discussion on the importance of wetland function to the Eagle River Plateau eco-region habitat is of great concern. This extensive complex of string bogs is extremely important wildlife habitat, yet it is not discussed. A discussion of wetlands in the project area is insufficient without explicit consideration of the Eagle River Plateau and the habitat and hydrological function it supports.

Response 109:

The Eagle Plateau area was considered throughout the effects assessment for waterfowl and wetlands. As noted in the response to Comment No. 108 in Section 3.4.10.2 in this addendum, wetlands within the Eagle Plateau were surveyed numerous times for use by waterfowl (Section 6.2 of the EIS/CSR) and wetlands on the Eagle Plateau were characterized (Section 6.9.3 of the EIS/CSR).

3.4.10.3 Mitigation (EIS/CSR Section 6.9.7)

Comment 110:

It is claimed that the highway route will avoid wetlands where feasible. This commitment to avoidance has not been demonstrated. The EIS/CSR should include a comprehensive discussion of how the proposed route avoids wetlands or minimized the effects on wetlands (e.g., an alternate route that would run adjacent to, instead of through, wetland areas).

Response 110:

The proposed highway route avoids wetlands wherever possible. However, in the centre portion of the highway route (i.e., in the Eagle Plateau area), the vast wetland complexes that occur make it impossible to avoid all wetland areas. Even within these wetland complexes, the road alignment follows areas of forest or scrub or skirts the edges of discreet wetlands, where possible.

Comment 111:

Mitigation measures to protect the hydrologic regime are vague and insufficient. Section 6.9.6 describes the adverse effects that roads can have on wetland hydrology, but these effects are not analyzed in relation to the proposed highway. The mitigation section should describe the appropriate technologies that will be applied and how these technologies will allow maintenance of current hydrological conditions.



Response 111:

Bullet 3 in the list of mitigative measures to reduce the project's potential effects on wetland function, as presented in Section 6.9.7 and Table 6.50 of the EIS/CSR, is amended to read:

The natural hydrologic regime of wetlands identified along the highway route will be maintained using appropriate construction techniques, such as avoiding the wetland where possible (this is the primary consideration). Other techniques (as identified by Environment Canada (1976) and USDA (1995)) include:

- maintaining the same gradient on both sides of the highway;
- sizing cross-drainage structures appropriately to take into consideration knowledge of runoff potential, storm frequencies and intensities;
- building up ground surface around culvert inlets and outlets to culvert invert elevation to avoid ponding and sediment build-up in culverts or the occurrence of plunge pools;
- ensuring all culverts are at least 60 cm in diameter and placed with their bottom half in the upper 30 cm of the soil to handle the subsurface flow and their top half above the surface to handle above-ground flow;
- where terrain conditions allow the use of ditches, the natural drainage flow will not be redirected away from wetland areas;
- keeping equipment operation in wetland areas to the minimum required to complete work; and
- locating laydown or staging areas away from wetland areas.

3.10.4.4 Construction (EIS/CSR Section 6.9.8.1)

Comment 112:

Contrary to the suggestion, the loss of 230 ha of wetland constitutes a considerable loss of wetland area and may constitute a considerable loss of wetland function.

Response 112:

Refer to the response to Comment No. 108 in Section 3.4.10.2 of this addendum.



3.4.10.5 Environmental Monitoring and Follow-up (EIS/CSR Section 6.9.11)

Comment 113:

This section indicates that monitoring requirements for wetlands have not been identified and Table 6.50 indicates that no monitoring or follow-up (of effects on wetlands and wetland function is) required. There appears to be a considerable gap in knowledge of wetland function in the project area and the potential effects on wetlands this highway could present. The provision for a comprehensive follow-up program that verifies effects predictions and the effectiveness of mitigation measures is of great importance to the credibility of the environmental assessment. This can only be accomplished after an adequate analysis of wetland function and potential effects of the highway on wetland function has been completed.

Response 113:

It is not anticipated that there will be any significant effects to wetland function as a result of highway construction. However, during routine highway maintenance activities, WST will monitor the effectiveness of drainage structures used for the highway.

3.4.11 Resource Use and Users (EIS/CSR Section 6.12)

Comment 114:

The EIS/CSR acknowledges that there may be increased fishing activity (legal and illegal), increased use of certain rivers or lakes and potential congestion. It also suggests increased harvesting of wildlife and fish resources may lead to resource depletion, resulting in indirect effects on resource populations and resource use and users. The EIS/CSR does not reveal the potential effects of creation of road access to obstruction pools where salmon congregate for longer periods and the opportunities for efficient poaching. Similar effects might occur with respect to spawning beds where the timing and location of trout and salmon aggregations can also be easily predicted. The EIS/CSR as well states that angling for brook trout and char is limited in Sandwich Bay because residents can legally net these species. There should be discussion as to whether there will be an interaction effect whereby local experience with this gear type encourages its use in interior lakes when access has increased. The consequence of such efficient gear combined with ATVs and fish finders used on populations of large trout that are slow growing and relatively low in numbers should be evaluated, as should the potential for a decline in catch rates for lodge clients. Application of the precautionary principle in this instance would require the assumption of the worst case scenario and an indication of mitigation required.



Response 114:

Surveys of stream crossings conducted in September 2002, identified two streams with a common obstruction pool directly downstream of the proposed crossing areas (Crossings 23 and 24). The obstruction in question is a major waterfall located on the Traverspine River (Crossing 23). Crossing 24 is a tributary stream that enters the Traverspine River.

The degree to which trout or salmon congregate at the base of the waterfall is unknown. The falls appears to be a total obstruction to trout and salmon migration and other obstructions are known to occur downstream of this location (Anderson 1985). With regard to spawning pools/beds in close proximity to stream crossings, several of the stream crossings occur over Type II habitat, which, by definition, suggests that at least pockets of spawning gravel are available for salmonids. Small pools with potential for spawning were observed at several of the crossing locations. Crossing 41 was the only crossing location that had Type I spawning habitat in close proximity to the crossing location. The Type I habitat extended from a point immediately below the crossing location to 250 m downstream. Poachers could indeed take advantage of access to these locations, to the detriment of local stocks if sufficient pressure were applied.

With respect to the use of gillnets, fishery officers in the St. Lewis area reported no increase in gillnetting activity in inland waters resulting from the completion of TLH - Phase II. Illegal netting of trout and salmon was limited to inland tidal waters (near river mouth). There were no confirmed gillnetting violations in inland waters that resulted from access provided by TLH - Phase II. However, there have been unsubstantiated reports of gillnetting activities occurring in inland areas (C. Bradley, pers. comm.).

The comment requires consideration of a worst case scenario, where illegal use of nets are combined with ATVs and fish finders, and an indication of appropriate mitigations. Potential mitigation measures, that could be undertaken by the responsible agencies, to address this issue include:

- establishing the Mealy Mountains National Park, which would provide another layer of regulation and enforcement over much of the highway route;
- increasing dedicated staff and funding to resource agencies responsible for conservation and protection in the area;
- pursuing cooperative enforcement initiatives between DFO and other regulatory agencies, such as providing DFO fishery officers, who could pursue cooperative enforcement initiatives with provincial conservation officers (who recently have attained authority to enforce fisheries regulations) and RCMP officers;



- giving consideration to developing partnerships with Aboriginal groups to aid with enforcement initiatives in select areas (e.g., an expansion to the Aboriginal guardian program could be considered);
- continuing to involve user groups in the developing management, monitoring, enforcement and public education programs to ensure that local knowledge, if effectively used, assists in reducing the potential for detrimental effects on the fishery; and
- conducting public education to discourage the procurement of illegally taken fish and game.

Comment 115:

Section 6.12.8.2 states that the effects of highway operation would likely affect outfitting operations. There is no attempt to quantify the effect or adopt the precautionary principle and assume the worst case scenario and apply appropriate mitigation. Given the stated conclusion and the Environmental Effects Criteria Ratings in Table 6.60, explain how the Environmental Effects Evaluation has determined that the effect of operation would be Not Significant (Minor), bearing in mind that potential significant adverse effects are indicated for salmon lodge outfitters on the Eagle River, trophy trout lodge outfitters on the Eagle River Plateau and suspected for caribou outfitters in western Labrador as a result of increased access for resident hunting of George River Caribou.

Response 115:

The EIS/CSR for the TLH - Phase III did not identify any potential significant adverse effects on salmon lodge outfitters on the Eagle River, “trophy trout” lodge outfitters on the Eagle River Plateau or caribou outfitters in western Labrador (as a result of increased access for resident hunting of George River caribou. As JW/IELP (2003) is not the source of this information and has no details on the analysis that led to these conclusions, it is not in a position to provide comment.

Comment 116:

One of the specific measures designed to mitigate project effects on resource use and users is the requirement that all hunting, fishing or trapping activities by project personnel during construction be carried out according to applicable legislation. How does the proponent intend to monitor these activities? As an added measure of protection for the fish resource, DFO suggests that the proponent consider requiring contractors to have a no fishing policy for construction personnel. This approach is in place for the Voisey’s Bay project and is considered appropriate for this road construction project, given the concerns over potential exploitation of fish stocks.



Response 116:

WST is not able to commit to a no fishing policy for construction personnel. In contrast to the Voisey's Bay Mine/Mill project site (which is a closed project site with access controlled), the construction sites for the TLH - Phase III are not closed sites. However, the nature of the construction work and schedule/timing will act to limit time available for fishing. Each year construction will be limited to two 20-km sections at either end of the highway, and construction will occur over a five-month period (mid-May to mid-November), while the fishing season ends in early September. In addition, the long work days required of personnel will also limit time available for fishing. DFO enforcement officers will also be permitted access to the construction site.

Comment 117:

Regarding the need for increase management measures to address potential effects on fish resources, DFO recognizes that new management approaches will be required to address the issues arising from Phase III of the Trans Labrador Highway. A regulatory amendment which will allow individual species management (in contrast to the current multi-species approach) is anticipated to be in place this year, and this will be a key component of DFO's management strategy for this area. In the fall of 2003, DFO will begin consultations with user groups, including aboriginal groups, in the development of its new five year management plan. DFO commits to the maintenance of aboriginal access to the resource for food, social and ceremonial purposes. The department has already had preliminary discussions in Goose Bay with the Labrador Salmonid Advisory Committee, which represents all major user groups. Key items discussed included the need for the development of a long-term management plan prior to the completion of the highway, monitoring and enforcement capacity, and the importance of education and public awareness in reducing the potential for detrimental effects on the fishery.

Response 117:

WST appreciates receiving this information. The information was helpful in preparing a response to comments on the subject of improved access and potential induced development and activity. Refer to the response to Appendix E of this addendum for a discussion on the issue of improved access and potential for induced development and activity.



3.4.12 Akamiupishku/Mealy Mountains National Park (EIS/CSR Section 6.13)

Comment 118:

The Guidelines require consideration of the highway's effects on the establishment, operation and ecological integrity of the proposed Akamiupishku/Mealy Mountain National Park. The proposed park was to be described in terms of its size, geographic area, ecological integrity and wilderness character (including landscape aesthetics, vistas and noise-scapes). Federally the proposed park is representative of the East Coast Boreal Forest, Natural Region 21 and provincially, the proposed park is representative of five of Labrador's ten ecoregions under the Natural Areas Systems Plan. The ecological integrity and wilderness character of either the Natural Region or the five ecoregions was not described nor was the potential effect of the highway on those ecological integrity's and wilderness characters assessed. The effect of the highway on the proposed park's size, geographic area or ecological integrity and wilderness character has not been provided (e.g., should the approach be adopted with respect to the exclusion of the Trans Labrador Highway from the national park as with the Kluane National Park exclusion of the Alaska Highway, what are the effects on the Akamiupishu/Mealy Mountains National Park's size and geographic extent, what are the effects on the Natural Region's and ecoregions' ecological integrity and wilderness character through exclusion of habitat on the opposite side of the highway, etc.).

Response 118:

Section 6.13.3.2 of the EIS/CSR describes the five ecoregions encompassed by the proposed national park and indicates that the proposed park is representative of Natural Region 21. Similarly, the effects on the ecological integrity of the proposed National Park, if it was established with a road within its boundaries, were assessed in Section 6.13.8 of the EIS/CSR. The presence of the road was not considered to result in a significant effect on the ecological integrity of the proposed park to such an extent that it would preclude establishment of a park in the area. This conclusion was reached by reviewing existing information on the effects of roads in national parks, particularly considering the density of roads (there are no other roads) and the likelihood that human activity as a result of the highway would cause effects beyond a small area surrounding the highway. There would continue to be little or no access to the majority of the national park area. As well, national park status would provide protection for the area from future resource use activities, such as forest harvesting, mining and cabin development, to a large area surrounding the proposed highway route.



3.4.13 Tourism and Recreation (EIS/CSR Section 6.14)

Comment 119:

The EIS/CSR doesn't offer baseline information about the area's tourism industry. It does not describe the contribution of the tourism industry to the local economy in terms of spending and employment. Further, it does not address key questions about the interaction between the highway and the tourism industry: the opportunities for tourism growth from hunting, fishing and adventure tourism markets assuming no road; the risks that the highway will result in less opportunity to increase (or even reduce) volumes of higher spending markets; the potential for increased spending from new automotive markets in excess of any losses and the availability of mitigation that will lead to minimal loss of high spenders and significant gains in the lower spending automotive markets. In addition the EIS/CSR should provide discussion of tourism employment implications of decline in demand for labour intensive lodge operations (cooks, wait staff, pilots, guides, maintenance, etc) in comparison to lower consumption automotive touring markets availing of store bought foods, gas, camping. It would be instructive to provide an evaluation of the number of automotive visitors required to replace the spending of one lost lodge client, without accounting for the differences in employment requirements of the two types of visitors.

Response 119:

In terms of the contribution of the tourism industry to the local economy, Section 6.14.3 of the EIS/CSR is amended by introducing the following after the current second paragraph:

Very limited information is available on the contribution the tourism industry makes to the Labrador economy. For example, the 1997 Auto Exit and Air Exit Surveys (DTCR n.d.) do not contain information on the expenditures of visitors to Labrador. There are data for the province as a whole (e.g., non-resident vacation/pleasure travelers responding to the automobile exit survey spent an average of \$459), with the greatest expenditures being on transportation (35 percent of the total spent), accommodations (21 percent) and restaurants (17 percent). Air travelers spent an average of \$712; of the costs other than those associated with a tourism package (these accounted for 40 percent of the total), the most important expenditures were on accommodations (19 percent), restaurants and bars (15 percent) and car rental and gas (11 percent). However, there is no reason to think that the amounts spent, or the distribution of expenditures across the different categories, will be the same in Labrador as they are for the province as a whole.

Similarly, the 1999 Non-Resident Big Game Hunter Survey (DTCR 1999) only contains information about the Island of Newfoundland. There is no reason to think that spending patterns in Labrador are similar.



The Department of Tourism, Culture and Recreation does have preliminary data from Labrador lodge owners and guides (DTCR 2003) that show that their clients spent \$5.8 million on fishing, hunting and non-consumptive activities in 2002. This included \$2.9 million spent on sportfishing and \$1.9 million on hunting. These figures include expenditures by residents, although they represented only 17 and 7 percent of those engaged in sportfishing and hunting, respectively.

The Department of Tourism, Culture and Recreation has also prepared a tabulation of spending by non-resident tourists in four of the five Labrador economic zones between June and September 1997. The greatest expenditure, \$1.1 million, was in Zone 2. This was followed by Zone 3 (\$1.0 million), Zone 1 (\$0.6 million) and Zone 5 (\$0.4 million). No information is available on Zone 4 (ACOA 2003a).

More detailed information on economic effects is available in a draft report on tourism development in the Labrador Straits, Zone 5 (ACOA 2003b). This found total 2002 tourism-related expenditures of \$1.3 million. Visitors on bus tours spent \$390,000 (30 percent) of this, with private visitors spending the rest. Tourism-related expenditures made an estimated direct contribution of about \$540,000 to the region's Gross Domestic Product (GDP). Including indirect and induced effects, the total GDP impact on the Labrador Straits was estimated at about \$670,000. Based on these GDP effects, it is thought that tourism supported 25 person years of employment (or 87 seasonal jobs), and generated about \$485,000 in wages and salaries, in the Straits during 2002.

The likely future state of tourism without construction of the road are described in Section 3.6 of the EIS/CSR, 'Likely Future Conditions'.

In respect of the balance of effects on the lodge/outfitter and automotive markets, Section 6.14.8.2 of the EIS/CSR is amended though the addition of a new, final, section:

Balance of Effects on Different Markets

As was noted in Section 6.14.3, only a limited amount of information is available on tourism expenditures in the Labrador lodge/outfitter and automotive markets. As such, there is only a very limited basis for estimating the effects of the road.

This is especially the case with automobile tourists, since the possibility for Island and Labrador residents, and non-residents, to access new areas and communities, and for undertaking a circular route, will attract new markets with new spending profiles. Furthermore, there is no basis for estimating the numbers of automotive tourists who will choose to avail of these new opportunities; this will depend, not the least, on the effectiveness of any TLH automobile tourism promotion programs. Lastly, the nature and extent of



economic benefits from this market will depend, in large part, on the ability of local residents to respond to this new market opportunity. This might include, for example, the opening or expansion of motels, bed and breakfasts, camping sites and craft stores.

The economic effects on the lodge/outfitter market are also unclear. It is generally recognized that the quality and pristine character of the area are key concerns respecting outdoor tourism markets. For example, D. Stewart (pers. comm) cites a 1993 Angus Reid Group survey of California travelers in which 65 percent of respondents indicated that the environment is very important in choosing a destination and 44 percent of respondents indicated that 'a chance to see wildlife and undisturbed nature' was a very important determinant of where they would go.

DFO's 1995 Survey of Recreational Fishing in Canada found a pristine environment (unpolluted fish, clean water and natural beauty of the setting) was one of the most important factors in choosing a destination.

However, it is not clear how far the new highway will affect either the environment around lodges, or potential clients' perceptions of same. As has been noted above, Section 6.14.7, various mitigation measures are in place that will help ensure such effects are minimized. The perception of any effect, real or not, will depend on a wide range of factors and is impossible to quantify. It is, as a result, not possible to estimate the overall economic effects on this market or the nature of any trade-off between different market segments. However, it should be noted that it seems unlikely that service sector jobs in lodges pay substantially higher wages than are offered by automobile tourism operations.

Comment 120:

Explain why the Environmental Effects Summary in Table 6.65 could not have characterized the Environmental Effects Evaluation as Significant based on the experience of lodge closures in the province as a result of increased crowding, reduced catch rates and reduced pristineness. Include in the explanation the effects of those closures on multiple sectors (airlines, bushplanes, guides, craft, hotel/motel, restaurants, etc.) from reduced business. Evaluate whether ancillary forestry, cabin and other development will be sufficient to cause closures of outfitting operations on the Eagle River Plateau and Eagle River.

Response 120:

No studies were identified during the data collection/research for the environmental assessment of the TLH - Phase III that provided information on lodge closures. Undertaking original research for this item is outside the scope of the environmental assessment as it was not required in the guidelines. The effects analysis for the tourism and recreation VEC, with results summarized in Table 6.62 of the EIS/CRS, considered all



aspects of the tourism and recreation industry within the study area (i.e., Regional Economic Zones 3 and 4) and, to an appropriate extent, other areas of Labrador and the province due to the transportation link that would be provided by the TLH - Phase III. Therefore, when factoring in all aspects of tourism and recreation, it was determined that highway operation would have both positive and negative effects. Overall, with appropriate planning and enforcement, significant effects will not likely occur.

Determining whether development such as forestry or cabin development would be sufficient to cause closures of outfitting operations on the Eagle River plateau and Eagle River is beyond the scope of this environmental assessment. However, with respect to the forest management planning process, stakeholder consultation is required, and plans are subject to environmental assessment and both government and public review. Tourism agencies and the Newfoundland and Labrador Outfitters Association could be involved in the process, if they are not already. The area at the western end of highway route (both north and south of the Churchill River) contains Labrador's most productive forests (Department of Forest Resources and Agrifoods 2002). Therefore, it is likely that the area of most interest for forestry operations will be away from the Eagle River and plateau. In addition, the Eagle River, a scheduled salmon river, already has several outfitting operations located in its watershed, and is a key area of traditional use identified by the Innu. There is also a freeze on the development of new outfitting camps on rivers in Labrador (T. Kent, pers. comm). This should act to limit the development of any new outfitting lodges.

3.5 EIS/CSR Summary and Conclusions

3.5.1 Mitigation Measures (EIS/CSR Section 7.1)

Comment 121:

Under "Wetlands" in the summary of mitigation measures presented in Table 7.1, and elsewhere throughout the EIS/CSR, it is indicated that the proponent will conduct a field investigation of potential areas for rare and endangered plant species. However, nothing further is indicated. Certainly more information on the proposed surveys is required. And, again, if breeding bird surveys are to occur after the EIS/CSR is completed, it is important that appropriate mitigation and follow-up measures acceptable to the Responsible Authorities and Environment Canada be developed before work on the highway is allowed to proceed. It would be preferable that these surveys be conducted before the EIS/CSR is finalized.



Response 121:

With respect to information on the field investigation for rare and endangered plant species, refer to the response to Comment No. 30 in Section 3.3 of the addendum. Section 3.2.1.3 of the EIS/CSR has been amended to provide details on the proposed field investigation of potential areas for rare and endangered plant species.

With respect to breeding bird surveys, refer to the response provided to Comment No. 60 in Section 3.4.3.5 of this addendum.

Also, there is a freeze on the development of new outfitting camps on rivers in Labrador (T. Kent, pers. comm.).



4.0 EDITORIAL MODIFICATIONS AND CHANGES

A list of editorial modifications or changes required to the EIS/CSR was provided to WST following the deficiency statement. These items are listed in Table 4.1 along with the corresponding responses.

Table 4.1 Editorial Modifications or Changes Required to the Environmental Impact Statement/Comprehensive Study Report

Section No.	Comments as Provided by the Environmental Assessment Committee	Response
General Comments	<ul style="list-style-type: none"> A table of abbreviations will greatly enhance the readability of the EIS/CSR. 	The EIS/CSR is amended to include a list of acronyms after the Table of Contents. The list of acronyms for the EIS/CSR is provided in Appendix F.
	<ul style="list-style-type: none"> The EIS/CSR should be proofread and reviewed for clarity. For example, there are too many words in the last sentence of Roadside pull Off locations; the first letter of many words are missing; there is something missing between the bottom of page 268 and the top of page 269; "(such as hydrocarbons)" is in the wrong place on page 276; and sentence 1, page 323, is ambiguous and the reader can only make assumptions. 	<p>The EIS/CSR was proofread and reviewed for clarity, and the EIS/CSR amended as appropriate.</p> <p>The issue regarding the first letter of many words being missing is due to technical issues associated with software used to create the electronic document file. The document was created using the WordPerfect word-processing software, as it is the standard software of WST. The final document was produced in an Adobe Acrobat file (a document reader software) for ease of printing the final reports required and to provide a protected electronic version of the final document on CDs and for posting on the Department of Environment website. Adobe Acrobat is not fully compatible with the WordPerfect software (Adobe Acrobat is best compatible with the Microsoft line of software) and the loss of the first letters off many words was one of the technical problems encountered with the document transfer. Unfortunately, the loss of letters was one problem that did not get detected prior to the release of the documents. To address this issue, the EIS/CSR has been amended throughout to correct for the loss of letters.</p> <p>The specific items listed in the comment are addressed as follows:</p> <ul style="list-style-type: none"> The EIS/CSR is amended by removing the word "be" from the last sentence of Section 2.4.12 on Page 52. The missing item between the bottom of Page 268 and the top of Page 269 is the letter "S", the first word at the top of Page 269 should be "smolt" not "molt". The EIS/CSR is amended to reflect this change. The EIS/CSR is amended by moving the phrase "(such as hydrocarbons)" from the middle of Paragraph 3 on Page 276 to Sentence 1 of Paragraph 3 immediately after "Hazardous materials (such as hydrocarbons)" Sentence 1, Page 323 is amended to read: "Overall, water quality is generally dilute, which is typical for waters draining the Canadian Shield."
	<ul style="list-style-type: none"> The EIS/CSR mentions in several places that a waterfowl and passerine birds study was conducted. In other places the EIS/CSR refers to migratory bird studies. The passerine birds study was not completed before submission of the EIS/CSR and will be ongoing subsequent to release of the undertaking as construction proceeds. All references to waterfowl and passerine bird studies and migratory birds studies should refer to waterfowl only. 	The EIS/CSR is amended to remove references to passerine and migratory bird studies. Avifauna studies conducted for the TLH - Phase III environment assessment focused on waterfowl and raptors (there were two separate studies). WST committed to completing a study on passerine birds in the vicinity of the highway, prior to the start of construction.
1.1	The Project - The citation is wrong: the project is officially known as "Cartwright Junction to Happy Valley-Goose Bay Trans Labrador Highway"	References to the project in the EIS/CSR are amended to read: Cartwright Junction to Happy Valley-Goose Bay Trans Labrador Highway.



Section No.	Comments as Provided by the Environmental Assessment Committee	Response
1.3.1	<p>Provincial Environmental Assessment Process - The decision making process described for the environmental assessment is missing key steps. Consult the <i>Environmental Protection Act</i> and the Memorandum of Understanding with the Innu Nation for the complete decision making process (and reflect the correct process in Table 2.1).</p>	<p>The last paragraph of Section 1.3.1 is amended to read: At the provincial level, the environmental assessment is also subject to a Memorandum of Understanding (MOU) between Innu Nation and the Departments of Environment, and Labrador and Aboriginal Affairs. As indicated in the guidelines for the EIS/CSR, the EIS will be used by the Minister of Environment, in consultation with Cabinet, and with Innu Nation in accordance with the MOU, to determine the acceptability of the proposed project based on its anticipated effects, proposed mitigation and significance of residual effects. The Minister of Environment will recommend to the Lieutenant-Governor in Council whether the undertaking should be released subject to terms and conditions or that it not be permitted to proceed.</p> <p>In the “Requirements” column of Table 2.1, Row 1 of the Provincial section, the second sentence is amended to read: As noted in the guidelines for the EIS/CSR, the EIS will be used by the Minister of Environment, in consultation with Cabinet, and Innu Nation, in accordance with the MOU signed by the Ministers of Environment and Labrador and Aboriginal Affairs, to determine the acceptability of the proposed project based on its anticipated effects, proposed mitigation and significance of residual environmental effects.</p>
1.3.2	<p>Federal Environmental Assessment Process - The use of the Comprehensive Study is not correctly described.</p>	<p>The last sentence of Section 1.3.2 is deleted. The first sentence of Paragraph 2 is amended to read: DFO has determined the TLH - Phase III will be subject to comprehensive study under CEAA and that a Comprehensive Study Report (CSR) is required. In addition, reference to the EIS and Comprehensive Study throughout the document is amended to read: EIS/CSR.</p>
1.4.3.3	<p>Caribou Component Study -Some of the contents of this section were not included as information in the Component Study submitted. This should be identified as supplementary information to the Caribou Component Study.</p>	<p>The following sentence is added to the beginning of Paragraph 3 in Section 1.4.3.3: Following completion of the component study, additional information was provided by the Department of Tourism, Culture and Recreation.</p>
1.4.3.5	<p>Resource Use and Users Component Study - The Component Study is called Land and Resource Use Component Study. This section should also reflect that land and resource use was covered in two parts, with a separate part for Labrador Innu land use.</p>	<p>The heading for Section 1.4.3.5 is amended to read Land and Resource Use Component Study, instead of Resource Use and Users Component Study. In addition, the following sentence is added at the end of Paragraph 1, Section 1.4.3.5: Innu land and resource use in the vicinity of the proposed routing fo the TLH - Phase III was described in a separate study by Armitage and Stopp (2003). A summary of this study is provided in Section 1.4.3.10.</p>
2.2.1	<p>Alternative to the Project - It is difficult to believe that Phase I of the Trans Labrador Highway has and will continue to change the socio-economic environment of Southern Labrador. Perhaps this statement should refer to either Phase II or Western Labrador.</p>	<p>Paragraph 5, Page 23 provides discussion on socio-economic changes related to the Phase II portion of the TLH. The reference to Phase I in Sentence 2, Paragraph 5, Page 23 is amended to be Phase II.</p>
2.2.2.3	<p>Alternatives for Crossing the Churchill River Muskrat Falls Crossing (A3) -This route is described as extending southwest but it actually appears to extend southeast.</p>	<p>Sentence 2, Paragraph 3 in Section 2.2.2.3 is amended to read: It would then extend southeast for approximately 47 km before joining the preferred route (A4 and A5)."</p>
2.2.2.4	<p>Alternative Routes through Central Labrador Route through Nekanikau (A12) - It is not clear if this route was to be considered further or not.</p>	<p>The following sentence is added to the end of Paragraph 6, Section 2.2.2.4: Therefore, A12 is not considered further.</p>
2.3	<p>Regulatory Approval Requirements - WST Specification 802 should have been included in the Appendix.</p>	<p>The reference to WST Specification 802 in Section 2.3 is amended to WST Specification 805 (i.e., the correct reference for the subject matter), which is already provided in Appendix D of the EIS/CSR.</p>
2.4.4.1	<p>Design Criteria for Crossing Structures - Rollings (1997b) is not identified in the Literature Cited.</p>	<p>The first sentence of Paragraph 3, Section 2.4.4.1 is amended to read: The main methods for determining stream flow will be the regional flood frequency method for Labrador as described in Rollings (1997) and the rational method as described in TAC (1982).</p>



Section No.	Comments as Provided by the Environmental Assessment Committee	Response
2.5.1	Project Schedule - the text indicates that the annual construction season will extend from mid-May but Figure 2.10 indicates April of each year.	The annual construction season will extend from mid-May each year as climatic conditions will not allow construction to begin any earlier. Figure 2.10 indicates that construction will begin in the second quarter of each year and was meant to provide an overview of the general schedule of project phases. The project schedule chart in Figure 2.10 is amended to show the bar starting in the middle of the second quarter of each construction year.
2.6	Operation and Maintenance - Development activities along highways are controlled under the <i>Protected Road Zoning Regulations</i> only if that road has been designated a protected road under the regulations, not along all highways.	The first sentence of Paragraph 4, Section 2.6 is amended to read: For roads designated as protected roads, development activities are controlled under the <i>Protected Road Zoning Regulations</i> .
3.2.1.1	Ecological Land Classification - If the Taiga Shield Ecozone lies on either side of Hudson Bay it should be the eastern segment occupying central Quebec and Labrador.	The first sentence of Paragraph 9, Section 3.2.1.1 is amended to read: This ecozone lies on either side of Hudson Bay, with the eastern segment occupying central Québec and Labrador.
3.2.1.3	Rare and Endangered Vascular Plant Species - The ACCDC contact is S. Gerriets, not Garriets.	The first sentence of Paragraph 3, Section 3.2.1.3 is amended to read: Only two rare plant records from the ACCDC are known for this area (S. Gerriets, pers. comm), small northern bog-orchid and sensitive fern.
3.2.2	Avifauna - Rough-legged hawk is mentioned twice. Perhaps a different species was to have been included in place of one of the rough-legged hawk citations.	The second sentence of Paragraph 2, Section 3.2.2 is amended to read: Raptors found in the region include bald eagle, osprey, rough-legged hawk, red-tailed hawk, great horned owl, merlin and American kestrel.
3.3.3	Fish - Should "east-northeast" be "west-southwest?"	The third sentence of Paragraph 2, Section 3.3.3 is amended to read: TLH - Phase III will cross the main stem near Paradise Junction and then traverse over 50 km of the watershed in an west-southwest direction.
3.4.7	Tourism and Recreation - This section states that there are a "number of existing and proposed parks and reserves (Section 3.4.5)." Section 3.4.5 states that "There are no existing provincial or federal parks in Central Labrador." One of these statements should be changed.	The first sentence of Paragraph 10, Section 3.4.5 is correct. There are no existing provincial or federal parks in Central Labrador. The fact that the Mealy Mountains area has been identified by Parks Canada as a candidate for national park status is noted in the second sentence of this paragraph. The discussion in Section 3.4.7 provides a general overview of tourism in Labrador, it does not focus on the Central Labrador area as does the text in Paragraph 10 of Section 3.4.5. The reference made in Section 3.4.7 to Section 3.4.5 directs the reader to examples of existing and proposed parks and reserves in Labrador as Paragraph 10 does provide some information of this nature. Thus, no change is required to the EIS/CSR.
4.2.1	Environmental Assessment Guidelines - The Guidelines were issued by the Minister of Environment, not the Department of Environment, and they were issued on December 06, not December 19. Key subjects were also identified by the public.	The first sentence of Paragraph 1, Section 4.2.1 is amended to read: <i>The Guidelines for Environmental Impact Statement and Comprehensive Study, Cartwright Junction to Happy Valley-Goose Bay Trans Labrador Highway</i> , as issued by the Minister of Environment on December 6, 2002, provide the framework for the environmental assessment.
		The first sentence in Paragraph 2, Section 4.2.1 is amended to read: Key subjects identified in the guidelines for consideration in the EIS/CSR are (also refer to the Table of Concordance provided in the Executive Summary):
5	ENVIRONMENTAL EFFECTS ASSESSMENT METHODS - The EIS/CSR guidelines were issued by the Minister of Environment on December 06.	The third sentence of Paragraph 1, Section 5.0 is amended to read: The EIS/CSR guidelines, issued by the Minister of Environment on December 6, 2002, also shaped the approach used for the assessment.
6.1.3	Existing Environment - it might have proved instructive to have the LLTA and control area raptor nest sites superimposed on Figure 6.1. Footnote 2 in Table 6.1 references an adjustment to the proposed TLH Phase III route but the text does not describe the adjustment, nor are the two additional nests identified in August.	Nests depicted on Figure 6.1 include those known in the LLTA and control area. Figure 6.1 is amended to include the LLTA. In order to accommodate an outfitter in the Eagle River area, a river crossing point was moved approximately 1.5 km south of the original proposed alignment. As a result, during the final waterfowl survey, conducted 28-29 August 2002, two osprey nest structures were identified in the new crossing area. The status of the nests (i.e., whether they had been active in 2002) was unknown since young osprey would have dispersed from the nests by the end of August.
6.3.2	Methods - The Caribou Component Study submitted for review consisted of Otto 2002a. Otto 2002b was never received by the Environmental Assessment Division.	Otto (2002b) is provided in Appendix G.



Section No.	Comments as Provided by the Environmental Assessment Committee	Response
6.5.1	Boundaries - “The NWPA is enforced by the CCG of DFO.” should be written in full.	The acronyms used in Paragraph 4, Section 6.5.1 are used properly in that the acronyms had been defined previously in the document. However, Sentence 9 of Paragraph 4, Section 6.5.1 is amended to read: The <i>Navigable Waters Protection Act</i> is enforced by the Canadian Coast Guard of the Department of Fisheries and Oceans.
6.5.2	Methods - The Fish and Fish Habitat Component Study states that fish sampling has been postponed indefinitely and the EIS/CSR states here that fish sampling has been deferred until the summer of 2003. The nature and extent of any fish sampling should be definitively stated.	Indefinitely meant that at the time the environmental assessment was to be completed without fish sampling. The statement in the EIS/CSR regarding the deferred fish sampling was in reference to the population study to be conducted by Inland Fish and Wildlife Division.
6.5.6	Existing Knowledge - The reference to proper mitigative steps in Section 2.6 is incorrectly referenced.	The reference to Section 2.6 at the end of the first sentence of Paragraph 1, Page 275 in Section 6.5.6, is amended to read Section 2.10.3.
6.5.8.2	Operation - The text of this section states that “effect will extend over the life of the highway” but Table 6.25 indicates that the duration in months is <1. These should be reconciled.	The potential effects will exist for the life project. However, there is to be no net loss of fish habitat or disruption of their migration.
6.7.3	Existing Environment - The statement is made that the closest activity is approximately 80 km to the southeast. Is this from Cartwright Junction, Park Lake or Happy Valley-Goose Bay?	The second sentence of Paragraph 10, Section 6.7.3 is amended to read: No recent mineral exploration activity has been reported near the proposed highway, and the closest activity is approximately 80 km to the southeast of Cartwright Junction.
6.7.9	Environmental Effects Evaluation - The definition of significant environmental effect should not be the same as not significant environmental effect.	The second paragraph in Section 6.7.9 is amended to read: A significant environmental effect is one that alters geomorphological features along the highway right-of-way, such that there is a measurable, sustained degradation in water quality as a result of exposure of AGR, slumping and erosion, and/or disturbance to permafrost.
6.9.3	Existing Environment - It is believed that the representative photos are in Appendix S, not Appendix R. Plant community descriptions are in Appendix R, not Appendix S. Only some, not all, plant species are contained in Appendix E. There is no Appendix X containing the detailed description of ground-truthed sites.	The last sentence of Paragraph 1, Section 6.9.3 is amended to read: Representative photos of each wetland type are provided in Appendix S. The second sentence of Paragraph 2, Section 6.9.3 is amended to read: Detailed plant community descriptions for each ground-truthed site are presented in Appendix R. The reference to Appendix X in the legend boxes of Figures 6.23 to 6.27 is in error. The figures are amended to show Appendix R, in place of Appendix X.
6.9.8.1	Construction - The first line of the second paragraph states that the majority of wetlands found within 200 m of the centre line of the highway are bogs (72.5 percent). Table 6.48 states that 72.5% are found within 100 meters of the proposed highway right-of-way. These two should be reconciled. WST's detailed procedures are not contained in Section 2.10.2. That section contains Management and Reporting Structure.	The first sentence of Paragraph 2, Section 6.9.8.1 is amended to read: As noted above, the majority of the wetlands found within 100 m of the centre line of the highway are bogs (72.5 percent), with basin bogs being the most common type (24.9 percent). The first sentence of Paragraph 3, Section 6.9.8.1 is amended to read: WST has detailed procedures for prevention of erosion and siltation, maintenance of flows, and protection of vegetation and wetlands during construction (Section 2.10.3).
6.11.2	Methods - The proposed highway route should be shown on Figure 6.29.	Figure 6.29 is amended to show the preferred route for the TLH - Phase III.
6.11.9	Environmental Effects Assessment - Bullet #7 in Table 6.54 should be changed to read “informing personnel of their responsibility to report suspected findings of historic resources will be part of all environmental awareness sessions.”	Bullet 7 under Mitigation in Table 6.54 is amended to read: informing personnel of their responsibility to report suspected findings of historic resources will be part of all environmental awareness sessions delivered to construction personnel.



Section No.	Comments as Provided by the Environmental Assessment Committee	Response
6.11.9	Environmental Effects Assessment - Bullet #11 in Table 6.54 should be changed to read "if required, develop in consultation with the PAO and Innu Nation appropriate mitigative measures if an archaeological site is encountered on the 40-m-right-of-way during future historic resources field assessment or construction."	Bullet 11 under Mitigation in Table 6.54 is amended to read: If required, develop in consultation with the PAO and Innu Nation, appropriate mitigative measures if an archaeological site is encountered on the 40-m-right-of-way during future historic resources field assessment or construction.
6.12.1	Boundaries - In both this section and 6.12.2 Methods, the Component Study prepared by JW (2003c) was called Land and Resource Use not resource use and users.	<p>The last sentence of Paragraph 2, Section 6.12.1 is amended to read: These zones also represented the study area for the component study on land and resource use prepared by JW (2003c).</p> <p>The first sentence of Paragraph 1 in Section 6.12.2 is amended to read: The environmental assessment of resource use and users draws on the background information provided by the component study on land and resource use completed by JW (2003c) for the TLH - Phase III environmental assessment.</p>
6.12.3.4	Hunting - Waterfowl and Seabird Management and Hunting - This section states that there are two different daily and possession limits after the first Monday in February.	The sixth sentence of Paragraph 13 in Section 6.12.3.4 is amended to read: Merganser, scoter and eider have a daily possession limit of six (not more than three may be eiders after the first Monday in February) and a total possession limit at any one time of 12 (not more than six may be eiders after the first Monday in February).
6.12.3.6	Fishing - The Total Days Fished in 1990 in Table 6.57 don't seem to sum to the numbers included in the table.	The total days fished in freshwater in 1990 was 128,215 not 127,515 as indicated in Table 6.57. Therefore, Table 6.57 is amended accordingly.
6.12.9	Environmental Effects Evaluation - One paragraph is included twice in this section.	Noted. Paragraph 7 in Section 6.12.9 is deleted.
6.13.8.3	Accidental and/or Unplanned Events - The last sentence appears to be redundant.	Noted. The last sentence in Section 6.13.8.3 is deleted.
6.16.3.1	Settlement and Demographics - The figures provided for lone-parent families do not add up to the totals given.	The data reported in Section 6.16.3.1 demographics were obtained from Statistics Canada's 2001 Census. The numbers shown for lone parent families are as published by Statistics Canada. The fact that the numbers do not add up to the total numbers presented is likely due to the fact that Statistics Canada data are rounded to the nearest 5 and when numbers are low for a category, they are not published for confidentiality reasons. Therefore, the final total for a group of numbers may not exactly equal the total of the individual numbers presented.
7.2	Monitoring and Follow-up Commitments - The provisions of the EIS/CSR should be added.	Provisions in the EIS/CSR with respect to monitoring and follow-up have been summarized in Table 7.2.



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APPENDIX A

Environmental Impact Statement/ Comprehensive Study Report Deficiency Statement

**CARTWRIGHT JUNCTION TO HAPPY VALLEY-GOOSE BAY
TRANS LABRADOR HIGHWAY
ENVIRONMENTAL IMPACT STATEMENT AND COMPREHENSIVE STUDY
DEFICIENCY STATEMENT**
Issued April 2003

**Part I: Sections of the Guidelines which have not been adequately addressed
or have not been addressed at all**

3.3.2 Alternative Methods of Carrying Out the Project

N The Guidelines require discussion of the following alternative routing criteria: avoidance of wetland areas; avoidance of adverse effects and enhancement of benefits on existing or potential tourism operations; avoidance of environmentally sensitive areas; avoidance of additional stress on land and resources through increased access; avoidance or reduction of effects on Innu land use; avoidance or reduction of effects on the proposed Akamiupishku/Mealy Mountain National Park; and, avoidance or reduction of effects on Woodland Caribou (Red Wine and Mealy Mountain herds). The EIS/CSR discussion provided is limited to minimization of construction and operating costs and provision of a direct and economical route for highway users, without consideration of the aforementioned criteria. It is also advised that the Guidelines require specific inclusion of each of two routes as one of the alternative methods of carrying out the undertaking: the route identified by Innu members and the route identified by the Newfoundland and Labrador Outfitters Association. Discussion of the alternative routing criteria identified above should be presented for at least each of these two routes. Specific considerations included in the criteria could include: the number of water crossings required by each alternative; the ability of either route to mitigate potential effects likely as a result of increased access to trophy trout lakes on the Eagle River Plateau and the area's salmon pools; the availability of either route to engage a variety of scenic vistas and/or natural tourist attractions which could increase automobile sightseeing touring and other tourism markets, etc. A rating table should be presented to show how the preferred route came to be so using the criteria identified.

3.6 Construction

N The Guidelines require discussion of stream crossing structures address a number of considerations, including any feasible alternatives to the proposed crossing structure, and information of any infilling required. The EIS/CSR does not provide any discussion of alternative crossing designs. The only infilling information provided is for the proposed causeway at the Churchill River crossing. However, there was no ground habitat survey done at this site for the Fish and Fish Habitat Component Study, and no information on habitat characteristics, fish species present and any fishing activity in this area was provided. Considering the extent of infilling and depending on the nature of the habitat and its link to a

fishery, Fisheries and Oceans Canada may determine that the Churchill River crossing would result in a harmful alteration, disruption or destruction of fish habitat. The Churchill River crossing design will need to incorporate fish habitat considerations, and in particular, it is important that hydraulic conditions in the vicinity not be significantly altered.

4.1 Existing Environment

N The Guidelines require a description of hydrological conditions consisting of hydrologic, hydraulic and design parameters and the methodologies used to determine the dimensions and capacities for all watercourse crossings. The Table of Concordance indicates that hydrological conditions, including hydrologic, hydraulic and design parameters are included in Section 3.3.2. They are not included in that section nor do those characteristics appear to be included anywhere in the EIS/CSR.

5.0 ENVIRONMENTAL EFFECTS

N The Guidelines require a comprehensive analysis of environmental effects of fish and fish habitat in accordance with the listed criteria. The analysis was not done for any alternative route(s), and the analysis of the preferred alternative is not addressed completely.

N Resource use and users are identified in the Guidelines as a VEC. Potential protected areas are required to be considered and the Eagle River has been identified as a potential candidate for designation under the Canadian Heritage Rivers System. There is no analysis of the predicted effects of each project alternative on the potential for designation of the Eagle River under the Canadian Heritage Rivers System.

6.1 Mitigation

N The Guidelines require full consideration of the precautionary principle however it is not evident that full consideration was utilized in impact avoidance through scheduling and siting constraints (e.g., the EIS/CSR indicates that the proponent's major mitigation initiative was to select the route that avoids wetlands yet the preferred route runs through the middle of the major wetland/string bog complexes in the headwaters of the Eagle River watershed. The precautionary principle seem needs to be considered in assessing the potential for the highway's effects on fish and the fishery or to propose mitigation for those effects.

N The Guidelines require the proponent to include an assessment of the present capacity of resource agencies to mitigate and monitor cumulative environmental effects resulting from increased access to the study area. Instead the Cumulative Effects Assessment makes the assumption that relevant government agencies will have adequate resources to effectively carry out their mandate with respect to enforcement. The EIS/CSR should comply with the

requirement of the Guidelines or the proponent should also use the assumption that relevant government agencies will **not** have adequate resources to effectively carry out their mandate with respect to enforcement and generate a second Environmental Effects Summary for each of the VECs based on that assumption. The Environmental Effects Summary prepared for the second assumption should then be compared to the Environmental Effects Summary prepared for the first assumption. Although planning and control measures are available to regulate activities associated with increased access, in the opinion of several agencies current resources are not believed adequate to enforce such regulations, considering the difficulties associated with enforcement across the large, sparsely populated area along the highway corridor. Options to be considered in addressing this issue could include the requirement to increase dedicated staff and funding to resource agencies for conservation and protection in the area, and cooperation with aboriginal groups and other regulatory agencies.

7.2 Effects Evaluation and Selection of Preferred Alternative

N This evaluation and selection is not provided. The evaluation of highway alternatives, as required by 3.3.2 above, should be supported by a substantive accounting of the environmental effects and socio-economic implications of each alternative. The option that represents the greatest gain, for the least environmental cost, should be apparent from the analysis to be provided.

Part II: Sections of the Environmental Impact Statement and Comprehensive Study for which additional information is required, for which revisions or clarification is required and for which the analysis and/or interpretation is not correct

1.4.3.3 Caribou Component Study

N The Science Division was responsible for conducting the study, not the Inland Fish and Wildlife Division.

2.2.1 Alternative (sic) to the Project

N The description of alternatives to the project highlights the planned reduction in alternative transportation means - including air and marine services - and puts considerable emphasis on associated financial cost savings. Economic costs and benefits are indeed important considerations. However the Canadian Environmental Assessment Agency's Operational Policy Statement on the consideration of project alternatives also emphasizes the importance of considering environmental costs and benefits. This is not currently reflected.

N A shift away from marine and air services toward ground transportation will presumably increase the need for individuals to acquire and operate their own vehicles for transportation, and increase the frequency of commercial and personal travel. The completion of Phase III will also likely support this increase by enhancing ground transportation access. This, in turn, will likely have an effect on the resulting volume of Greenhouse Gas (GHG) emissions. The environmental assessment of a project of this magnitude should examine the potential change in overall GHG emissions associated with a shift in transportation mode. The examination should include a comparison of fuel consumption and associated GHG emissions from current transportation modes and from anticipated transportation modes if the highway were to proceed. An accounting of GHG emissions and losses of GHG sinks associated with the highway compared with an unaltered environment is required by the Guidelines.

2.2.2 Alternative Means for Carrying out the Project

N One of the technical/engineering factors listed is watercourse location. Identify whether during route location any consideration was given to proximity of proposed crossings to major inflows or outflows of ponds or lakes, or to obstructions. Pond and lake inflows and outflows are areas of high productivity, and should be avoided as preferred crossing locations where possible. Crossings at or near major waterfalls, or other obstructions (e.g., stream #23 and #24), may be a problem as fish could concentrate at these sites and be particularly susceptible to heavy angling pressure. This could be a particular concern for anadromous fish.

2.2.2.4 Alternative Routes through Central Labrador

Route Proposed by Outfitters (A13)

N The EIS/CSR states that Innu raised concerns with this route. Describe the concerns raised.

N Fisheries and Oceans Canada (DFO) notes that the outfitters' alternative route would eliminate the need for a bridge on the South Branch of the Eagle River. By reducing easy access to the Eagle River, this route may alleviate concerns over increased angling pressure on the fish stocks of the Eagle River watershed, in particular the large Eastern brook trout and salmon, and the potential for negative effects on the sport fishing industry that this area supports. From a conservation and protection perspective, this alternative route would be more protective of the Eagle River fish stocks than the proponent's preferred route. Provide an effects evaluation of this protection as required by Section 7.2 of the Guidelines.

2.3 Regulatory Approval Requirements

N Table 2.1 acknowledges a requirement to submit an application to Navigable Waters Protection, Canadian Coast Guard for any bridges, causeways, pipe arch culverts and cylindrical culverts 1500 mm or larger. Photographs should accompany applications. Any temporary watercourse diversion must also be included with the original application for that specific crossing.

2.4.4 Watercourse Crossings

N Table 2.3 identifies a causeway/bridge configuration for the Churchill River crossing. Provide the rationale for that decision. A 60 m bridge span has been proposed for the Paradise River crossing yet for the Kenamu and Eagle River South Branch, two bridge spans of 30 m each are proposed. Provide the rationale for that decision. From a fish habitat perspective, clear span bridges would be preferable wherever feasible.

N Table 2.3 also identifies that there are 31 crossings in Type I/II habitat yet only 17 pipe arches are proposed. Of the 17 pipe arches, seven are located in Type III/IV habitat, hence the majority of crossings in Type I/II habitat are cylindrical culverts. DFO considers that bottomless arch culverts are the preferred type to avoid any harmful alteration, disruption or destruction of fish habitat (HADD). Why are no bottomless arch culverts proposed? What criteria were used in selection of culvert type? Culverts and bridges must be sized to maintain as much of the natural stream width as possible. It would appear from the information presented in the EIS/CSR and the Fish and Fish Habitat Component Study that this is not always the

case. Wherever infilling is proposed at any crossing location DFO requires site-specific habitat information for HADD determination purposes.

N A number of discrepancies have been noted between the EIS/CSR and the Fish and Fish Habitat Component Study. For example, a comparison of Table 2.3 in the EIS/CSR and Tables 3.4 and 3.5 in the Fish and Fish Habitat Component Study revealed a number of inconsistencies. In Table 3.4 and 3.5, there are 9 stream crossings that have drainage areas ranging from 13.1 km² up to 140 km² that are not scheduled for pipe arch type or bottomless culverts (#46, #48, #52, #55, #61, #71, #77, #82 and #87). Also there are two locations that cross a pond or a steady that have large drainage areas and have no indication as to the type of culvert to be used. These need to be reviewed. Additionally, Table 2.3 details several crossings that have large pipe arch type culverts for watershed drainage areas that are 5.0 km² or less. There is a possibly a mix-up with respect to culvert designations in the two reports.

N According to the EIS/CSR, the actual engineering surveys for the culvert and bridge installations have not yet been completed and the detailed design information was not available at the time of the report completion. Without the information on stream crossing structures and stream crossings as specified in Sections 3.6 and 4.1 of the Guidelines, it is not possible to determine the appropriateness of any proposed culvert installations with respect to fish passage and whether or not it would constitute an obstruction to resident or anadromous fish species. In addition, it is not possible to determine whether there is the potential for HADD of fish habitat associated with stream crossing installations and to quantify the extent of any HADD. In general, even though the EIS/CSR recognizes the negative effects to fish populations that can result from the improper design and installation of culverts, the information presented is not sufficient for DFO to ascertain whether culverts will be properly designed and installed at proposed stream crossings.

2.4.4.1 Design Criteria for Crossing Structures

N This section states that details for each watercourse crossing would be submitted prior to construction. It is important that the detailed design information be submitted after completion of the preliminary design stage and prior to the tender of the construction contract. This would enable DFO to assess the type of culverts proposed, determine the appropriateness of the proposed stream crossing design and identify any installations that are problematic with respect to fish passage or potential for HADD.

N Appendix D, Department of Works, Services and Transportation - Relevant Specifications, Form 421, Form 423, and Form 424 are specifications that will be used by contractors to bid on the work. These Forms should detail the design criteria for proper culvert installation regarding maximum slope for the type of culvert. Embedment depths of 300 mm (150 mm where bedrock is encountered) are specified in Forms 421 and 423. The

guidance from Gosse et al (1998) should be adhered to with regard to embedment depths. Form 424 does not have any criteria for culvert installation.

2.4.4.4 Pipe Arch and Cylindrical Culverts

N This section states that most of the stream crossings can be accommodated using cylindrical culverts ranging in size from 800 to 3 000 mm in diameter. This section discusses the design criteria with respect to slope and velocity for culverts >25 m but there are no design parameters discussed for culverts <25 m, arch-type culverts or bottomless culverts. Also, the criteria provided for culverts >25 m do not appear to incorporate any biological considerations. It appears from the EIS/CSR that the only fish species considered as being affected are Atlantic salmon and brook trout. This needs to be clarified, since culvert design may need to take into account the provision of fish passage for other species in some locations.

N Where baffles or weirs are proposed, specific biological and engineering input is required and is essential to ensure adequate fish passage. The proponent should provide specific design criteria and site conditions under which circular, arch-pipe, bottomless and baffled culverts are to be utilized to provide adequate fish passage.

2.5.2.7 Site Rehabilitation and Monitoring

N All revegetation should be done using native species and seed sources only.

2.9 Effects of the Environment on the Project

N The discussion of effects of the environment on the project is inadequate. Potential effects on crossing structures are mentioned but no further discussion is offered. Also, there is no discussion of potential environmental effects resulting from structural failures as specifically required by Section 5 of the Guidelines.

N The potential effects of changes in precipitation volumes, changes in tidal flow, and related changes to flood risk do not appear to have been discussed or analysed. These basic factors should be incorporated in the EIS/CSR, and should explicitly take into account the potential effects of climate change. Recent experiences with winter weather and related potential effects on project operation (e.g., road closures) should be part of this discussion.

2.10 Environmental Management Planning

N This section indicates that the Environmental Management Plan will be finalized after the project is released from the environmental assessment process. The proponent is encouraged

to use the environmental assessment process as a tool to support the development of its environmental management plan and include as much detail as possible regarding the form and content of the environmental management plan within the EIS/CSR.

2.10.3 Environmental Protection Measures

N Based on the information presented, it does not appear that the identified environmental protection measures will enable compliance with the *Migratory Birds Convention Act* (MCBA) and its regulations. For example, Environmental Protection Measure #1.5 for highway construction indicates that “where active migratory bird nests are present or suspected, vegetation clearing will not be conducted until eggs have hatched and young are mobile.” In practical terms, how will the presence or suspected presence of active nests be established? Details should be provided in the EIS/CSR. Given the difficulty in identifying nests, Environment Canada strongly recommends that clearing activity be avoided during the nesting season for migratory birds. The recommendation also applies to maintenance activities related to Environmental Protection measure #2.7 for highway operation.

N Table 2.7, the following sentences should be added to 1.5: “Trees will be inspected for active bird nests prior to removal. Whenever possible, trees with active nests will be left standing until such time as the young have fledged.”

N Table 2.7, 1.9 should be modified to read “All merchantable or forest product timber will be salvaged and will be the property of the contractor. Merchantable timber should not be piled in the vicinity of a blasting operation or in any other area where construction activities could negatively impact the value or utility of the timber.”

N Table 2.7, the second 1.1 should be 1.10 and should be modified to read “Fires will be located a minimum of 10 m from the existing tree line and/or adjacent piles of slash and piled merchantable timber, or as directed by the Conservation Officer.”

N Table 2.7, add 3.12 which should read as follows: “Uncontrolled blasting, caused by failed discharges or otherwise, will be reported immediately to DFRA or DFO officials. Where uncontrolled blasting results in degradation to terrestrial or aquatic habitats, mitigative measures as recommended by DFRA or DFO will be implemented.”

N Table 2.7, add 3.13 which should read as follows: “Blasting areas will be surveyed for caribou and other wildlife species. Presence of wildlife in the immediate area will result in postponement of blasting activities. Guidelines for mitigation of the impacts of blasting activities on wildlife will be developed in consultation with the Inland Fish and Wildlife Division.

N Table 2.7, add 8.10 which should read as follows: “Efforts will be made to deter nuisance animals using non-lethal deterrents. Nuisance animals will be reported to DFRA and if relocation is necessary, it will be at the expense of the proponent.”

2.10.5 Emergency Response and Contingency Plans

N Table 2.10, add 5.5 which should read as follows: “The Inland Fish and Wildlife Division will be notified immediately if any species at risk or raptor nests are located by Works, Services and Transportation personnel or contractors.”

N Table 2.10, add 5.6 which should read as follows: “Works, Services and Transportation staff will maintain a logbook to record sightings of wildlife species. The Inland Fish and Wildlife Division will be consulted for direction on the development and maintenance of the logbook.”

2.10.8.2 Environmental Effects Monitoring

N This section should be revised to indicate that breeding bird, rare plant and beaver surveys will be conducted prior to the start of each construction season. Data collected should be copied to Inland Fish and Wildlife Division along with the proposed mitigative measures. The section should be expanded to provide more detail on proposed monitoring protocols to evaluate the accuracy of effects predictions made in the EIS/CSR.

3.2.1.3 Rare and Endangered Vascular Plant Species

N Additional information is required on the methodology for the rare plant survey. Trained botanists should perform the surveys and sampling protocols should be standardized and rigorous enough to ensure adequate data collection for analysis, effects assessment and mitigation. Plant samples should be collected and arrangements should be made to have the samples provided to a Newfoundland herbarium. The Inland Fish and Wildlife Division can be consulted for further direction.

3.2.3 Wildlife

N The EIS/CSR states that the Mealy Mountain Caribou Herd (MMCH) numbers less than 600 animals. The estimated population of the Mealy Mountain Caribou Herd from the most recent census is approximately $2\ 500 \pm 1\ 500$ animals (Otto 2002a).

N Recent information indicates that the Red Wine Herd is moving closer towards Goose Bay. There is a potential for this herd to be impacted by the highway. Given the very low population estimate for the Red Wine Herd and the level of effects associated with the low level

flying activity, additional information should be provided to assess the potential effects of the highway and possible mitigation measures that could be applied to protect this herd during construction and operation.

N Although there are no confirmed sightings of wolverine since the 1950s there are a number of unconfirmed sightings, some along the preferred route. Knox (1994) summarizes all sightings. This information should be presented to facilitate an assessment of the potential effects of the proposed route on potential wolverine recovery habitat.

3.3 Freshwater Environment

N Characterization of the lower portion of Paradise River as not suitable for angling is incorrect. In fact, angling on tributary streams is quite good and Paradise River has recently become a scheduled salmon river. Eagle River is a scheduled salmon river, and supports a significant recreational fishery and commercial outfitting operations. Both river systems are unobstructed and Atlantic salmon and sea run trout can and do presently ascend both rivers into their upper reaches. Paradise River has spawning areas in its lower reaches in both the main stem and tributary streams. Table 3.4 should list Arctic charr and rainbow smelt for Paradise River. The statement that ‘there are 16 scheduled salmon rivers in the area and all are located in the Eagle River and Paradise River watersheds’ is incorrect. Also, the statement that ‘most if not all angling undertaken at these camps is hook and release’ is incorrect. It should say ‘some,’ as a lot of salmon are retained.

6.0 ENVIRONMENTAL EFFECTS ASSESSMENT

N The conclusion and recommendations of the Labrador Innu Land Use Component Study should be incorporated into the effects assessment to provide an integrated and comprehensive evaluation of effects and allow the further incorporation of appropriate conclusions and findings into the Environmental Protection Plans.

N Section 5 of the Guidelines clearly indicates that particular emphasis shall be placed on the significant increase in human access and the attendant implications for increased development pressure along with induced development (e.g., forest harvesting, fish harvesting, fur harvesting). However, the EIS/CSR provides little discussion of these potential effects.

N The cumulative environmental effects sections for each of the VECs seems to be very narrow in scope and compounds the averaging out of effects in its predictions. Cumulative environmental effects from opening up a previously inaccessible remote area often have a more significant environmental effect than the original development. The cumulative environmental effects predictions rely heavily on the use of assumptions. While it is acknowledged that

cumulative effects may not be the sole responsibility of the proponent for mitigation and enforcement purposes, it is the proponents responsibility to accurately and comprehensively provide a prediction of effects. Although forestry activity will undoubtedly occur after the highway is constructed, its potential effects on some of the VECs needs to be addressed. Also current provincial harvesting guidelines offer significantly more protection to habitat requirements than is described (e.g., 20 m buffer around waterbodies). Further, harvesting guidelines specific to District 19 offer significantly more habitat protection than is seen in other jurisdictions and again this is not reflected in the EIS/CSR. Examples are: forestry activity is not likely to be concentrated in core MMCH habitat; harvesting guidelines prohibit activities within 800 m of active raptor nests, and not all raptors can be similarly characterized in their reaction to nearby harvesting activity; and, staging areas for waterfowl, especially that for threatened species, would not be considered for forest harvesting.

N The assertion repeated throughout that mitigating the effects is, for the most part, beyond the ability and responsibility of the proponent is not entirely justified. For example, if a change in the proposed route, or some other mitigative measure, would substantially lessen the environmental implications of development pressure, then such a mitigation measure should be given adequate consideration by the proponent. Indeed, the difficulty in directly mitigating environmental effects of future activities does not preclude the need to give them full discussion and consideration, and to develop mitigation recommendations or adopt any mitigation measures that are feasible.

N A comprehensive discussion of reasonably foreseeable induced development is also important in evaluating the suitability of the proposed routing. Conceivably, future development will be concentrated around the proposed routing, resulting in a higher level of development pressure and greater environmental effect in its immediate vicinity. Therefore, the EIS/CSR should demonstrate that the proposed routing will not introduce development pressure to sensitive habitat areas that could result in significant cumulative effects. Without this analysis, a potentially major source of environmental effect would be overlooked.

N Beyond the requirement of the Guidelines to consider induced effects, the CEA Agency's *Operational Policy Statement on Addressing Cumulative Environmental Effects* suggests that a cumulative effects assessment include projects that are "reasonably foreseeable." It is stated repeatedly under individual "mitigation" sections for VECs that many of the potential adverse effects of the highway stem from the improved access provided by the highway and the associated increase in human presence and activities in this previously remote area. This statement acknowledges that induced development, increased development pressure and increased human access are "reasonably foreseeable" activities. Therefore, they should receive full consideration.

N At numerous points in the EIS/CSR, and summarized in section 7.1, compliance with various guidelines and standard contract language are identified as mitigative measures. However, specific descriptions of the actual measures and how they will be applied are sporadic. The EIS/CSR should describe the proposed mitigation strategy and specific mitigation measures - in an appendix if necessary - rather than rely upon a list of guidelines. For example, the proponent indicates that it will confer with the Inland Fish and Wildlife Division regarding mitigation for raptor nests within the right-of-way. Does this mean that the raptor nest guidelines will be applied? If so, the EIS/CSR must be definitive in this regard. If not, then the guidelines should not be presented as mitigation.

N The EIS/CSR should identify information gained from Phase II mitigation experience. For example, using the raptor example above, how did conferring with Inland Fish and Wildlife Division protect raptor nests? Was the mitigation successful? How many nests were removed? How many times was construction delayed for nesting? How and where was the road realigned to avoid raptor nests? Previous mitigation experiences, particularly for Phase II, should be reflected for all applicable VECs throughout.

N Similarly, the effects analysis for each VEC should reflect the failure rate in planned mitigation as evidenced by previous phases of the Trans Labrador Highway. For example, the EIS/CSR concludes that residual effects on fish and fish habitat will be insignificant when standard mitigation measures are applied. However, evidence from Phase II seems to indicate there were failures at stream crossings. These failures should be considered when conducting the analysis for the proposed highway.

N Section 6.3 of the Guidelines clearly indicates basic requirements for a follow-up program. It is important that the assessment be conducted in a manner that supports an adaptive management approach. Accordingly, the EIS/CSR should include provisions for implementation of a follow-up program that allows the accuracy of effects predictions and the effectiveness of mitigation measures to be tested throughout the life of the project. The proponent should address if there is an expectation that responsible agencies may need to carry out monitoring programs and the costs of doing so. It is with follow-up results in hand that the provisions for project management can be adapted to ensure a commitment to avoid significant adverse environmental effects is respected.

N The testing of effects predictions and mitigation measures is especially important in cases where there is a lack of site-specific data. Under these circumstances, predictions often rely heavily on experience elsewhere and expert opinion. Uncertainty regarding effects resulting from a certain type of project under a specific set of environmental conditions dictates that the proponent demonstrate preparedness for a range of potential outcomes to be confirmed through follow-up.

N As it stands, the proposed follow-up program is inadequate. In many cases, a follow-up program for VECs either has not been developed, or would not permit an evaluation of the accuracy of effects predictions and the effectiveness of mitigation procedures. From the information provided, it appears that most of the follow-up proposed would actually occur before project construction, with no corresponding follow-up effort during and after construction. The proponent is advised to consult the CEA Agency's *Operational Policy Statement: Follow-up Programs Under the CEAA* that outlines how follow-up would be applicable to all phases of project implementation.

N The Guidelines refer to the precautionary principle and state that "the best available technology and best management practices must be considered." The EIS/CSR is deficient on this item with respect to stream crossings. There are no culvert selection criteria presented. DFO notes that the proponent has not proposed to use any bottomless arch culverts and that the majority of culverts are cylindrical pipes. DFO strongly recommends open bottom/bottomless arch culverts to minimize potential effects on fish and fish habitat, maintain fish passage, and sufficiently accommodate watercourse flows, particularly in sensitive habitats, as a mitigation against HADD of fish habitat. It is also suggested that natural stream conditions (i.e., widths, habitat) be maintained to the extent possible (Gosse et al, 1988).

6.1 **Raptors**

6.1.6 **Existing Knowledge**

N Define 'vicinity' and 'close proximity.' Caution should be used in interpreting data from studies where raptors established successful nest sites in the 'vicinity' of roads and highways. There is a difference between a bird establishing a nest near a road and having a new road constructed near a nest. Effects may be much greater for new developments in areas that were previously undisturbed.

6.1.7 **Mitigation**

N Additional discussion should be provided on options for mitigation. Mitigation guidelines for other developments recommend that no activity take place within 800 m of an active eagle or osprey nest during nesting (March 15 - July 15). A 200 m no activity buffer should be maintained at all other times of the year. Relocation of these nests likely is not an option as the nests would have to be moved too far to be considered out of the impact area. Data presented in the Component Study suggests that the string bog complex of the Eagle River watershed represents a relatively high density area for osprey. Without information on raptor densities in other areas (alternative routes) it is difficult to estimate the relative effect of the highway on raptor populations.

6.1.10 Cumulative Environmental Effects

N Additional discussion should be directed towards the potential effects of increased access. Although regulatory and enforcement capabilities are outside the direct mandate of the proponent, limitations in human and financial resources for responsible government departments make it extremely unlikely that mitigation of increased access will be totally effective.

6.2 Waterfowl and Passerine Birds

N Waterfowl and passerine birds are considered together in most sections of the EIS/CSR. Presentation of information in this manner is confusing. It is also implied that a passerine bird component study was undertaken, which is not the case. Given the differences between waterfowl and passerines, including important differences in the nature and extent of potential interactions with the highway, these migratory bird groups should be discussed separately.

N Table 6.5 indicates that Environmental Effects Evaluation of construction and operation is Not Significant (Minor). Relate this conclusion to the finding described in the Tourism and Recreation Component Study that tallymen reported the disappearance and growing scarcity of certain species along a corridor 10 km wide on both sides of the main road system for the La Grand hydroelectric development. Clarify also why the Environmental Effects Criteria Ratings describe effects as irreversible, considering that effects have been described as Not Significant (Minor).

6.2.3.1 Waterfowl

N The significance of the study area to waterfowl is not evident from the EIS/CSR. The data presented in the report indicate that there are large numbers of birds in the study area. The Eagle River Plateau is one of the most important areas for waterfowl in Labrador. Therefore, the significance of the study area to waterfowl in Labrador should be identified and the contribution of this population to the Atlantic Flyway should be recognized.

N The low number of waterfowl found in the spring survey should be discussed in terms of the heavy ice conditions at the time.

N It is stated that although suitable habitat for Harlequin Ducks exists along rivers that will be crossed by the highway, no breeding Harlequins were found. It should also be stated that these rivers may provide habitat in the future as the populations recover and expand their breeding range.

6.2.6.1 Waterfowl

N Although some species may use highway rights-of-way, use does not indicate a preference. These areas may be sub-optimal habitat or may be used by non-breeding individuals. Interpretation of 'use' data without additional information on the demographics of individuals using the area and in relation to use of other areas must be done with extreme caution.

6.2.7 Mitigation

N It is indicated that "removal of forest vegetation in areas where active nests are identified, (will occur) outside of the nesting period in sensitive areas." It is unclear why avoidance of clearing during the nesting period would only be practiced in sensitive areas, as the *Migratory Birds Convention Act* (MBCA) applies to all migratory birds regardless of health of their populations. Again, clearing activity should not be undertaken when migratory birds are breeding or nesting.

6.2.9 Environmental Effects Evaluation

N The finding that environmental effects are "not significant (minor)" is not supported by the text. In addition, the rating does not consider cumulative effects and increased access. It also does not consider potential changes in hydrology (see Wetland section) that would irreversibly affect waterfowl habitat.

N Effects prediction cannot be made in isolation from cumulative effects. Increased access will likely change the forest landscape, primarily through forest harvesting. These changes will likely be considerable and will likely have significant effect upon forest bird populations.

N Any conclusions offered in the EIS/CSR must be predicated on provisions for ensuring survey results are reviewed in consultation with Environment Canada, and that mitigation and follow-up measures acceptable to the Responsible Authorities and Environment Canada are developed before work on the highway is allowed to proceed.

6.2.11 Environmental Monitoring and Follow-up

N Environment Canada notes the commitment to conduct breeding passerine bird surveys prior to construction, currently scheduled for 2003. The proponent states that the purpose of the surveys is "to establish a baseline for possible future monitoring." From Environment Canada's perspective, the purpose of this survey effort is not only to provide baseline information, but also to identify the presence of any bird populations particularly sensitive to disturbance or habitat loss (e.g., rare species or species known to be in decline). Given that the

current scheduling arrangements do not allow survey results to be incorporated into the EIS/CSR, provisions for ensuring an appropriate mitigation and follow-up program that will be in place before any work on the highway is allowed to proceed should be described. Such a mitigation and follow-up program must be acceptable to the Responsible Authorities and to Environment Canada and must include the following elements to be effective:

- methods quantifying habitat losses, and provisions for a review of these data by the Canadian Wildlife Service of Environment Canada;
- a description of the full range of available mitigation options including: adjustments to the highway corridor; modifications to clearing schedules and techniques during construction and maintenance phases; and on-site habitat creation or rehabilitation.
- a description of the circumstances under which each mitigation option would be considered and a commitment to mitigation implementation; and
- provisions for follow-up on effects accuracy and on mitigation effectiveness and a commitment to implement additional measures based on follow-up results.

6.3 Caribou

6.3.1 Boundaries

N The total area (km²) should be indicated.

N The statement on consistency of calving areas does not seem confirmed by information presented on the following page. If 60 % of females calve less than 15 km from previous calving locations and >30 % were less than 5 km from previous calving locations one would conclude a relatively high site fidelity given that 3 of the 6 collared animals moved >100 km in the approximately six month monitoring period. The issue of scale is not adequately addressed so interpretation of site fidelity data in relation to the impact area is difficult. Also, no indication is provided regarding the degree of movement exhibited by females within the calving grounds.

6.3.2 Methods

N The study area is very narrow. Given that caribou are mobile and that the initial telemetry data indicates considerable variability in movement patterns, a 20 km study area (as opposed to 2 km) centered on the highway would be more appropriate. More information should be presented here on the history and historic range distribution of the herd. Local traditional knowledge should have been incorporated into the discussion. There is very little empirical data presented on movement parameters. The terms 'near,' 'relatively sedentary' and 'widely dispersed' are used often, without quantification of the distances involved. Without more specific information, assessing the potential effects is not possible.

N The study was conducted by the Science Division, not the Inland Fish and Wildlife Division. VHF collars were used in the study, not satellite collars. There were four females collared and two males collared, not six females.

6.3.3.2 Herd Abundance

N The survey information indicates five discrete groups were located around Park Lake and two smaller groups were located at the coast. The number and composition of these groups should be provided. More detailed information on the dates when observations were made, the number of hours spent flying, the numbers of animals seen in each location, etc. would facilitate the assessment. A comparison of the survey and classification results for this herd with information from other woodland caribou herds in the area and from historic classification results for this herd with information from other woodland caribou herds in the area and from historic classifications conducted on the MMCH would provide a better background against which to judge current information. It is unclear why a male:female sex ratio of 1:2 would suggest high survival rates or how this would necessarily result in a large increase in population size. More information is required on other demographic parameters such as birth rates, recruitment rates and mortality rates in order to make conclusions regarding the population trajectory of the herd.

6.3.3.3 Migration Pattern

N This section needs clarification. Only six animals were collared. Number, rather than percentages, should be used here. The 70% of the locations that were more than 40 km north of the highway may well represent only two or three animals. Different symbols should be used for each of the animals to facilitate the assessment of movement patterns. An indication of the actual date when each point was collected would facilitate the evaluation of movement rates.

6.3.6 Existing Knowledge

N The literature review for this section is not complete. There is a significant body of recent literature on the impacts of both linear and other developments on caribou. The more recent literature indicates effects of development that are subtle but that have the potential to result in population level changes in caribou herd dynamics. Information from this more recent body of literature should be included in the EIS/CSR. As well, many of the studies on caribou in Newfoundland have been conducted on populations that were increasing. The effects of development on a caribou population that is decreasing or stable may be very different than the effects observed on a population that is increasing.

6.3.7 Mitigation

N More information should be provided on the mitigation associated with blasting. How will the proponent determine if caribou are in the area? What criteria will be used to halt activity in the area? What area will be examined for caribou? Will the mitigation be applied over the entire construction period?

6.3.8 Environmental Effects Assessment

N Without better information on habitat selection, habitat use and movement patterns the assertion cannot be accepted that the habitat at the periphery of the range (which cannot currently be defined with any accuracy) is marginal or less critical than other habitat. Caribou use different portions of the range during different seasons. Critical range areas may lie at the periphery of the entire range area.

6.3.8.1 Construction

N Recent work by Schaefer et al (2002) indicates that caribou may not habituate quickly to disturbance. The majority of the Mealy Mountain Caribou range has been previously undisturbed. Construction and operation activities associated with the highway are going to introduce a significant new component to the caribou range. Issue can be taken with the conclusion that caribou in disturbed areas will select an alternate undisturbed site and that no reduction in herd productivity is anticipated. If this conclusion is based on work that has been conducted elsewhere that clearly demonstrates there is no decrease in caribou productivity associated with development of a similar nature, that study should be cited explicitly and the data on pre- and post- development productivity estimates should be provided.

Work done by Hill (1985) and Mahoney (1985) were on woodland caribou in Newfoundland. During this time, Island caribou populations were increasing rapidly. The population status of the Mealy Mountain Herd remains unclear and the herd is designated as "Threatened." The scientific basis for concluding that MMCH will likely reoccupy areas that were disturbed during construction based on data from Island populations in an expansion phase is weak. To verify this assertion, data from more recent studies on animal response to disturbance for declining caribou populations should be used.

Data on only six animals, four females and two males, does not provide sufficient information on which to base any conclusions regarding habitat use patterns or the potential effects of the road, particularly during the sensitive calving and post-calving periods.

6.3.9 Environmental Effects Evaluation

N The conclusion that the residual environmental effects will be minor (not significant) is not well substantiated by the information presented in the EIS/CSR.

N Table 6.9 indicates that the level of confidence in the effects prediction is high. Based on the information presented, the evaluation is debatable. The Caribou Component Study submitted for the highway indicates there is insufficient information to assess effects, therefore the conclusion of a high level of confidence in the evaluation is unsubstantiated.

6.3.10 Cumulative Environmental Effects

N More discussion needs to be provided on options for mitigating the effects of increased access on caribou populations. According to the opinions of resource agencies resources available to agencies for enforcement are limited and the potential for adverse effects does exist.

6.3.11 Environmental Monitoring and Follow-up

N A monitoring program must be developed to evaluate the effects predictions generated in the EIS/CSR. At a minimum, evaluation of habitat use must be made for calving and post-calving both pre-construction and post-construction. As well, a monitoring program should be developed to assess the ability of animals to cross the highway once it is constructed. The Inland Fish and Wildlife Division should be consulted for the development of appropriate monitoring protocols.

6.4 Furbearers

6.4.7 Mitigation

N Mitigation should specifically provide for surveys to be conducted for active beaver ponds prior to each construction season. A 30 m treed buffer should be maintained on all active beaver ponds.

6.4.9 Environmental Effects Evaluation

N Table 6.11 indicates that Environmental Effects Evaluation of construction and operation is Not Significant (Minor). Relate this conclusion to the finding described in the Tourism and Recreation Component Study that tallymen reported the disappearance and growing scarcity of certain species along a corridor 10 km wide on both sides of the main road system for the La Grand hydroelectric development. Clarify also why the Environmental Effects Criteria Ratings describe effects as irreversible, considering that effects have been described as Not Significant (Minor).

6.5 Fish and Fish Habitat

N The opening statement of this section says ‘several species of fish are present....’ There are 20 species listed.

N Baseline information for fish and fish habitat is not well quantified. Similarly, the value of this resource to the outfitting industry and its contribution to the local economy is not adequately characterized. To assume that enforcement agencies will have adequate resources in place after the highway is constructed to monitor fishing activities may not be realistic. Further collection of baseline information to quantify the effects, and more comprehensive mitigative measures to ensure the protection of this resource, is required.

N The EIS/CSR does not describe key features of the area’s recreational fishery and use the precautionary assumption that the recreational fishery’s ability to compete on these features is fragile. These features include: fish size, variety and catch rate together with length of the fishing season; pristine surroundings; level of angler crowding and type and quality of services. It also does not discuss the level to which these features can be degraded and still maintain the viability of the lodges in the area. Specifically, a description of the trophy nature of the brook trout stocks on the Eagle River Plateau, their fragility and the likelihood that increased access will attract sufficient fishing effort to threaten their sustainability is required.

N Potential environmental effects and mitigation have been described. While DFO is in agreement that the measures listed will reduce the potential for environmental effects, there are additional measures that should be considered in addressing Section 6.1 of the Guidelines, as follows:

- with respect to culverts, while pipe arch culverts are preferred to cylindrical culverts, bottomless arch culverts are the preferred type from a fish and fish habitat perspective. Clear span bridges are preferred to those requiring in-river pilings. Culverts must provide passage for all species and life stages that could be present at each crossing to avoid habitat alienation.
- an additional item should be added - appropriate measures will be taken to control sedimentation. Roads by their nature tend to channelize and concentrate runoff and promote erosion, particularly in the approaches to the stream crossings. It will be important that the appropriate mitigations are undertaken both during construction and afterwards to minimize sediment problems. There will need to be consideration for bank erosion at the road crossings and the appropriate bank stabilization conditions provided. Guidance on these items is contained in Gosse et al (1998), particularly in the section on Linear Development.
- there is a growing awareness that road crossings and the associated ‘rights-of-way’ can increase the amount of sunlight reaching a stream and this can contribute to stream

warming. This can be exacerbated in smaller streams. Consideration should be given to keeping the clearances and rights-of-way to a minimum and maintaining as much natural riparian vegetation as possible.

6.5.1 Boundaries

N The description of ecological boundaries states that temporal boundaries are year-round for brook trout and only seasonal for anadromous species. This is incorrect as anadromous juveniles are present year-round.

N Figure 6.2.1 should show watershed boundaries. Also the Churchill River, Traverspine River and Otter Brook should be labelled. The Eagle River appears fragmented in two places to the north of the area between crossings #78 and #79; this should be corrected.

6.5.2 Methods

N Fish habitat surveys/habitat characterization were not conducted at all sites, since at some sites the stream could not be seen and for some there was no place to land.

N It is stated that ‘because actual engineering surveys have not been completed, detailed design information is not available and precise watercourse crossing sites have not been confirmed.’ DFO recognizes this, however the EIS/CSR should address how the proponent intends to provide the stream crossing information as required in Section 3.6 of the Guidelines. DFO recommends that the proponent provide basic design information and precise watercourse crossing locations as soon as this information becomes available. This will allow Fisheries and Oceans Canada the opportunity to identify areas of potential concern, to address any possibilities for re-design or relocation of crossings if warranted, and to initiate discussions concerning special protection measures for these areas. Depending on the type of habitat present, the proposed crossing structure (culvert type, bridge), i.e., whether there is to be any infilling, there is the potential for HADD at some locations. If it is determined that a HADD will likely result, the proponent must provide a precise quantification of the habitat, and DFO must decide if the HADD should be authorized and can be compensated for. Issuance of a Section 35 (2) *Fisheries Act* authorization will not occur until a compensation agreement is developed between the proponent and DFO. Given the time requirements for these steps to take place, the requirement for the proponent to provide the needed information to DFO in a timely manner is strongly emphasized. It is also recommended that the proponent meet with DFO prior to the collection of site-specific information at surveyed stream crossings.

6.5.3 Existing Environment

N The barriers to fish migration in Table 6.12 is incorrect. The barriers listed for Paradise River are not barriers for the area of the watershed where the Phase III highway is to be located and so are irrelevant in the current context. Muskrat Falls is not a barrier to eels and is also irrelevant to Phase III as it is above the crossing. During summer low flows, Muskrat Falls may not be a barrier to other species as well.

6.5.3.2 Description of Watersheds

N The crossing type should be indicate in the ‘Comment’ column, specifically for the proposed bridges and pipe arches.

N There are some errors in transferring information from the Fish and Fish Habitat Component Study to tables in this section. For example, Crossing 8 information states it is 0-2 m wide, yet Table 6.17 states it is 2-5 m wide and there are other discrepancies. In Table 6.20, crossing 48 is 2-5 m wide, whereas in the Component Study it is said to be 5-20 m wide. For Eagle River, there are 14 crossings with a basin area of less than 2 km².

6.5.3.3 Fish Surveys

N The statement is made that ‘DFO have made a preliminary determination that the planned highway construction methods are not likely to result in a harmful alteration, disturbance or destruction (HADD) as described under Section 35 (2) of the *Fisheries Act*.’ (Note that the word ‘disturbance’ is incorrect, it should be ‘disruption.’) This statement could be interpreted as DFO having already made a decision on HADD in advance of the EIS/CSR, which is not the case. Such a decision can only be made when the exact crossing locations are determined, as noted elsewhere, and DFO has reviewed site-specific habitat information and the designs of the crossing structures. As noted earlier, infilling could result in a HADD and require an Authorization. In discussions with the proponent in May of 2002, DFO advised that the proponent should make the assumption that all crossing locations will be in fish habitat and that any of the species known for the particular watershed could be present at each location. Also, DFO was willing to proceed without fish survey information at crossing locations on the assumption that the proponent would design and construct stream crossings in such a manner as to avoid HADD.

6.5.3.4 Fish Species

N While it is agreed that Atlantic salmon and brook trout are most widely distributed and potentially most likely to be affected by the project, the discussion should not be limited to these two species only, as per Section 4.1 of the Guidelines. Summaries should be presented for other species as well. There has been limited, or no consideration, given to other species. It is recognized that information is sparse for much of the area, however there are other sources

besides Anderson (1985) that could have been used, e.g., Labrador Hydro Project for Churchill River, outfitters, TEK, local residents, DFO scientists, etc.

N It is stated that brook trout have a similar life cycle and seasons to Atlantic salmon. This is inaccurate since brook trout life cycle and their habitat utilization are actually quite different than for Atlantic salmon. As an example, salmon remain at least one full year at sea while migratory brook trout return to freshwater and overwinter after only a couple of months at sea. While as stated, population status of brook trout is poorly known, it can be deduced from catches in the small existing angling fisheries that populations of large sized trout exist in many of the lakes and streams proposed to be crossed by the highway. Also, since most of the fish populations are probably lightly exploited, the standing stock should be equivalent to the carrying capacity of the habitat.

6.5.6 Existing Knowledge

N The information in Table 6.24 needs to be updated to reflect more current information. Migration times for the anadromous fish species is earlier than July 1 and later than end of August in Labrador. Trout, charr and salmon of adult and smolt stage migrate out in early spring around the ice breakup time. Charr, trout and salmon adults migrate into rivers in Labrador earlier and later than stated; also juvenile charr and trout migrate into rivers in late summer and fall (September and October). See DFO's Canadian Stock Assessment Secretariat website at http://www.dfo-mpo.gc.ca/csas/Csas/English/Index_e.htm.

N Observations from Exxon Valdez are irrelevant here as the highway is crossing freshwater not marine. Salmon and trout parr do not feed on phytoplankton, they feed on invertebrates that are in the stream or fall into the stream from surrounding vegetation. Therefore, some feeding occurs on the surface meaning that an oil spill would be problematic for salmonids.

6.5.7 Mitigation

N The third bullet “culverts will be countersunk where required to maintain...” should be changed to delete the phrase ‘where required.’

N Construction personnel must not fish while on site. Survey work being conducted by the proponent and the Inland Fish and Wildlife Division is attempting to determine pre-access fish population inventory. Fishing by construction personnel will invalidate survey results. The possibility of closing the area to fishing during the construction phase should be explored with resource management agencies.

6.5.8.1 Construction

N Reference is made to Gosse et al (1998) and WDFW (1999) with respect to proper culvert installation and provision of fish passage. DFO stresses the importance of implementing appropriate mitigative techniques to reduce or eliminate potential negative effects to fish and fish habitat, and acknowledges the proponent's statement that all crossing structures will be designed and installed to provide fish passage (unless there is clear evidence that the culvert is not located in fish habitat).

6.5.9 Environmental Effects Evaluation

N Table 6.25, the Environmental Effects Summary - Fish and Fish Habitat requires additional explanatory justification. Construction and operation effects are proposed to be of nil to low magnitude, of not significant (minor) significance and confidence levels are described as high. These characteristics seem inconsistent with statements on pages 268, 270 and 285 which indicate that the status of both the Labrador salmon stock and the brook trout population in the study area is poorly known. The strong drawing power associated with world class trophy brook trout and internationally competitive catch rates for salmon together with the 120,000 residents who could be interested in fishing these newly accessible stocks would seem to point to different characterization of effects than those provided. The predicted environmental effects should also be placed in the context of statements elsewhere in the EIS/CSR that while provincial angling effort declined by nearly half since 1990 the Labrador effort nearly tripled, and that angling activity has increased (as much as tripled) with the completion of Phase II of the Trans Labrador Highway. Such comments suggest that one should expect dramatic increase in fishing effort and catch of trophy trout and salmon in the study area following highway construction. The Environmental Effect Summary appears to have omitted consideration of the fishery entirely.

6.6 Species at Risk

N It is unclear why the consideration of species of special conservation concern (includes floral and faunal species listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), identified as S1, S2 and S3 by the Atlantic Canada Conservation Data Centre (ACCDC), designated in provincial listings, or of otherwise high conservation priority) is limited to two bird species. It is expected that the EIS/CSR would address any floral or faunal species of special conservation concern that could be adversely affected by the proposed highway. In support of this, it was indicated in the Guidelines for both floral and faunal species of special conservation concern that "available data, survey results and detailed mitigation measures that demonstrate a special emphasis on avoidance of environmental effects is to be include." As it stands, consideration of species of special conservation concern is inadequate.

N Appendix F clearly establishes that many rare plant species may be present within the right-of-way, and identifies 33 areas that should be surveyed. However it appears that these surveys have not been conducted, and there is no analysis of the potential effect of the highway on plant species of special conservation concern. The number of sites potentially supporting rare plants highlights the importance of conducting surveys in those areas. The results of surveys and appropriate analysis of potential effects on rare plants should be included in the EIS/CSR if conclusions regarding the likelihood and significance of effects on floral species of special conservation concern are to be supported.

6.6.7 Mitigation

N Additional information should be provided on methods to be used for locating active short-eared owl nests within 800 m of the highway route alternatives.

6.7 Geomorphology

6.7.11 Environmental Monitoring and Follow-up

N The EIS/CSR provides an overview of acid-generating rock considerations, identifies avoidance as the preferred mitigation option, and indicates that the proponent is committed to carrying out a field investigation, prior to the start of construction to further define the acid generation potential along the route. In many cases, however, the EIS/CSR defers specific procedural information to the environmental protection plan. Therefore, the EPP should be submitted to Environment Canada for review and confirmation that the sampling protocol, and proposed methods for dealing with acid-generating rock, are appropriate and will allow adverse effects to be avoided. Similar to other highway projects in the region, and other projects involving acidic material, Environment Canada is prepared to discuss proposed site-specific management approaches when the presence of acid-generating rock is suspected or discovered.

6.8 Water Resources

6.8.3.1 Watershed Areas

N For ease of review, information on the bridge or culvert size and approximate width of stream should be located in the same table (Tables 6.29 through 6.38). It would appear that there may be infilling associated with a number of crossings, e.g., crossing #22 has a width of >20 m, yet the proposed crossing is a 5 890 x 3 710 pipe arch; crossing #73 is 90 m wide, yet the proposed crossing is a bridge with 2 x 30 m spans; crossing #79 is 40 m wide, with a 20 m span bridge proposed. As noted previously, DFO requires site-specific habitat information at all locations where infilling is proposed in order to make a HADD determination.

N In Tables 6.34 to 6.38 define “T” and “P” in the last column. Is it Total and Partial?

6.8.3.2 Water Quality

N There is no QA/QC information for the water chemistry results. A description of water sampling protocols is also useful information that should be included.

N Tables 6.41 to 6.45 are summaries of water chemistry results. However, there are no results for specific samples. Hence, results of analyses, sample numbers and date sampled should be included in an appendix. This information will be useful for future sampling activities if the need arises.

6.8.3.3 Salt Loading

N It is noted that road salt is typically ineffective for the climate in the project area, and would only be applied as less than 5% of a sand/salt mixture to improve manageability during freezing. However, it is also noted that salt may be stored on site at a number of locations along the proposed highway and at maintenance depots. Since storage areas have been acknowledged as primary sources of salt contamination in the environment, estimated volumes of salt to be stored and storage design criteria should be identified and provisions for avoiding adverse effects described.

6.9 Wetlands

6.9.1 Boundaries

N The objective of *The Federal Policy on Wetland Conservation* is mentioned. However, the goal of the “No Net Loss” of wetland function advocated in the policy is not included in the discussion. The goal of “No Net Loss” is fundamental to the effectiveness of wetland conservation efforts, given the cumulative effect of developments and related activities on wetland function. Indeed, the North American Wetlands Conservation Council (Canada) recommends the adoption of “No Net Loss” goals in project management. The “No Net Loss” approach to addressing effects on wetlands should be reflected in the EIS/CSR.

6.9.3 Existing Environment

N No evaluation of wetland function (e.g., hydrology and habitat) appears to have been conducted. The Guidelines require that the description of the present environment must include wetland resources, including location, size and class of any wetland within a predicted zone of influence and conduct of a wetland evaluation using a comprehensive valuation methodology that assesses component, functional and attribute values. Without this evaluation, the

conclusion that the highway will not have a significant effect on wetlands and wetland function cannot be reasonably supported, especially given the scale of the project, the total area of wetland directly destroyed, and the effect to wetland function caused by potential changes in hydrology.

N The absence of a discussion on the importance of wetland function to the Eagle River Plateau eco-region habitat is of great concern. This extensive complex of string bogs is extremely important wildlife habitat, yet it is not discussed. A discussion of wetlands in the project area is insufficient without explicit consideration of the Eagle River Plateau and the habitat and hydrological function it supports.

6.9.7 Mitigation

N It is claimed that the highway route will avoid wetlands where feasible. This commitment to avoidance has not been demonstrated. The EIS/CSR should include a comprehensive discussion of how the proposed route avoids wetlands or minimized the effects on wetlands (e.g., an alternate route that would run adjacent to, instead of through, wetland areas).

N Mitigation measures to protect the hydrologic regime are vague and insufficient. Section 6.9.6 describes the adverse effects that roads can have on wetland hydrology, but these effects are not analysed in relation to the proposed highway. The mitigation section should describe the appropriate technologies that will be applied and how these technologies will allow maintenance of current hydrological conditions.

6.9.8.1 Construction

N Contrary to the suggestion, the loss of 230 ha of wetland constitutes a considerable loss of wetland area and may constitute a considerable loss of wetland function.

6.9.11 Environmental Monitoring and Follow-up

N This section indicates that monitoring requirements for wetlands have not been identified and Table 6.50 indicates that no monitoring or follow-up (of effects on wetlands and wetland function is) required. There appears to be a considerable gap in knowledge of wetland function in the project area and the potential effects on wetlands this highway could present. The provision for a comprehensive follow-up program that verifies effects predictions and the effectiveness of mitigation measures is of great importance to the credibility of the environmental assessment. This can only be accomplished after an adequate analysis of wetland function and potential effects of the highway on wetland function has been completed.

6.12 Resource Use and Users

N The EIS/CSR acknowledges that there may be increased fishing activity (legal and illegal), increased use of certain rivers or lakes and potential congestion. It also suggests increased harvesting of wildlife and fish resources may lead to resource depletion, resulting in indirect effects on resource populations and resource use and users. The EIS/CSR does not reveal the potential effects of creation of road access to obstruction pools where salmon congregate for longer periods and the opportunities for efficient poaching. Similar effects might occur with respect to spawning beds where the timing and location of trout and salmon aggregations can also be easily predicted. The EIS/CSR as well states that angling for brook trout and char is limited in Sandwich Bay because residents can legally net these species. There should be discussion as to whether there will be an interaction effect whereby local experience with this gear type encourages its use in interior lakes when access has increased. The consequence of such efficient gear combined with ATVs and fish finders used on populations of large trout that are slow growing and relatively low in numbers should be evaluated, as should the potential for a decline in catch rates for lodge clients. Application of the precautionary principle in this instance would require the assumption of the worst case scenario and an indication of mitigation required.

N Section 6.12.8.2 states that the effects of highway operation would likely affect outfitting operations. There is no attempt to quantify the effect or adopt the precautionary principle and assume the worst case scenario and apply appropriate mitigation. Given the stated conclusion and the Environmental Effects Criteria Ratings in Table 6.60, explain how the Environmental Effects Evaluation has determined that the effect of operation would be Not Significant (Minor), bearing in mind that potential significant adverse effects are indicated for salmon lodge outfitters on the Eagle River, trophy trout lodge outfitters on the Eagle River Plateau and suspected for caribou outfitters in western Labrador as a result of increased access for resident hunting of George River Caribou.

N One of the specific measures designed to mitigate project effects on resource use and users is the requirement that all hunting, fishing or trapping activities by project personnel during construction be carried out according to applicable legislation. How does the proponent intend to monitor these activities? As an added measure of protection for the fish resource, DFO suggests that the proponent consider requiring contractors to have a no fishing policy for construction personnel. This approach is in place for the Voisey's Bay project and is considered appropriate for this road construction project, given the concerns over potential exploitation of fish stocks.

N Regarding the need for increase management measures to address potential effects on fish resources, DFO recognizes that new management approaches will be required to address the issues arising from Phase III of the Trans Labrador Highway. A regulatory amendment

which will allow individual species management (in contrast to the current multi-species approach) is anticipated to be in place this year, and this will be a key component of DFO's management strategy for this area. In the fall of 2003, DFO will begin consultations with user groups, including aboriginal groups, in the development of its new five year management plan. DFO commits to the maintenance of aboriginal access to the resource for food, social and ceremonial purposes. The department has already had preliminary discussions in Goose Bay with the Labrador Salmonid Advisory Committee, which represents all major user groups. Key items discussed included the need for the development of a long-term management plan prior to the completion of the highway, monitoring and enforcement capacity, and the importance of education and public awareness in reducing the potential for detrimental effects on the fishery.

6.13 Akamiuapishku/Mealy Mountain National Park

N The Guidelines require consideration of the highway's effects on the establishment, operation and ecological integrity of the proposed Akamiuapishku/Mealy Mountain National Park. The proposed park was to be described in terms of its size, geographic area, ecological integrity and wilderness character (including landscape aesthetics, vistas and noise-scapes). Federally the proposed park is representative of the East Coast Boreal Forest, Natural Region 21 and provincially, the proposed park is representative of five of Labrador's ten ecoregions under the Natural Areas Systems Plan. The ecological integrity and wilderness character of either the Natural Region or the five ecoregions was not described nor was the potential effect of the highway on those ecological integrity's and wilderness characters assessed. The effect of the highway on the proposed park's size, geographic area or ecological integrity and wilderness character has not been provided (e.g., should the approach be adopted with respect to the exclusion of the Trans Labrador Highway from the national park as with the Kluane National Park exclusion of the Alaska Highway, what are the effects on the Akamiuapishku/Mealy Mountains National Park's size and geographic extent, what are the effects on the Natural Region's and ecoregions' ecological integrity and wilderness character through exclusion of habitat on the opposite side of the highway, etc.).

6.14 Tourism and Recreation

N The EIS/CSR doesn't offer baseline information about the area's tourism industry. It does not describe the contribution of the tourism industry to the local economy in terms of spending and employment. Further, it does not address key questions about the interaction between the highway and the tourism industry: the opportunities for tourism growth from hunting, fishing and adventure tourism markets assuming no road; the risks that the highway will result in less opportunity to increase (or even reduce) volumes of higher spending markets; the potential for increased spending from new automotive markets in excess of any losses and the availability of mitigation that will lead to minimal loss of high spenders and significant gains in the

lower spending automotive markets. In addition the EIS should provide discussion of tourism employment implications of decline in demand for labour intensive lodge operations (cooks, wait staff, pilots, guides, maintenance, etc) in comparison to lower consumption automotive touring markets availing of store bought foods, gas, camping. It would be instructive to provide an evaluation of the number of automotive visitors required to replace the spending of one lost lodge client, without accounting for the differences in employment requirements of the two types of visitors.

N Explain why the Environmental Effects Summary in Table 6.65 could not have characterized the Environmental Effects Evaluation as Significant based on the experience of lodge closures in the province as a result of increased crowding, reduced catch rates and reduced pristineness. Include in the explanation the effects of those closures on multiple sectors (airlines, bushplanes, guides, craft, hotel/motel, restaurants, etc.) from reduced business. Evaluate whether ancillary forestry, cabin and other development will be sufficient to cause closures of outfitting operations on the Eagle River Plateau and Eagle River.

7.1 Mitigation Measures

N Under “Wetlands” in the summary of mitigation measures presented in Table 7.1, and elsewhere throughout the EIS/CSR, it is indicated that the proponent will conduct a field investigation of potential areas for rare and endangered plant species. However, nothing further is indicated. Certainly more information on the proposed surveys is required. And, again, if breeding bird surveys are to occur after the EIS/CSR is completed, it is important that appropriate mitigation and follow-up measures acceptable to the Responsible Authorities and Environment Canada be developed before work on the highway is allowed to proceed. It would be preferable that these surveys be conducted before the EIS/CSR is finalized.

APPENDIX B

Editorial Modifications or Changes Required to the Environmental Impact Statement/Comprehensive Study Report

**CARTWRIGHT JUNCTION TO HAPPY VALLEY-GOOSE BAY
TRANS LABRADOR HIGHWAY
ENVIRONMENTAL IMPACT STATEMENT AND COMPREHENSIVE STUDY
Issued April 2003**

**Editorial modifications or changes required to the
Environmental Impact Statement and Comprehensive Study**

General Comments

- A table of abbreviations will greatly enhance the readability of the EIS/CSR.
- The EIS/CSR should be proofread and reviewed for clarity. For example, there are too many words in the last sentence of Roadside pull Off locations; the first letter of many words are missing; there is something missing between the bottom of page 268 and the top of page 269; “(such as hydrocarbons)” is in the wrong place on page 276; and sentence 1, page 323, is ambiguous and the reader can only make assumptions.
- The EIS mentions in several places that a waterfowl and passerine birds study was conducted. In other places the EIS refers to migratory bird studies. The passerine birds study was not completed before submission of the EIS and will be ongoing subsequent to release of the undertaking as construction proceeds. All references to waterfowl and passerine bird studies and migratory birds studies should refer to waterfowl only.

1.1 The Project - The citation is wrong: the project is officially known as “Cartwright Junction to Happy Valley-Goose Bay Trans Labrador Highway”

1.3.1 Provincial Environmental Assessment Process - The decision making process described for the environmental assessment is missing key steps. Consult the *Environmental Protection Act* and the Memorandum of Understanding with the Innu Nation for the complete decision making process (and reflect the correct process in Table 2.1).

1.3.2 Federal Environmental Assessment Process - The use of the Comprehensive Study is not correctly described.

1.4.3.3 Caribou Component Study - Some of the contents of this section were not included as information in the Component Study submitted. This should be identified as supplementary information to the Caribou Component Study.

1.4.3.5 Resource Use and Users Component Study - The Component Study is called Land and Resource Use Component Study. This section should also reflect that land and resource use was covered in two parts, with a separate part for Labrador Innu land use.

2.2.1 Alternative to the Project - It is difficult to believe that Phase I of the Trans Labrador Highway has and will continue to change the socio-economic environment of Southern Labrador. Perhaps this statement should refer to either Phase II or Western Labrador.

2.2.3 Alternatives for Crossing the Churchill River

Muskrat Falls Crossing (A3) - This route is described as extending southwest but it actually appears to extend southeast.

2.2.4 Alternative Routes through Central Labrador

Route through Nekanikau (A12) - It is not clear if this route was to be considered further or not.

2.3 Regulatory Approval Requirements - WST Specification 802 should have been included in the Appendix.

2.4.4.1 Design Criteria for Crossing Structures - Rollings (1997b) is not identified in the Literature Cited.

2.5.1 Project Schedule - the text indicates that the annual construction season will extend from mid-May but Figure 2.10 indicates April of each year.

2.6 Operation and Maintenance - Development activities along highways are controlled under the *Protected Road Zoning Regulations* only if that road has been designated a protected road under the regulations, not along all highways.

3.2.1.1 Ecological Land Classification - If the Taiga Shield Ecozone lies on either side of Hudson Bay it should be the eastern segment occupying central Quebec and Labrador.

3.2.1.3 Rare and Endangered Vascular Plant Species - The ACCDC contact is S. Gerriets, not Garriets.

3.2.2 Avifauna - Rough-legged hawk is mentioned twice. Perhaps a different species was to have been included in place of one of the rough-legged hawk citations.

3.3 Fish - Should “east-northeast” be “west-southwest?”

3.4.7 Tourism and Recreation - This section states that there are a “number of existing and proposed parks and reserves (Section 3.4.5).” Section 3.4.5 states that “There are no existing provincial or federal parks in Central Labrador.” One of these statements should be changed.

4.2.1 Environmental Assessment Guidelines - The Guidelines were issued by the Minister of Environment, not the Department of Environment, and they were issued on December 06, not December 19. Key subjects were also identified by the public.

5.0 ENVIRONMENTAL EFFECTS ASSESSMENT METHODS - The EIS guidelines were issued by the Minister of Environment on December 06.

6.1.3 Existing Environment - it might have proved instructive to have the LLTA and control area raptor nest sites superimposed on Figure 6.1. Footnote 2 in Table 6.1 references an adjustment to the proposed TLH Phase III route but the text does not describe the adjustment, nor are the two additional nests identified in August.

6.3.2 Methods - The Caribou Component Study submitted for review consisted of Otto 2002a. Otto 2002b was never received by the Environmental Assessment Division.

6.5.1 Boundaries - “The NWPA is enforced by the CCG of DFO.” should be written in full.

6.5.2 Methods - The Fish and Fish Habitat Component Study states that fish sampling has been postponed indefinitely and the EIS/CSR states here that fish sampling has been deferred until the summer of 2003. The nature and extent of any fish sampling should be definitively stated.

6.5.6 Existing Knowledge - The reference to proper mitigative steps in Section 2.6 is incorrectly referenced.

6.5.8.2 Operation - The text of this section states that “effect will extend over the life of the highway” but Table 6.25 indicates that the duration in months is <1. These should be reconciled.

6.7.3 Existing Environment - The statement is made that the closest activity is approximately 80 km to the southeast. Is this from Cartwright Junction, Park Lake or Happy Valley-Goose Bay?

6.7.9 Environmental Effects Evaluation - The definition of significant environmental effect should not be the same as not significant environmental effect.

6.9.3 Existing Environment - It is believed that the representative photos are in Appendix S, not Appendix R. Plant community descriptions are in Appendix R, not Appendix S. Only some, not all, plant species are contained in Appendix E. There is no Appendix X containing the detailed description of ground-truthed sites.

6.9.8.1 Construction - The first line of the second paragraph states that the majority of wetlands found within 200 m of the centre line of the highway are bogs (72.5 percent). Table 6.48 states that 72.5% are found within 100 meters of the proposed highway right-of-way. These two should be reconciled.

WST’s detailed procedures are not contained in Section 2.10.2. That section contains Management and Reporting Structure.

6.11.2 Methods - The proposed highway route should be shown on Figure 6.29.

6.11.9 Environmental Effects Assessment - Bullet #7 in Table 6.54 should be changed to read “informing personnel of their responsibility to report suspected findings of historic resources will be part of all environmental awareness sessions.”

6.11.9 Environmental Effects Assessment - Bullet #11 in Table 6.54 should be changed to read “if required, develop in consultation with the PAO and Innu Nation appropriate mitigative measures if an archaeological site is encountered on the 40-m-right-of-way during future historic resources field assessment or construction.”

6.12.1 Boundaries - In both this section and 6.12.2 Methods, the Component Study prepared by JW (2003c) was called Land and Resource Use not resource use and users.

6.12.3.4 Hunting - Waterfowl and Seabird Management and Hunting - This section states that there are two different daily and possession limits after the first Monday in February.

6.12.3.6 Fishing - The Total Days Fished in 1990 in Table 6.57 don't seem to sum to the numbers included in the table.

6.12.9 Environmental Effects Evaluation - One paragraph is included twice in this section.

6.13.8.3 Accidental and/or Unplanned Events - The last sentence appears to be redundant.

6.16.3.1 Settlement and Demographics - The figures provided for lone-parent families do not add up to the totals given.

7.2 Monitoring and Follow-up Commitments - The provisions of the EIS should be added.

APPENDIX C

**Cartwright Junction to Happy Valley-Goose Bay Trans Labrador Highway
Alternative (Outfitter) Route Environmental Impact Statement
and Comprehensive Study Report**

APPENDIX D

**Innu Land Use Component Study Conclusions and Recommendations
(Armitage and Stopp 2003)**

6.0 Conclusions and recommendations

We have presented an assessment of the potential environmental effects of the TLH Phase III with respect to Labrador Innu land use by examining comparative situations from Newfoundland and Labrador and elsewhere in North America.

In conducting this assessment, we quickly recognized the difficulty in quantifying the environmental effects which have resulted from other road projects, since virtually all of the environmental effects predictions made in the course of environmental assessments conducted on major new road works in northern environments have not been followed-up with monitoring research. We were nevertheless able to make what we believe are realistic and well-informed predictions of the potential effects of the TLH Phase III on Innu land use based on data from governments (Aboriginal, federal, and provincial), academic research, personal observations of field-based professionals, and publicly documented environmental studies.

The single most likely effect of the highway corridor, (resulting in both short- and long-term consequences) is increased access and increased land use by both Innu and non-Innu alike. Increased access will undoubtedly result in significant changes to existing Innu land use patterns. Whether these effects are negative or whether they result in benefits to Innu individuals, and to the Innu as a whole, will depend largely on the success of mitigation measures, particularly under the mitigation scenarios we have described.

Increased access has the potential to dramatically increase the level of harvesting by Innu and non-Innu alike in this expanse of formerly remote territory. Dramatic increases in harvesting activities or even a concentration of such activities in areas most accessible from the road could lead to significant declines in species abundance and serious long-term reductions in future harvesting success in accessible areas. We expect this effect to

commence with the start of construction unless mitigation measures are brought into effect before then.

One of the positive effects of increased access to the Eagle River plateau as far as the Innu are concerned is that their land use in the area could increase. Current trends in Innu land use show expanded use of the existing Labrador road network for harvesting and cabin building, especially in the context of limited support for travel to remote territory under the Sheshatshiu Innu Band Council's Outpost Programme. This trend is likely to continue, with families that have a long-time association with the *Akamiuapishk*" (Mealy Mountains) area spending more time there.

However, expanded Sheshatshiu Innu use of the area will likely occur in the face of greatly increased competition with non-Innu and Innu from Quebec. An increased presence of Labrador and Quebec Innu in the *Akamiuapishk*" (Mealy Mountains) region could result in heightened pressure on wildlife and fish populations. Combined with non-Innu harvesting, the aggregate effects could see significant reductions in wildlife and fish abundance unless conservation measures are implemented.

Potential effects would certainly not be limited to the road corridor. The preferred Phase III route intersects several natural travel corridors which will give hunters and fishers relatively easy access to much of the Eagle River plateau – by snowmobile in the winter and spring, and by boat in the summer and fall. As a result, the geographic extent of possible highway effects could be quite large.

We have identified a number of places along the preferred route of the TLH where access to the surrounding hinterland is made easy by natural corridors. One area is the north end of *Uinikush* Lake. With the proposed TLH routing, hunters and fishers will be able to park their vehicles at this location and boat through a large network of lakes that are fully within customary Innu land use regions. *Mishtashini*, *Pepauakamau*, *Uapanatsheu-nipi*, *Eshkanat katshipukutiniht*, *Mashku-nipi* and *Nekanakau* will all be accessible by boaters launching from the north end of *Uinikush*. During the winter, the road will make these lakes accessible from other points as well including a natural corridor to the east of *Mashku-nipi*, and another at the northeast end of *Nekanakau*. Travel to the north on snowmobile will also be easy. Using natural corridors, *Iatuekupau* (Park Lake) and *Enakapeshakamau* will be readily accessible as well as all of the valleys that run east-west across the top of the plateau. Ice-fishing throughout this area, starting with the best-known locations such as *Iatuekupau* (Park Lake), runs the risk of seriously reducing fish stocks.

Further west, *Tshenuamiu-shipu* (Kenamu River) has been an important salmon fishing river for the Innu since time immemorial. In the pre-settlement period, the Innu harvested salmon at the mouth of the river and near its confluence with the *Utshashumeku-shipiss* (Salmon River). While the river is not currently a scheduled salmon river, it continues to support a significant Innu salmon fishery downstream. With the construction of the TLH Phase III, fishers may be able to access the river's confluence with *Utshashumeku-shipiss* (Salmon River) from the proposed bridge

crossing. Easier access to this junction could result in over-harvesting of salmon, especially if there is inadequate regulation and surveillance of the harvesting effort there. Toward *Mishta-shipu* (Churchill River), we identified an access concern just east of the *Mush-nipi* area of Innu land use, approximately 12 km along the preferred route (A3) from the river.

Commercial forestry, mineral exploration and development, and tourism are considered the three most likely categories of cumulative effects associated with the TLH Phase III between Cartwright and Happy Valley-Goose Bay. The construction of the proposed highway through the southern portion of Forest Management District 19, and a bridge across *Mishta-shipu* (Churchill River), will open the black spruce forests on the south side of the Churchill River to commercial exploitation. Future commercial harvesting of these forests is currently the subject of negotiations between the Innu Nation and the provincial Department of Forest Resources and Agrifoods, with good progress having been made on a management plan.

In light of the effects noted thus far, all of which are facilitated by increased access afforded by the highway corridor, we considered the effect that building a road through the Eagle River plateau could have on the establishment of a new national park. Should the construction and operation of the TLH result in effects that detract from the values and objectives underlying park establishment, there is a risk that the park, when it is finally established, could exclude significant Innu land use areas. The Innu Nation has endorsed the establishment of the national park, and would like to see the core Innu land use area on the Eagle River plateau included in it.

Three mitigation scenarios were outlined to deal with the possible effects of the preferred route of the highway, each with different outcomes in terms of effectiveness and the level of residual effects (significance). The mitigation scenarios include (1) regulation under existing provincial and federal legislation, (2) Innu land selection and co-management under a treaty with the federal and provincial governments, and (3) the inclusion of core Innu lands in a new *Akamiuapishk^u* (Mealy Mountains) National Park. The establishment of a national park (scenario 3) which would encompass all of the Eagle River plateau portion of the road, is considered the most effective option, particularly in combination with Innu land selection under a treaty (scenario 2), followed by the options available under existing federal and provincial land use and wildlife conservation legislation (scenario 1). However, we wish to stress the point that these scenarios are complementary, not exclusive, that is, scenario 2 builds on the effectiveness of scenario 1. All three scenarios (1, 2 and 3) are, in principle, mutually compatible in operation.

We rated the residual effects of the proposed TLH Phase III on Innu land use as minor to major (significant) because of the uncertainty concerning the extent to which the federal and provincial governments would implement all of the legislative mechanisms in their respective areas of jurisdiction to prevent over-harvesting and mitigate other potential effects on Innu land use.

Without adequate mitigation, monitoring and enforcement, Labrador Innu face the possible depletion of fish and wildlife species in a core land use area. Competition with non-Innu may also mean that a significant portion of the Sheshatshiu Innu population experiences a significant loss of independence and control in relation to the *Akamiuapishk*^u (Mealy Mountains) area, and that many of the cultural attributes of land occupancy (e.g. history, religious practice, sense of community, etc.) are eroded as well.

Mitigation using a range of complementary regulatory instruments is required, at least in the short-term, pending the completion of negotiations concerning the proposed national park and a treaty with the Labrador Innu. Should regulation be thoroughly applied, with the view to protecting species abundance, and therefore harvesting success and other important aspects of Innu land use in the project area, residual effects could approach the minor side of the spectrum. However, should regulation be applied inconsistently, in a piecemeal fashion, or come too late after the commencement of highway construction, the effects could tend toward the moderate (significant) to major (significant) side of the spectrum.

While there is considerable uncertainty in our effects predictions under existing legislation (scenario 1), there is less uncertainty about such predictions under the national park scenario (scenario 3), particularly if combined with Innu land selections/treaty provisions under scenario 2. However, as already noted, all the benefits of the park or Innu land selections as far as mitigating the TLH's effects on Innu land use are concerned could fail to materialize if a national park were not established, if the park's boundaries exclude the core Innu land use areas, or if Innu land selection options and/or co-management provisions under a treaty are insufficient in size or scope.

A requirement for monitoring the residual effects of both the construction and operations phases of the highway is an integral recommendation of this report. Without monitoring programmes, the proponent, responsible authorities or the Innu themselves cannot reliably determine whether effects predictions are accurate and mitigation measures are working. A number of features of the proposed highway during the operations phase were suggested as candidates for monitoring programmes. The direct involvement of the Innu in such monitoring programmes would provide the proponent and regulatory agencies with direct access to Innu experience and observations about project effects, as well as Innu environmental knowledge concerning wildlife and fish habitat, and animal population dynamics that could have a direct bearing on project/environment interactions.

Throughout the effects assessment section of this report, we made a number of suggestions and recommendations. These include:

- during the construction phase of the proposed TLH Phase III, the proponent should consider routing alternatives, including realignments of the preferred route at *Uinikush* as far away as practical so as to make it difficult for people to gain aquatic access to *Uinikush* and the *Mishtashini-Nekanakau* network of lakes;
- in advance of construction each season, the proponent and construction managers should meet with the Innu Nation and Innu families who plan to be in the

construction area to discuss specific mitigation measures related to construction (e.g. scheduling of blasting operations, the location of construction camps);

- construction managers and workers should be educated with respect to the Innu presence on the plateau, including the need to respect their privacy, and not to interfere with Innu hunting and fishing activities;
- a variety of legislative mechanisms exist (both federal and provincial) that could go a long way to mitigating the environmental effects of the proposed TLH Phase III on Innu land use. These mechanisms include provisions in the provincial *Forestry Act*, *Lands Act* (i.e. Special Management Areas), and *Wild Life Act*, and the federal *Fisheries Act* and *Migratory Birds Convention Act*. These mechanisms should be implemented fully, with all necessary enforcement and monitoring resources put into place. The timely implementation of such mechanisms is required at construction start-up pending the outcome of national park and treaty negotiations that may result in a new land use management regime for the Eagle River plateau;
- in order to protect the salmon in the *Tshenuamiu-shipu* (Kenamu River) system, DFO should schedule the entire river (including *Utshashumeku-shipu*) and establish a monitoring program in partnership with the Innu Nation to assess harvesting effort and population levels there;
- ice-fishing on numerous lakes on the Eagle River plateau runs the risk of seriously reducing fish stocks. We noted previously that DFO has scheduled *Iatuekupau* (Park Lake) as a way to prevent ice-fishing. The scheduling of other lakes in the Eagle River watershed should be given serious consideration for the same reason;
- the Canadian Wildlife Service in partnership with other federal and provincial resource management agencies and the Innu Nation should establish a comprehensive monitoring and enforcement presence with respect to the important migratory waterfowl populations and habitat in the Eagle River watershed;
- a good monitoring programme should be established involving the Innu and government departments and agencies responsible for the management of natural resources (e.g. wildlife and fish) to ensure mitigation measures are effective. The Innu Nation's Environment Office has the capacity to participate in a monitoring programme;
- government departments responsible for managing wildlife and fish resources should conduct an immediate review of their monitoring and enforcement capabilities. Where deficiencies exist, steps should be taken to acquire additional resources to ensure that over-harvesting of wildlife and fish resources does not follow highway construction. Prompt action is required in order to avoid a repeat of the Star Lake experience on the Island of Newfoundland;
- quick action by governments on the officialization of Innu place names on the Eagle River plateau could help mitigate the sense of dispossession and loss of independence that many Innu experience when they see their place names disappearing from the map. Acceptance of Innu toponyms would recognize the important cultural heritage of the region. As an added measure, the Government of Newfoundland and Labrador should consider giving the new highway an Innu

name (e.g. the “Akamiuapishk^u Highway”), a practice not without precedent in other provinces.

APPENDIX E

Induced Development and Activities Associated with the Trans Labrador Highway - Phase III and Potential Cumulative Effects.

Induced Development Activities Associated with the Trans Labrador Highway - Phase III and Potential Cumulative Effects

The following text provides a summary of the discussion on the cumulative environmental effects assessment, in particular, effects that may result from induced activities, conducted for the TLH - Phase III. This text is added to Chapter 7.0 of the EIS/CSR, with the chapter being amended to include the following text in a new Section 7.5. The current Section 7.5 is amended to be Section 7.6.

7.5 Cumulative Environmental Effects

Cumulative environmental effects were considered for each of the VECs assessed. The existing (baseline) environment description for each VEC reflected the effects of past and ongoing human activities on the region's natural and human environments. An overview of past and/or current actions that are likely to interact with those of the project to cause cumulative effects, as well as the effects of these past and/or current actions, was provided for each VEC. Future projects that are likely to proceed were also included in the cumulative effects assessment. Where appropriate, the current status of the VEC due to natural and/or anthropogenic factors was indicated (e.g., a statement is made as to whether a VEC population is declining, stable or increasing). Relevant technical limitations and assumptions were presented in the cumulative effects assessments for each VEC. Cumulative effects significance was evaluated in the same manner as that described for the project-specific effects.

7.5.1 Assumptions

As details regarding the likelihood, nature, location and timing of induced actions were not available to WST, and control of most potential induced actions and related effects was beyond the responsibility of WST, assumptions were made for assessing cumulative effects of induced actions, including:

- other projects and activities will be subject to appropriate planning and management;
- other projects and activities will be subject to the appropriate government requirements (e.g., legislation, regulations and guidelines) for protecting crown resources;
- relevant government agencies will have adequate resources to effectively carry out their mandate with respect to enforcement and planning;
- adherence to existing regulatory requirements will not measurably change; and
- the TLH-Phase III will be designated a protected road and subject to the *Protected Road Zoning Regulations* administered by MAPA.

7.5.2 Existing and Future Projects and Activities

Existing and future planned projects and activities considered in the assessment include those that are ongoing or likely to proceed, and have been issued permits, licences, leases or other forms of approval as specified by the Canadian Environmental Assessment Agency (1994). The environmental assessment also considered the potential cumulative environmental effects of the proposed TLH - Phase III project that may result from future actions potentially induced by the project.

The following existing, planned or reasonably foreseeable future projects and activities were considered in the cumulative environmental effects assessment:

- existing sections of the TLH (Phases I and II);
- other roads in central and southern Labrador;
- Akamiuapishku/Mealy Mountains National Park;
- hydro development, including transmission lines;
- forestry activities;
- tourism and recreation activities, including outfitting operations;
- land and resource use activities, including consideration of improved access, by Innu and other residents of Labrador;
- Voisey's Bay mine/mill development;
- mineral exploration; and
- low-level military flight training.

7.5.3 Existing Management and Planning Processes

Various mechanisms are already in place for carrying out the planning and management necessary for various projects and activities that are already occurring in the region or may potentially occur in the region in the future.

7.5.3.1 Resource Management

Big game and small game hunting, as well as trapping, in Labrador are regulated under the *Wildlife Act* and associated regulations, including the *Wildlife Regulations* and a series of hunting and trapping orders (JW 2003a). The Inland Fish and Wildlife Division of the Department of Tourism, Culture and Recreation is the provincial government division responsible for managing wildlife in Newfoundland and Labrador. The division manages wildlife resources, sets quotas for hunting and issues trapping licenses. The Forest Resources Division of the Department of Forest Resources and Agrifoods is responsible for enforcing the provincial *Wildlife Regulations*. Conservation officers are based in Happy Valley-Goose Bay and district offices in North West River, Cartwright, Port Hope Simpson and Red Bay, as well as offices in Churchill Falls and Wabush.

Migratory bird hunting is managed by the Canadian Wildlife Service under the *Migratory Birds Convention Act*. All hunting is prohibited in provincial and national parks.

Fish in inland waters in Newfoundland and Labrador are a provincial resource. The federal government, however, has responsibility for regulation and management of the resource, similar to their responsibility in Canadian coastal waters. Regulation is under the federal *Fisheries Act*, which addresses freshwater and anadromous fish under the *Newfoundland Fisheries Regulations* and the *Coastal Fisheries Protection Act*, which regulates saltwater fish under the *Atlantic Fisheries Regulations*. Aboriginal communal fisheries activities are regulated under the *Aboriginal Communal Licence Fishing Regulations* (under the *Fisheries Act*). The province retains control of who has access to inland fisheries, whereby the province determines licencing, guiding, and related requirements for resident and non-residents. Those regulations are under the provincial *Wildlife Act*, which also regulates big and small game hunting.

Newfoundland and Labrador's forests are the responsibility of the Department of Forest Resources and Agrifoods. The proposed TLH - Phase III route crosses FMD19 and FMD20. A Forest Ecosystem Strategy Plan and Five-Year Operating Plan have been prepared for these two FMDs. District representatives worked

with external management teams, comprised of industry representatives, general public, government resource managers and other non-governmental organizations, to complete the strategy and operating plans for each district (JW 2003a). The Department of Forest Resources and Agrifoods issues permits and licenses to control the use of forest resources. Conservation officers have the authority to issue permits and enforce the terms and conditions of the permits or licenses.

The *Forest Process Agreement*, signed by Innu Nation and the Government of Newfoundland and Labrador, facilitates Innu involvement in the forest management process, in the absence of a settled land claim (JW 2003a). Labrador Métis Nation participation in forest management in Labrador is facilitated by a Memorandum of Understanding, between the Labrador Métis Nation and the Government of Newfoundland and Labrador.

The Newfoundland and Labrador Department of Mines and Energy is responsible for managing the province's mineral resources, and plays a regulatory role with respect to mineral exploration, mining and quarrying activities in the province. The province's *Mineral Act* governs and regulates the granting of mineral rights in Newfoundland and Labrador. The *Mineral Regulations* define the procedures and rules for holding and maintaining mineral rights in the province. The *Environmental Guidelines for Construction and Mineral Exploration Companies* also apply to mineral activities in the province.

The TLH - Phase III will also be subject to the terms and conditions of the Innu land claim settlement, currently being negotiated between Innu Nation and the governments of Canada and Newfoundland and Labrador. Under a land claim agreement, it is likely that the Labrador Innu will have more control over land and resource use decisions and regulation (Armitage and Stopp 2003). It will establish a framework for land and resource management in the settlement area.

7.5.3.2 Planning and Development

There are a number of planning processes in place to address various of aspects of resource use. The municipal planning process under the *Urban and Rural Planning Act, 2000* provides the means for incorporated municipalities to prepare municipal plans outlining land use designations and defining the manner in which development may occur within the municipality. The municipal plan and development regulations are legal documents and are binding on the municipality, council and others using or proposing to use land in the municipality. Public consultation in the municipal planning process is required under the act. A development permit is required for any development within the municipality and the development must be carried out according to the municipal plan and associated development regulations. The *Urban and Rural Planning Act, 2000* also has provisions for regional and protected area planning.

Similarly, a development permit is required for any development within the building control lines established for a protected road. Building control lines for protected roads are 400 m on either side of the highway as measured perpendicular from the highway centreline, except for the following:

- within the municipal boundary of an incorporated municipality, the building control line is 100 m from the centreline;
- outside the municipal boundary, but within the municipal planning area, the building control line is 150 m from the centreline; and

- within an unincorporated municipality, the building control line is 400 m from the centreline or as set by an interim or approved protected road zoning plan.

Protected road zoning plans currently being prepared for Routes 500 (Phase I of the TLH) and 510 (Phase II of the TLH) will identify the type of development permitted and locations where it is permitted along the highway corridor (JW 2003a). Public consultation is also required for these plans. In addition, the *Protected Road Zoning Regulations* also outline the type of development that may be considered within the building control lines of a protected road.

Development within the protected road corridor, including any cabin development within the corridor, is subject to permitting and enforcement by the Department of Government Services, specifically the Government Services Centre. Cabin development outside the protected road corridor is the responsibility of the Crown Lands Administration Division of the same department. Any cottage lot development plans that the division may prepare are subject to environmental assessment and a Crown Land Application must be submitted (and permit obtained) for any individual cabin development involving crown land. Both staff with the Land Management Division and Department of Forest Resources and Agrifoods' Conservation Officers are responsible for enforcement. Management and enforcement measures are outlined in the *Lands Act*. Under the act, structures placed on crown land without the proper grant, lease or license can be removed.

Tourism and recreation, including outfitting operations, in the province are within the mandate of the Department of Tourism, Culture and Recreation. The department is involved in various aspects of the province's tourism industry, including: advertising and communications; product development; touring and travel trade; visitor services; regional support; and special celebrations. It is also involved in regulating tourism operations, including outfitting operations, in the province under the *Tourist Establishments Act* and *Tourist Establishment Regulations*. All operators of tourist establishments in the province are required to be licenced. The regulations also include specific guidelines and requirements for certain types of tourism establishments in the province. There is currently a freeze on the development of new lodges on rivers in Labrador (T. Kent, pers. comm.).

There are also formal processes in place for establishing national parks and heritage rivers, both of which are coordinated by Parks Canada. Recognition of a park under the *National Parks Act* brings with it defined management responsibilities and rules regarding resource use. Similarly, management plans for heritage rivers outline resource protection measures, appropriate resource use activities, strategies to maintain ecological integrity and monitoring. Both of these planning processes provide opportunity for public involvement and consultation.

Provisions for establishing Special Management Areas are outlined in the provincial *Lands Act*. This measure was used to protect lands within the area of the proposed Torngat Mountain National Park, until the park is officially established (Government of Newfoundland and Labrador 2000). The Special Management Area for the Torngat Mountains was established through a MOU between the Government of Newfoundland and Labrador and the Labrador Inuit Association. Under the agreement, commercial and industrial development are prohibited. The Special Management Area is administered by the Department of Tourism, Culture and Recreation.

The forestry management planning process involves various user groups in the planning process, including industry representatives, the general public, government resource managers and non-governmental organizations. In addition, forestry management plans are also required to be registered under the *Environmental Protection Act* and, as a result, are subject to government and public review under this process.

These planning processes (municipal and regional planning, protected road zoning plans, forest management planning, national park planning and heritage river management planning) all require some form of public consultation (JW 2003a). Thus, there is further opportunity for Labrador residents and others to have input into further planning and development.

7.5.4 Experience with TLH - Phases I and II and Others Roads in Labrador

Comments from the public open houses conducted as part of the environmental assessment indicate that many residents are generally pleased with the benefits offered by the TLH - Phase II. Experience with previous highway development in Labrador provides some indication of the type of activities that may occur along the TLH - Phase III.

7.5.4.1 Cabin and Lodge Development

Both the Phase I and Phase II portions of the TLH have been designated as protected roads and protected road zoning plans are being prepared for both sections of highway. As noted above, this designation and associated management plans provide a means for controlling development along the highways. However, there are reports of development having occurred along both the Phase I and II portions of the TLH.

In the section of Churchill River from Gull Island to Churchill Falls (along the Phase I portion of TLH), private cabins are being built and anglers are experiencing good fishing for brook trout and ouananiche (W. Maclean, pers. comm.). Armitage and Stopp (2003) indicate that, of a total 1,248 cottages in Labrador, 462 were located within 1 km of a road.

New lodge development has occurred along the Phase I portion of the TLH between Happy Valley-Goose Bay and Western Labrador. In the Labrador Straits, a number of outfitting operations currently exist in very close proximity to the highway, and the ability to access these camps directly by road has allowed these operations to offer fishing packages at somewhat lower prices than those who rely on air transportation (JW 1998).

7.5.4.2 Resource Harvesting

Increasing trapping activity has been noted along the Phase I portion of the TLH, as well as dust covering vegetation along the route (Innu Nation 2002). Increased incidences of trapping along roadways has occurred around other roads in Labrador, including the Grand Lake Road and Orma Road located along the eastern edge of the Smallwood Reservoir.

Following construction of the highway through the Labrador Straits, there was an influx of anglers from the island of Newfoundland when Atlantic salmon quotas were changed to permit fishers in Labrador to retain one large salmon, resulting in overcrowding along the Pinware, Forteau and other rivers in the region. This

eventually resulted in a requirement to implement fish quotas and retention regulations for the Labrador Straits similar to those for the island of Newfoundland (JW 1998).

There has also been an increase in the number of anglers fishing newly accessible areas associated with the construction of the Phase II portion of the TLH. C. Poole (pers. comm.) notes that angling activity has increased (as much as tripled) with the completion of Phase II. Correspondingly, the number of patrols by conservation officers and the number of charges laid have probably doubled. Anglers frequenting the area are mainly from communities in southern Labrador. Others were from the island of Newfoundland, the maritime provinces, Québec and from outside Canada.

Due to the expected influx of anglers as a result of the TLH - Phase II, nine previously unscheduled rivers (including the Paradise River) in Southern Labrador were scheduled and given Class III designations in 2001 for salmon conservation purposes (DFO 2002). In addition, special trout management plans (i.e., reduced daily bag limit and possession limit) were put in place for Gilbert's Lake and Chateau Pond in Southern Labrador to protect brook trout. These plans were put in place in response to the anticipated increase in angling pressure that may result from the completion of the Phase II portion of the TLH (B. Slade, pers. comm.).

7.5.5 Managing the Effects of Induced Development and Activities along the TLH - Phase III

Assuming that the relevant agencies have adequate resources to effectively carry out their mandate with respect to enforcement and the other assumptions (listed in Section 7.5.1) made with respect to induced actions are met, no significant adverse environmental effects, including cumulative effects, are identified for the TLH - Phase III project. While increased use of the area may result due to the improved access provided by the highway, the planning and control measures in place by various agencies to govern activities and development that may be carried out in the area act to reduce the potential adverse cumulative effects.

While there are appropriate management mechanisms and planning processes in place, these tools are only effective if the relevant agencies have the capacity or means to implement and enforce the various management requirements.

7.5.5.1 Capacity of Resource Management Agencies

The deficiency statement states, *although planning and control measures are available to regulate activities associated with increased access, in the opinion of several agencies current resources are not believed adequate to enforce such regulations, considering the difficulties associated with enforcement across the large, sparsely populated area along the highway corridor* (p. 3). Several agencies were contacted in regard to the proposed TLH - Phase III and asked if they believed they lacked the resources to fulfill their mandate, at least at current levels. Agencies, which are responsible for implementing and enforcing various legislation and regulations with respect to development and resource use activities, contacted include:

- Department of Environment, Water Resources Management Division;
- Department of Government Services and Lands;
- Department of Forest Resources and Agrifoods;
- Department of Fisheries and Oceans; and
- Environment Canada, Environment Protection Branch.

Based on the results of these contacts, no formal requests were submitted to the regulatory agencies in an attempt to verify the statement from Page 3 of the deficiency statement. The Canadian Wildlife Service was also contacted.

Some agencies recognized their limited capability and the need to reassign or redistribute available resources. In addition, actions by some agencies indicate that they are taking steps to identify and respond to potential concerns that may result in relation to highway development. For example, DFO has commenced program modifications to regulate and mitigate the potential for depletion of the brook trout resource. The deficiency statement (Appendix A of the addendum to the preferred route EIS/CSR) provided to WST in April 2003 states: *Regarding the need for increase management measures to address potential effects on fish resources, DFO recognizes that new management approaches will be required to address the issues arising from Phase III of the Trans Labrador Highway. A regulatory amendment which will allow individual species management (in contrast to the current multi-species approach) is anticipated to be in place this year, and this will be a key component of DFO's management strategy for this area. In the fall of 2003, DFO will begin consultations with user groups, including aboriginal groups, in the development of its new five year management plan. DFO commits to the maintenance of aboriginal access to the resource for food, social and ceremonial purposes. The department has already had preliminary discussions in Goose Bay with the Labrador Salmonid Advisory Committee, which represents all major user groups. Key items discussed included the need for the development of a long-term management plan prior to the completion of the highway, monitoring and enforcement capacity, and the importance of education and public awareness in reducing the potential for detrimental effects on the fishery.*

Likewise, the deficiency statement also notes that the recently completed forest management plan for District 19A outlines objectives for forest management in the district and the *harvesting guidelines specific to District 19 offer significantly more habitat protection than is seen [in] other jurisdictions* (p. 11).

7.5.5.2 Assuming a Lack of or Inadequate Resources for Enforcement

In the event that there is a lack or inadequate level of resources for enforcement, the cumulative environmental effects that may result due to induced development and activities would likely be different from those identified under the set of assumptions presented in Section 7.5.1.

Without proper application of the management and planning processes and related enforcement requirements, it is expected that there would be some level of uncontrolled activities and development occurring along the highway, such as:

- uncontrolled development activity and side roads may occur along the highway;
- ATV and other trails being developed off the highway to provide access to cabins, rivers and/or lakes;
- uncontrolled cabin development along and off the highway;
- uncontrolled hunting, trapping and fishing activity;
- disruption of current land and resource use patterns of Innu and other current users;
- startup of unlicenced outfitting camps along the highway;
- uncontrolled mineral exploration activities; and
- uncontrolled forestry activity, both commercial and domestic.

The concern regarding the inability of the appropriate departments or agencies to fulfill enforcement requirements and the associated potential results is applicable to both the preferred and outfitter routes. However, as noted, the outfitter route is less likely than the preferred route to be included within the final boundary for the national park. Therefore, the area in the immediate vicinity of a highway along the outfitter route would not benefit from the resource protection offered by a national park.

In the absence of a land claim settlement, Innu Nation has been involved in the forestry management planning process that has been established for District 19A (i.e., the area which includes the western portion of both the preferred and outfitter routes). The management plan outlines objectives for forest management in the district and, as noted in the deficiency statement for the EIS/CSR completed for the preferred route, the *harvesting guidelines specific to District 19 offer significantly more habitat protection than is seen [in] other jurisdictions*. Forest management plans are subject to the provincial environmental assessment process, which provides for government and public review and input. The five-year operating plan for District 19A was released from the provincial environmental assessment process on May 23, 2003. As a condition of release, the Department of Forest Resources and Agrifoods was required to prepare a human resource plan and conduct employment monitoring.

The TLH - Phase III will also be subject to the terms and conditions of the Innu land claim settlement, currently being negotiated between Innu Nation and the governments of Canada and Newfoundland and Labrador. When the Innu land claim is settled, it will establish a framework for managing area land and resources within the land claim settlement area.

While mineral exploration is not subject to environmental assessment, permits and/or licences are required and regulations and guidelines are in force. Any resulting mining developments are subject to environmental assessment and monitoring under provincial approvals and the federal *Metal Mining Effluent Regulations*. Likewise, any hydroelectric power development would also be subject to both the provincial and federal environmental assessment processes. Therefore, any mining or hydroelectric power developments are not expected to occur in an uncontrolled manner without proper regulation and enforcement.

For socio-economic aspects, such as tourism and recreation, employment and business, and community life, cumulative effects associated with uncontrolled activities and development may be both positive and adverse, depending on the perspective of the various resource user groups. For example, any employment or business generated due to new activities along the highway would most likely be viewed favourably among local residents, but if any new businesses replace the services offered by existing tourist operations, they could potentially affect the viability of an existing operation.

For those activities or developments that are not subject to the environmental assessment process, permitting, licensing or other regulatory mechanisms could be required. Permits and licences may outline terms and conditions, but in the event permit or licence holders do not adhere to those requirements, it would pose a concern for both the preferred and outfitter routes in the absence of proper enforcement or adaptive management (e.g., adjusting quotas).

In a case where relevant government agencies do not have the resources to adequately carry out their mandate, it is conceivable that inspections and prosecutions will be reduced and accidents and violations increased as a result. If future projects and/or activities are not managed appropriately or, if government

agencies do not have sufficient resources to effectively manage or implement and enforce their respective mandates, a major (significant) cumulative environmental effect may result to caribou, and moderate (significant) cumulative environmental effects may result to raptors, waterfowl, furbearers, fish and fish habitat, resource use and users, and tourism and recreation. Minor (not significant) cumulative environmental effects may result to species at risk (specifically short-eared owl and harlequin duck), employment and business, and community life.

Not significant cumulative environmental effects are expected to result to geomorphology, wetlands and riparian habitat. Significant cumulative environmental effects may result to the Akamiupishku/Mealy Mountains National Park study area.

7.5.6 Recommendations

The Canadian Environmental Assessment Agency (1997) indicates that due to the uncertainty and dispersed nature of induced activities, they are best addressed through a regional land use planning process that involves the relevant regional agencies. The environmental assessment for the TLH - Phase III could provide a resource that may be used by the relevant agencies to develop an appropriate framework for planning and managing induced development and activities along the TLH - Phase III and in the surrounding area. Agencies may also need to review and adapt existing management policies and programs to ensure that they are appropriate for the region and the type of development and activities that may occur in the region. There may also be a need for agencies to adjust resource levels to meet any changes in development and activity levels.

Tourism Company/Rodger Todhunter & Associates (1997), in their tourism impact assessment of the TLH - Phase II, suggest that the Dempster Highway provides a suitable model for addressing induced development and other activities associated with a highway development in a remote area. Development regulations were put in place to control land use within an 8-km corridor on either side of the Dempster Highway. This was followed by the establishment of a management planning process that involved the Yukon First Nations. The planning process involved: preparing an inventory of land uses and resources (natural, flora, fauna, heritage, mineral, and oil and gas); developing guidelines for managing resources within the corridor; preparing management options; public and First Nations consultation; and developing a management strategy.

Similar strategies are now being used to manage and plan for access into wilderness areas. For example, in southeastern British Columbia, a recreation management strategy is being developed as part of the Southern Rocky Mountain Management Plan. The planning process involved a stakeholder committee, which included commercial and non-commercial interests in the affected area, and public consultation (Matthews and Quinn 2003).

As there is not one sole government agency responsible for managing resources and access, then a cooperative approach would allow all aspects to be considered within the same framework. Interagency coordination and involvement of key stakeholder groups are critical elements for any management and planning process.

APPENDIX F

List of Acronyms for the Environmental Impact Statement and Comprehensive Study Report

LIST OF ACRONYMS

ACCDC	Atlantic Canada Conservation Data Centre
ARD	Acid Rock Drainage
ASL	Above Sea Level
ATV	All-terrain Vehicle
BBS	Breeding Bird Survey
BP	[Years] Before Present
CCG	Canadian Coast Guard
CCME	Canadian Council of Ministers of the Environment
CEAA	<i>Canadian Environmental Assessment Act</i>
CEC	Commission for Environmental Cooperation
CFB	Canadian Forces Base
CFL Co	Churchill Falls (Labrador) Company
CHRS	Canadian Heritage Rivers System
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CPUE	Catch per Unit Effort
CSP	Corrugated Steel Pipe
CSR	Comprehensive Study Report
CWS	Canadian Wildlife Service
dBa	Decibels
DBH	Diameter at Breast Height
DDRR	Department of Development and Rural Renewal
DDT	Dichlorodiphenyltrichloroethane
DFA	Department of Fisheries and Aquaculture
DFO	Department of Fisheries and Oceans Canada
DFRA	Department of Forest Resources and Agrifoods
DND	Department of National Defence Canada
DTCR	Department of Tourism, Culture and Recreation
ECM	Environmental Compliance Monitoring
EEM	Environmental Effects Monitoring
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EPP	Environmental Protection Plan
ESO	Environmental Surveillance Officer
ESWG	Ecological Stratification Working Group
EQL	Estimated Quantitation Limit
FGA	Fiander-Good Associates Limited
FMD	Forest Management Districts
GBAC	Goose Bay Airport Corporation
GPS	Global Positioning System
GRHS	Grenfell Regional Health Services
HADD	Harmful Alteration, Disruption or Destruction

HBC	Hudson's Bay Company
IBA	Important Bird Area
IBP	International Biological Programme
IELP	Innu Environmental Limited Partnership
IEMR	Institute for Environmental Monitoring and Research
INEN	Innu Environmental
IOC	Iron Ore Company of Canada
JW/JWEL	Jacques Whitford Environment Limited
KP	Kilometre Point
LLTA	Low-Level Training Area
LMN	Labrador Métis Nation
LMSS	Land Management and Survey Systems
MAPA	Department of Municipal and Provincial Affairs
mbf	Million Board Feet
MCC	Ministere de la Culture et des Communications
MIBC	Mushuau Innu Band Council
MMA	Moose Management Area
MMCH	Mealy Mountains Caribou Herd
MOD	Mineral Occurrence Database
MOU	Memorandum of Understanding
NLH	Newfoundland and Labrador Hydro
NO _x	Nitrogen Oxides
NP/AP	Neutralization Potential to Acid Producing Potential Ratio
NRC	Natural Resources Canada
NTS	National Topographic Survey
NWPA	<i>Navigable Waters Protection Act</i>
NWWG	National Wetlands Working Group
PAH	Polycyclic Aromatic Hydrocarbon
PAO	Provincial Archaeology Office
PTA	Practice Target Area
RA	Responsible Authority
RLU 80	Rural Local Undivided 80 km/hr
RRCS	Renewable Resources Consulting Services Ltd.
SFZ	Salmon Fishing Zone
SO ₂	Sulphur Dioxide
TAC	Transportation Association of Canada
TCC	Torngâsok Cultural Center
TLH	Trans Labrador Highway
USDOT	United States Department of Transportation
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VBEAP	Voisey's Bay Environmental Assessment Panel
VBNC	Voisey's Bay Nickel Company Limited
VECs	Valued Environmental Components
VOCs	Volatile Organic Compounds

WDFW
WHMIS
WRMD
WST

Washington Department of Fish and Wildlife
Workplace Hazardous Materials Information System
Water Resources Management Division
Department of Works, Services and Transportation

APPENDIX G

Caribou Component Study Progress Report

Progress Report

Telemetry of the Mealy Mountain Caribou Herd, Labrador

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20 September 2002

Introduction

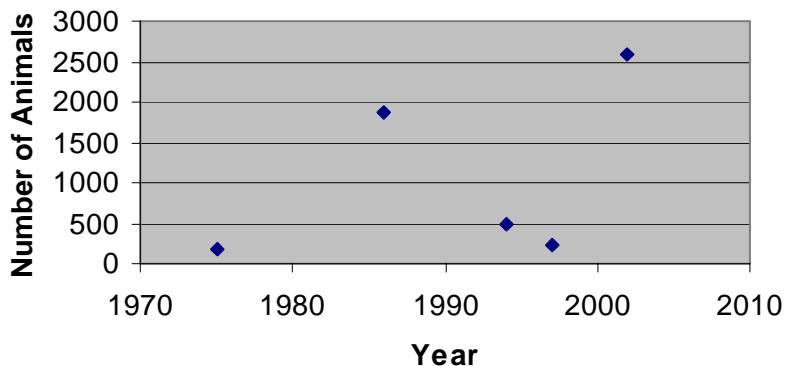
Background

The Mealy Mountain caribou herd (MMCH) occupies that area of Labrador from the Kenamu river near Goose Bay eastward to the south Labrador coast. The northern limit for the herd is essentially Lake Melville and Groswater Bay, with incidental and survey reports of occasional animals on the northern shore of Groswater Bay, and near the community of Rigolet. This herd extends southward toward the Lower north shore of Quebec as well as toward the Straits area of Labrador. It is difficult to determine the exact extent of the southern limit of the herd, as there are local pockets of caribou existing in these southern areas, and their herd affiliation, if any, is not understood.

Woodland caribou in Labrador are listed as “Threatened” by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). The MMCH is the scientifically least well known of the three recognized Woodland caribou herds in Labrador, and has not been the subject of ongoing research and monitoring efforts since 1988. However, in 1994 a survey of the herd range was undertaken and provided a minimum count of approximately 500 animals (Chubbs 1994). Methodology used for this work precluded an estimate of population size. In 1997, a density-distribution survey was completed to estimate population size, and resulted in an estimate of 223 animals (Schaefer 1997). However, the 1997 work was hampered by few sighted animals, and a clumped distribution of sighted animals, many observed while off survey lines. As a result, the confidence interval for this work was extremely wide, covering approximately 200% of the estimate. In 2002, a density distribution survey was completed and the associated population estimate was 2585 ± 1596 caribou (\pm approximately 60%) (Otto 2002). The 2002 survey located caribou in much of the traditional range of the herd.

The MMCH has undergone wide fluctuations in population size in the past. For instance, the herd was estimated at less than 200 individuals in the mid-1970's, increasing to approximately 2000 animals in the mid-1980's. Coupled with the estimates from 1994, 1997, and 2002, it is clear that the MMCH herd exhibits an inherent population cycle (Figure 1). However, there is a high potential for new pressures, such as road construction, tree harvesting activities, and increased human access to the area, to have a major impact on herd dynamics.

Figure 1. MMCH Population Estimates



This report summarizes the re-establishment of an ongoing research and monitoring program on the MMCH through radio telemetry of collared individuals from the herd.

Study Objectives

Objectives for the re-initiation of a radio telemetry program on the Mealy Mountain caribou herd are as follows. From a sample of collared animals this project will:

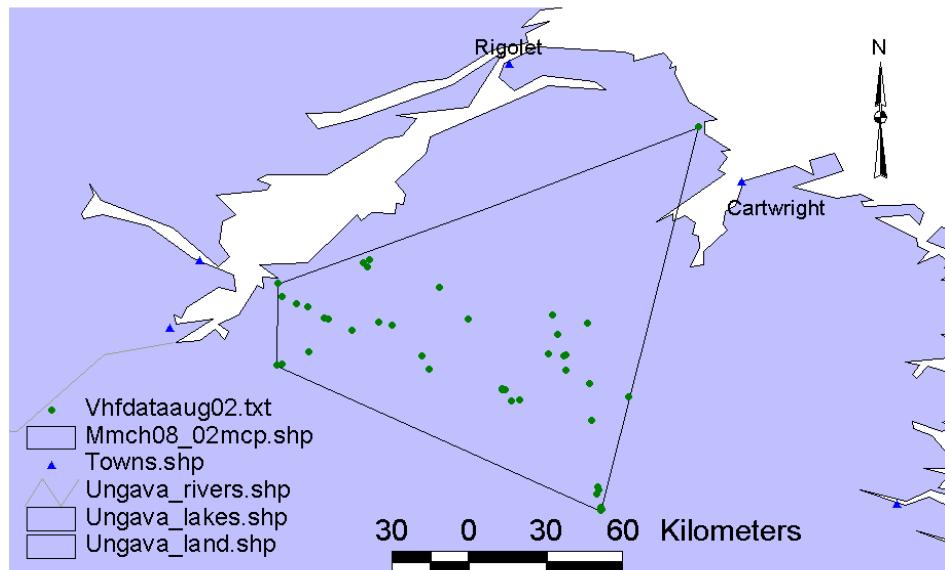
1. Estimate extent of home ranges, both seasonally and annually, for collared animals,
2. Evaluate total range use by all collared animals,
3. Determine caribou group composition and distribution by season, and
4. Provide season and location information required for subsequent additional collaring and population estimation efforts.

Study Area

As with any telemetry project, the exact bounds of the study area are determined by the movements of the collared animals. The area covered by the telemetry surveys is shown in Figure

2, and covers the Mealy mountains proper on the south side of Lake Melville, as well as the majority of the Eagle river watershed inclusive of the large string bog complexes in the area.

Figure 2. All locations of caribou found during Mealy Mountain caribou survey as well as caribou capture locations showing total study region.



Source of Field Data

Field data was collected from 29 May to 31 August 2002 by staff from the Science Division office (Goose Bay) and observers from the Innu Nation.

Methodology

Determination of sampling periods

After initiation of the telemetry project in May 2002, a schedule was put in place for relocation and is as follows:

1. From May through October 2002, flights would occur about every two weeks, and
2. From November through March 2002-2003, flights would occur about every month.

As there has not been a telemetry program on this herd since 1988, we were not sure that

seasonal movements of collared animals would remain the same as in the past. As well, calving and post-calving periods are generally considered as very important to herd demography, therefore the concentration of flights during this time period. During fall migration and winter seasons, woodland caribou in Labrador move relatively little, and are easier to relocate due to better radio transmission/reception and the presence of tracks, both due to the extensive snow cover. As well, during winter season woodland caribou tend to form larger groups than at other times of year. Therefore, late autumn and winter relocation frequency is reduced.

Aerial telemetry methods

Collared animals were relocated from a helicopter equipped with radio antennas and crewed by staff from the Science Division (Goose Bay office) and observers from the Innu Nation. Animals were located via a unique radio frequency through a radio receiver. The directional signal from the transmitters was followed until a visual identification was made or until the receiver operator was sure the animal was very near the aircraft. Often, visual identification was made quickly, and the location recorded via global positioning system (GPS). Otherwise, the receiver operator determined location to a small specific area and recorded that position via GPS. Inability to make visual observations was usually due to either heavy forest cover or severe terrain. Making visual observations under these conditions would require extra time, resulting in increased stress to the animal as well as increased aircraft costs.

Results

Relocations

A total of 48 relocations (including capture locations) were collected as of 7 September 2002. Number of relocations per animals was not equal due to either inability to hear a signal or operational difficulties during telemetry flights (equipment problems, darkness, etc...). Number of relocations per animal ranged from 7 to 9. Most of the relocations included visual observations (43 of 48, or 96%).

Group size and classification

Of the 42 non-capture locations collected, 32 were observations of single caribou (76%),

and of the 10 multiple animal sightings, 3 were of a collared female with calf of the year, meaning that only 7 of 42 (17%) of relocations were of multiple animals. Further, only 2 of 42 (5%) relocations were of 3 or more animals. For the full telemetry record, see Appendix 1.

Discussion

Movements

To date, the collared sample of Mealy Mountain caribou have exhibited a variety of movement characteristics, from vagile to relatively sedentary, both between and by individual animals. Some of the movements recorded for this herd are surprising, while others fit the general patterns known for woodland caribou. No consistent pattern emerged for movement rates and/or distances either by sex or by reproductive status. This is primarily due to lack of sample size of collared animals for the study to date.

Animal MM2002001, VHF frequency 151.570-s, is a large stag that was captured while alone, and by evidence of tracks and craters in the area at that time, had spent at least the majority of late winter alone. He moved slightly west after capture, and was observed with another stag in late May. By late June he had moved north into the Mealy Mountains, remaining in a small area since arrival. He has been alone since late May.

Animal MM2002002, VHF frequency 151.450-s, is an adult female collared at the same location as animal MM2002003. She moved almost exactly south after capture, and quickly settled within several kilometres of the edge of the extensive string bog complex comprising the headwaters of the Paradise and Eagle rivers. Several observations were made of her with a calf of the year. This area is characterised by large expanses of string bog and by adjacent areas of very heavy, closed canopy spruce forest, interspersed with small streams.

Animal MM2002003, VHF frequency 151.290-s, is a stag, collared with MM2002002. He moved slightly east after capture, and after one relocation, moved westward past the capture location and stopped near Igloo lake. The area is characterised by several large lakes, many large bogs, and sizeable streams and rivers.

Animal MM2002004, VHF frequency 151.120-s, is a female, collared at the same location as MM2002005. When captured, she had a yearling at heel, presumably born in 2001. She was captured in the southeastern margin of the Mealy Mountains. By late May, she had traversed the

majority of the mountains and was located on the Kenemish marshes near the shores of Lake Melville, a distance of approximately 80 km, with her previous years' calf still at heel. By mid-June, she was found up the Kenamu river valley some 30 km, and was not observed with other caribou. She then turned east, and has travelled to within approximately 30 km of the original capture location. It is probable that she gave birth in 2002, providing an explanation for the absence of her yearling after late May, but she was not observed immediately after calving time with a calf, primarily due to heavy forest canopy closure at those locations.

Animal MM2002005, a calf collared at the same location as MM2002004 (but not her calf) also made the same cross-mountain journey as MM2002004 to the Kenemish marshes. Since that time, he has been alone and has moved slightly southeast back into the edges of the mountains near Lake Melville. He has remained in a very rugged area with many small ponds and steep streams and a few small bogs. Forest cover is sparse, but dense where found.

Animal MM2002006, is a female collared on the Wonderstrand north of Cartwright, the well-known wintering area for Mealy Mountain caribou. She was found in a group of approximately 130 caribou, and did not have a yearling at heel when captured. She was first relocated in the lower end of the Eagle River watershed, approximately 90 km from her capture location. I was very worried about her fate, as she was slightly injured during capture (some hair removed by the capture net and skin abraded). She was run extremely hard during capture as the first net did not completely tangle her, and subsequent netting attempts were hampered by the terrain. Since moving to the Eagle River area, she has remained in a relatively small area characterised by several large, steeply sloped river valleys, and many medium sized bogs on flat terrain above the slopes, with heavy forest cover everywhere. She has not been observed with a calf of 2002, and has been alone since moving to this area.

Observed movement patterns seem to fit those predicted by models of hierarchical habitat selection processes. Briefly, such a process causes an animal to make gross decisions on general location based on landscape-scale characteristics of the area (mountainous, plateau, coastal). Once a suitable landscape has been chosen, the animal then searches for suitable patches within that landscape that offer attributes required for survival (heavy forest cover near large bog complexes, narrow stream valleys with abundant small patches of trees). Such movements would be characterised by relatively large displacements in space, along with clusters of relocations in a

relatively small area. These are exactly what were found for at least five of the six collared caribou, and maybe all six. Detailed analyses of these movement patterns are not completed at the present time.

Location characteristics

No consistent pattern emerged for movement rates and distances nor location characteristics by sex or by reproductive status.

Recommendations

It is clear that individual animals from the Mealy Mountain caribou herd move relatively large distances as compared to other woodland caribou herds in Labrador. Also, it is clear that animals from this herd are present throughout the area where the various routing options for Phase III of the Trans Labrador highway. Further, it appears that the large aggregations of Mealy Mountain caribou found north of Cartwright in winter disperse great distances during the summer period, making the watersheds of the Eagle and Paradise rivers potentially important summer range. This is not totally unexpected, as the expansive string bogs comprising the headwaters of both rivers are classic woodland caribou summer range type for regions where wolves and other large predators are present. Based on the distribution of animals found during winter, it is likely that these animals are choosing different landscapes during different seasons, and are willing to travel relatively long distances to find such landscapes.

The construction, maintenance, and use of an all-weather road through this area will have an impact on Mealy Mountain caribou. Access along the road by humans, in concert with the myriad of other activities that invariably follow road construction (forest harvesting, snowmobiling, camping, etc...) along with hunting by aboriginals, will cause at least a decrease in already low caribou densities in the area of the road, and could extirpate local pockets of animals. Evidence from research conducted on the Red Wine Mountains caribou herd suggests that individuals may learn small scale migration routes through family groups.

Much is to be learned from the ongoing Mealy Mountain caribou telemetry project. Certainly results to date are preliminary, but a picture of the habits of these animals is emerging. I look forward to the coming autumn and winter portions of the present project.

Literature Cited

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