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GLOSSARY

abandonment	terminating use of facilities at the end of project life.
ACCDC	**Atlantic Canada Conservation Data Center**
AHCC	Atlantic Health Science Corporation.
AMEC	AMEC Earth & Environmental Limited.
alternative routes	refers to routes that have been identified on the basis of constraint mapping, stakeholder consultation, impact assessment and other factors.
anadromous	used to describe fish that spawn in freshwater after spending most of their life in the sea (*i.e.*, species with a saltwater growing phase and a freshwater reproductive phase).
anthropogenic	derived or resulting from human activity.
aquifer	any geologic unit capable of supplying a significant amount of water.
archaeological resource	pre-contact and/or historical artifacts, archaeological features or sites.
ARD	acid rock drainage.
ASU	Archaeological Services Unit.
archaeological site	an area where one or more archaeological resources have been identified.
archaeological survey	the archaeological investigation of an area for evidence of cultural activity.
artifact	an object made or altered by human activity.
back-blading	excavation using a bulldozer by dropping the blade and moving backwards so as to scrape material from the surface. Conducted at streamsides so the bulldozer does not enter the watercourse.

GLOSSARY (CONTINUED)

bedrock	the more or less solid rock in place either at or beneath the surface of the earth.
carnivores	a species whose diet consists of animal matter.
CEAA	*Canadian Environmental Assessment Act*. B.S.C 1992, C.37.
channel	a natural stream that conveys waters; a ditch excavated to control the flow of water.
CMA	Saint John Census Metropolitan Area.
CO	carbon monoxide.
corduroy	a temporary road built of logs laid side by side.
counterpoise	ground wires which are connected to tower footings to provide an adequate lightning current path to the ground.
CPCN	Certificate of Public Convenience and Necessity.
cultural landscape	the physical and cultural environment associated with a heritage site.
dBA	a commonly used sound measurement that approximates the response of the human ear to sound. A 10 dBA increase represents a doubling of the noise level, a 10 dBA decrease results in a halving of the noise level.
decommissioning	preparing facilities for abandonment at the end of project life.
DEP	Department of Environmental Protection (Maine).
deposition	in the context of “sediment deposition,” meaning the accumulation of material which settles or is dropped due to slower movement of the transporting agent, water.
designated archaeological site/ heritage structure	a site or structure registered in government inventories, and may have some level of protection.

GLOSSARY (CONTINUED)

discharge	in the context of "water flow," meaning the process by which groundwater feeds into surface water bodies, or the general flow of water from a source to a receiving body of water.
diversity	in the context of "species diversity," meaning an expression of the number of different species in a sample or study area indexed according to the number of individuals of each species.
drainage area	all land and water area from which runoff may contribute to a common point (watershed).
drainage	the removal of excess surface water or groundwater from land by means of surface or subsurface drains.
DWA	Deer Wintering Area.
earthquake	perceptible trembling to violent shaking of the ground, produced by the sudden displacement of rocks below the earth's surface.
ECC	Environmental Component of Concern.
ecosystem	the combination of the biological (biotic) community and the non-living (abiotic) environment.
edge habitat	areas where two habitat types meet (*e.g.,* forest-field; water-shore).
effect	an observable and measurable response of a population, individual or a biotic/abiotic factor to an external source of disturbance (synonymous with "impact").
EHV	Extra High Voltage
EIA	environmental impact assessment. Synonymous with environmental effects assessment.
embankment	fill constructed with soil materials to contain water.
emergent vegetation	aquatic vegetation which reaches above the surface of the water.

GLOSSARY (CONTINUED)

EMF	Electromagnetic Fields.
endangered	descriptive of a species threatened with imminent extinction or extirpation.
endemic	peculiar to a particular region or locality.
environment	the surrounding region, which includes both the biophysical/ ecosystem, and socio-economic components.
erodible	susceptible to erosion.
erosion	detachment of soil particles by agents such as water, wind, ice and gravity.
ESA	Environmentally Significant Area.
extinct	a species that no longer exists on the planet.
extirpated	a species that no longer exists in a specific location, but found elsewhere.
fauna	animals.
FERC	Federal Energy Regulatory Commission, Department of Energy (United States).
fines	generally refers to the silt- and clay-size particles in soil.
First Nations	Aboriginal communities.
fish habitat	the spawning grounds and nursery, rearing, food supply, and migration areas on which fish depend directly or indirectly in order to carry out their life processes (federal definition).
flora	plants.
glacial till	non-sorted, non-stratified sediment carried or deposited by glaciation.

GLOSSARY (CONTINUED)

glaciofluvial	pertaining to watercourses flowing from glaciers or to material deposited by their flow.
grading	any RoW stripping, cutting, filling, stockpiling, or any combination thereof, including the land in its cut-and-filled condition.
gravel	rounded rock or mineral pieces larger than two mm in diameter (*i.e.,* an accumulation of pebble, cobbles, or combinations of these).
ground level ozone	ozone concentrations at ground level.
habitat	the environment in which the life-cycle requirements of a plant or animal are supplied.
hazardous materials	any prohibited, restricted, or controlled product.
herbivore	a species whose diet consists of plant matter.
heritage constraint	constraint to development due to the existence of a heritage resource.
heritage potential	pertains to the level of potential an area holds to contain heritage resources based on an understanding of the region's past and present landscape uses and environment.
heritage resources	an all encompassing term referring to archaeological resources/ sites, heritage structures, designated historic sites, sensitive sites, burial sites, and areas of historical importance.
heritage structure	standing structure meeting Canadian Inventory of Historic Building (CIHB) criteria.
herpetiles	a category of animal consisting of amphibians and reptiles.
historic	associated with the period/era following European arrival in New Brunswick (circa 1604).

GLOSSARY (CONTINUED)

hydroseeding	application of a mixture of seed, fertilizer, mulch, binder, and water on forslopes, backslopes, ditches, and other prepared areas to produce a uniform cover of vegetation.
impact	an observable and measurable response of a population, individual or biotic/abiotic factor to an external source of disturbance (synonymous with “effect”).
infiltration	in the context of “groundwater,” meaning liquid penetration through an area, such as water-borne pollutants moving through soil (*e.g.,* saltwater intrusion).
invertebrate	an animal lacking a backbone or bony skeleton.
IPL	International Power Line.
LURC	Land Use Regulation Commission (Jurisdiction).
M&NP	Maritimes & Northeast Pipeline.
MCFH	Mature Coniferous Forest Habitat.
migration (fish)	movement of fish, usually in large numbers, with the purpose of reaching areas used for spawning.
mitigation measures	measures applied to eliminate or minimize the potential adverse effects of an activity on the environment (synonymous with mitigative measures).
NAPS	National Air Pollution Surveillance Network.
NB	New Brunswick.
NBDAFA	New Brunswick Department of Agriculture Fisheries and Aquaculture.
NBDELG	New Brunswick Department of Environment & Local Government.
NBDNRE	New Brunswick Department of Natural Resources & Energy.
NBDOT	New Brunswick Department of Transporation

GLOSSARY (CONTINUED)

NBSR	New Brunswick Southern Railway.
NEB	National Energy Board.
NEBA	*National Energy Board Act*, R.S.C. 1985, C.N-6, as amended.
NGO	non-government organization.
NO_x	nitrogen dioxide.
NS	Nova Scotia.
O_3	ground level ozone.
order odonata	a taxonomical grouping of invertebrate species, commonly known as dragonflies.
organism	any life form.
passerine	perching birds.
perennial	a plant which lives for more than two growing seasons.
petroleum product	includes aviation fuel, asphalt, bunker “C” oil, diesel fuel, engine oil, gasoline, kerosene, lubricants, mineral spirits, naphtha, petroleum-based solvents, transformer oil, and water/petroleum products (exclusive of paint and propane).
pH	a quantitative measure from 0 to 14 which indicates the acidity or alkalinity of a solution. Low pH (<7) reflects acidity, high pH (>7) reflects alkalinity.
physiography	the shape and form of the landscape.
PID	Property Identification Number
post-contact	after the arrival of European groups, generally accepted as after 1604 in New Brunswick.

GLOSSARY (CONTINUED)

pre-contact	prior to arrival of European groups, generally accepted as prior to 1604 in New Brunswick.
raptors	birds of prey (*e.g.,* hawks, owls, eagles).
rare species	species which occur in low numbers in a given area, but which are in little danger of extinction, but are likely to become vulnerable.
recharge	in the context of "groundwater," meaning the process by which water resulting from precipitation infiltrates into the groundwater table.
RFI	Radio Frequency Interference
RTOs	Regional Transmission Organizations. Corrections of which were ordered by FERC Order No.: 2000.
riparian zones	landscape features associated with water bodies such as lakes, rivers, streams, and wet areas, consisting of terrestrial and aquatic components that influence each other; the banks or shores of watercourses.
RoW	right-of-way, legal right of passage over another individual's parcel of land.
runoff	portion of the precipitation on a drainage area that is discharged from the area via watercourses. Includes surface runoff, groundwater runoff, or seepage.
sediment control fence	fence constructed of geotechnical fabric and installed in a special manner to collect sediments in surface runoff, and prevent sedimentation of watercourses.
sediment basin	a depression formed from the construction of a barrier or dam built to retain sediment or debris, and prevent sedimentation of watercourses.
sediment	fine soil material that is generated by erosion and deposited from water.

GLOSSARY (CONTINUED)

sedimentary rock	rock formed by the accumulation of sediment in water (aqueous deposits) or from air (eolian deposits).
sedimentation	deposition of soil particles or other solids into a watercourse.
seepage	water escaping through, or emerging from, the ground; usually considered to occur along an extensive line or surface, as contrasted with a spring, where the water emerges from a localized spot.
seismic	pertaining to, characteristic of, or produced by earthquakes or earth vibration, as seismic disturbances.
sensitive	descriptive of a species that normally exhibits a well-defined response to an external source of disturbance when measured under controlled conditions.
silt	clastic material from 1/256 mm to 1/16 mm in diameter (*i.e.,* fine sand).
siltation	see also sedimentation. Denotes sediment pollution of a watercourse.
SO_2	sulphur dioxide.
solvent	an organic liquid in which other organic materials (such as grease or oil) will dissolve (*e.g.,* alcohol).
species	a self-perpetuating population of animals or plants which is more or less genetically isolated.
species at risk	species designated as either endangered, threatened, of special concern, or rare (*i.e.,* by federal and provincial regulatory authorities or species experts).
species of special concern	descriptive of a species at risk because of low numbers or restricted occurrence, and likely to become threatened.
streambank	the usual boundaries, not the flood boundaries, of a stream channel.
streambed	the bottom of a channel, carrying streamflow.

GLOSSARY (CONTINUED)

surface water	all water, the surface of which is exposed to the atmosphere.
surficial	in the context of "geology," meaning characteristic of, pertaining to, formed on, situated at, or occurring on the earth's surface; especially, consisting of unconsolidated residual, alluvial, or glacial deposits lying on the bedrock.
suspended sediments	sediment particles either floating or suspended in water.
threatened	descriptive of a species likely to become endangered.
till	non-sorted, non-stratified sediment carried or deposited by a glacier.
topography	the configuration of the Earth's surface, including the shape, elevation and position of its natural and man-made features.
toxicity	the characteristic of being poisonous or harmful to plant or animal life; the relative degree or severity of this characteristic.
toxins	substances which are poisonous or harmful to plant or animal life.
trophic level	the position that an organism occupies on the food web (number of energy transfer steps needed to get to that level of the food web).
TSP	Total Suspended Particulates.
turbidity	condition of water when it becomes cloudy due to sediment in suspension.
UNB	University of New Brunswick.
vagile	having the ability or freedom to move about or disperse in a given environment.
vantage	a position which provides an extensive view and strategic advantage.

GLOSSARY (CONTINUED)

vascular plant	any plant characterized by possession of water and sugar transporting tissue.
VEC	Valued Environmental Component (including both biophysical and socio-economic components).
VOCs	a volatile organic compound.
WAP	**Watercourse Alteration Permit**
watercourse	the full width and length, including the bed, banks, sides and shorelines, or any part of a river, creek, stream, spring, brook, lake, pond, reservoir, canal, ditch or other natural or artificial channel open to the atmosphere, the primary function of which is the conveyance or containment of water whether the flow be continuous or not (provincial definition).
watershed	an area of land draining to a common collection system such as stream or lake. See also, drainage area.
wetland	land that is saturated with water long enough to promote wetland or aquatic processes as indicated by poorly drained soils, wetlands vegetation, and various kinds of biological activity which are adapted to a wet environment. Includes bogs, fens, marshes, swamps, and shallow waters.
WGA	Washburn & Gillis Associates Ltd.
WHMIS	Workplace Hazardous Materials Information System.

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1.0 INTRODUCTION

1.1 Objectives of Comprehensive Study Report

The Comprehensive Study Report (CSR) was prepared by AMEC Earth & Environmental Limited (AMEC) under the direction of New Brunswick Power Corporation (NB Power) in consideration of a proposal to construct, operate and maintain a 345 kV International Power Line (IPL) and as a requirement under the *Canadian Environmental Assessment Act* (CEAA). The CSR reflects the National Energy Board's (NEB) S*coping Letter for the Environmental Assessment,* dated August 16, 2001.

The CSR outlines the environmental assessment process which has been followed to arrive at the 1 km wide Preferred Corridor for this Project. It also describes the methodology and criteria used to select a preliminary Preferred 50 m Right-of-Way (RoW) within the 1 km wide Preferred Corridor. Finally, it examines how NB Power will design, construct, operate and maintain the Project so as to minimize adverse environmental effects.

The CSR permits the reader to assess the significance of the environmental effects of the Project, including cumulative effects and other similar projects and activities within the Study Area.

NB Power has applied to the NEB for a Certificate of Public Convenience and Necessity (CPCN) under Section 58.16 of Part III.1 of the *National Energy Board Act,* R.S.C. 1985, c.N-7 as amended for a proposed IPL. NB Power has filed with the NEB the following preliminary documents in support of the CSR:

- Corridor Selection and Environmental Impact Assessment Study Report (EIA Report; AMEC 2001a) filed April 25, 2001.
- Supplementary Information Report (SIR; AMEC 2001b), describing alignment modifications made outside the 1 km wide Preferred Corridor filed July 13, 2001.
- Field Assessment Report (FAR; AMEC 2002) Proposed 345 kV International Power Line Project from Point Lepreau to the New Brunswick/Maine Border.

NB Power requests the Minister of Environment refer the CSR to the NEB and Department of Fisheries and Oceans (DFO) under paragraph 37 (i) (a) of CEAA for consideration in the process of deciding whether a CPCN should be granted for the Project and, if so, in the determination of any conditions that may attach thereto.

1.2 Environmental Assessment (EA) Process

Under the CEAA and the *Comprehensive Study List Regulations*, a CSR is required for a power line that is "345 kV and greater than 75 km in length on a new right-of-way". The following triggers have led to this assessment:

- *National Energy Board Act*, s. 58.16(1)
- *Comprehensive Study List Regulations*, Part II, s. 7
- *Fisheries Act*, ss. 35(2)
- *Navigable Waters Protection Act*, s. 5(1)

The EA leading to this CSR consisted of three phases. Phase 1 dealt with the collection of available baseline data and features mapping, which involved the definition of the Study Area, collection of environmental mapping and review of relevant projects/reports. Phase 2 involved the corridor selection process and included the identification and evaluation of Alternative Corridors and selection of the Preferred Corridor. Phase 3 focussed on the EA of the 1 km wide Preferred Corridor.

Three Alternative Corridors were identified in the Study Area on the basis of constraint mapping and a preliminary assessment of constructability. The process to select the 1 km wide Preferred Corridor was iterative in nature, and included consideration of environmental constraints as well as engineering and land issues in order to ensure selection of a corridor that minimized Project interaction with Valued Environmental Components (VECs).

During the summer of 2001, NB Power identified two modifications that extended beyond the width of the 1 km wide Preferred Corridor assessed in the EIA Report (AMEC, 2001a). These modifications were summarized in the SIR (AMEC; 2001b) and dealt with the potential environmental effects as a result of Project activities. These modifications and mitigative measures were also incorporated in this Report.

When reading the CSR, the following should be noted:

- NB Power is committed to implementing all recommended mitigation measures provided in the CSR.
- Legislation and regulations considered in the preparation of this CSR are listed in Table 1-1 of this Section.

TABLE 1-1
Environmental Legislation and Guidelines which may be Applicable to the 345 kV International Power Line Project

Issue	Applicable Legislation/Guidelines	Regulator/Agency
Environmental Impact Assessment Filing and Approval	• *National Energy Board Act,* R.S.C. 1985, c. N-7, Part III.1 - Construction and Operation of Power Lines • *National Energy Board Electricity Regulations,* S.O.R./97-130, s. 5	• National Energy Board
	• *Canadian Environmental Assessment Act,* S.C. 1992, c. 37 • Responsible Authority Guide	• Canadian Environmental Assessment Agency • Environment Canada • National Energy Board • Department of Fisheries and Oceans
	• *Navigable Waters Protection Act*	• Canadian Coast Guard
Handling, storage and/or transportation of hazardous and/or dangerous goods (*e.g.*, oils, fuels, gasoline, etc.)	• *Transportation of Dangerous Goods Act*, S.C. 1992, c. 34 • *Transportation of Dangerous Goods Regulations*, S.O.R./85-77	• Transport Canada
	• *General Regulation – Transportation of Dangerous Goods Act*, N.B. Reg. 89-67	• Department of Public Safety (New Brunswick)
	• *Petroleum Product Storage and Handling Regulation - Clean Environment Act*, N.B. Reg. 87-97	• Department of the Environment and Local Government / Department of Health and Wellness (New Brunswick)
	• *Workplace Hazardous Materials Information System Regulation - Occupational Health and Safety Act*, N.B. Reg. 88-221	• Workplace Health, Safety and Compensation Commission (New Brunswick)
Blasting, Pits and Quarries	• Wright, D.G. and G.E. Hopky, *Guidelines for the use of explosives in or near Canadian fisheries waters* (Minister of Public Works and Government Services Canada, 1998) Cat. No. Fs 98-6/2107E	• Fisheries and Oceans Canada
	• *General Regulation - Quarriable Substances Act*, N.B. Reg. 93-92	• Department of Natural Resources and Energy (New Brunswick)
	• *Blasting Code Approval Regulation - Municipalities Act*, N.B. Reg. 89-108	• Department of the Environment and Local Government / Department of Finance (New Brunswick)

TABLE 1-1
Environmental Legislation and Guidelines which may be Applicable to the 345 kV International Power Line Project (continued)

Issue	Applicable Legislation/Guidelines	Regulator/Agency
Groundwater, Surface Water Protection	• *Fisheries Act*, R.S.C. 1985, c. F-14 • *Water Quality Regulation - Clean Environment Act*, N.B. Reg. 82-126 • *Water Well Regulation - Clean Water Act*, N.B. Reg. 90-79 • *Watercourse Alteration Regulation - Clean Water Act*, N.B. Reg. 90-80 • *Protected Area Exemption Regulation – Clean Water Act*, N.B. Reg. 90-120 • *Wellfield Protected Area Designation Order - Clean Water Act*, N.B. Reg. 2000-47 • *Watershed Protection Designation Order – Clean Water Act, N.B. Reg. 2001-83*	• Fisheries and Oceans Canada • Department of the Environment and Local Government / Department of Health and Wellness (New Brunswick)
Drinking Water Quality	• *Guidelines for Canadian Drinking Water Quality* (Minister of Supply and Services Canada, 1996) Cat. No. H48-10/1996E	• Health Canada
	• *Potable Water Regulation - Clean Water Act*, N.B. Reg. 93-203	• Department of the Environment and Local Government / Department of Health and Wellness (New Brunswick)
Works or undertakings affecting fish habitat (*e.g.*, alteration, disruption, destruction)	• *Fisheries Act*, R.S.C. 1985, c. F-14	• Fisheries and Oceans Canada
	• *Watercourse Alteration Regulation - Clean Water Act*, N.B. Reg. 90-80 • Watercourse Alterations Technical Guidelines	• Department of the Environment and Local Government / Department of Health and Wellness (New Brunswick)
Species Protection	• *Canada Wildlife Act*, R.S.C. 1985, c. W-9 • *Migratory Birds Convention Act*, S.C. 1994, c. 22	• Committee on the Status of Endangered Wildlife in Canada (COSEWIC) • Environment Canada

TABLE 1-1
Environmental Legislation and Guidelines which may be Applicable to the 345 kV International Power Line Project (continued)

Issue	Applicable Legislation/Guidelines	Regulator/Agency
Species Protection (Continued)	• *Endangered Species Regulation – Endangered Species Act*, N.B. Reg. 96-26 • *Wildlife Refuges and Wildlife Management Areas Regulation - Fish and Wildlife Act*, N.B. Reg. 94-43 • *Ecological Reserves Act*, S.N.B. 2000, c. E-1.1 • Forest Management Manual for Crown Lands • Deer Wintering Area Management Manual for Crown Forest Lands	• Department of Natural Resources and Energy (New Brunswick)
Wetlands Protection	• *Federal Wetlands Policy* (Government of Canada, 1991) • *Migratory Birds Convention Act*, S.C. 1994, c. 22 and regulations	• Environment Canada
	• *Watercourse Alteration Regulation - Clean Water Act*, N.B. Reg. 90-80	• Department of the Environment and Local Government / Department of Health and Wellness (New Brunswick)
Protection of Archaeological and Heritage Resource Sites	• *Historic Sites and Monuments Act*, R.S.C. 1985, c. H-4	• Department of Canadian Heritage (Federal)
	• *Criminal Code of Canada*, R.S.C. 1985, c. C-46	• Office of the Solicitor General of Canada
	• *Historic Sites Protection Act*, S.N.B. 2000, c. H-6	• Culture and Sport Secretariat (New Brunswick)
Ambient Air Quality	• *Canadian Environmental Protection Act*, R.S. 1999, c. 33 • *Clean Air Act*, Repealed, R.S.C. 1985, c. 16 (4th Supp.), s. 145 • Ambient Air Quality Objectives	• Environment Canada
	• *Air Quality Regulation - Clean Air Act*, N.B. Reg. 97-133	• Department of the Environment and Local Government / Department of Health and Wellness (New Brunswick)

- The preliminary Preferred 50 m RoW will be refined and finalized as the Project design advances and information is received from discussions with landowners and stakeholders. All field investigations have been completed and a summary of the results provided in Section 4 of the CSR.

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2.0 ENVIRONMENTAL ASSESSMENT APPROACH & METHODOLOGY

AMEC conducted the EA Study for the proposed Project between December, 2000 and April, 2001 using a multi-disciplinary Project Team. AMEC held meetings at key points during the Study to keep NB Power representatives apprised of the environmental findings, and to allow them to receive information in relation to NB Power's technical requirements and construction practices.

The EA consisted of three phases:

- Phase 1 - Baseline Data Collection and Features Mapping
- Phase 2 - Corridor Selection Process
- Phase 3 - Environmental Assessment of the 1 km wide Preferred Corridor.

The EA process is summarized in Figure 2-1. As part of the EA process, a CSR was prepared by AMEC under the direction of NB Power between May 2001 and July 2002 as a requirement under CEAA. The CSR reflects the NEB's Scoping Letter for the Environmental Assessment dated August 16, 2001.

For assessment purposes, the temporal bounds for the Project were divided into the construction and operational periods. Construction of the Project will occur over approximately a one-year period, while operation may last for more than 100 years. Spatial bounds for the assessment areas are specific to each of the identified VECs. The EA included the assessment of potentially adverse environmental effects, including cumulative effects, resulting from Project activities, following the approach outlined in Figure 2-2.

The Study Area for the EA was selected to limit salt spray interference with the proposed transmission line. The Study Area boundaries included Mount Pleasant, Big Kedron Lake, Lynnefield to the north; St. Stephen, Bartlett Mills, Second Falls and Point Lepreau to the south; Dipper Harbour and South Oromocto Lake to the east; and the St. Croix River to the west. The terminal points for the proposed IPL Project were the Point Lepreau Terminal and the New Brunswick/Maine border. The Study Area is depicted in Figure 2-3.

CEAA was used as the framework for the early identification, prevention and management of adverse environmental effects potentially resulting from the proposed Project. The Reference Guide entitled "Determining Whether A Project Is Likely To Cause Significant Adverse Environmental Effects", included in the Responsible Authority's Guide (the Agency, 1994) assists Responsible Authorities in determining whether a project is likely to cause significant adverse environmental effects.

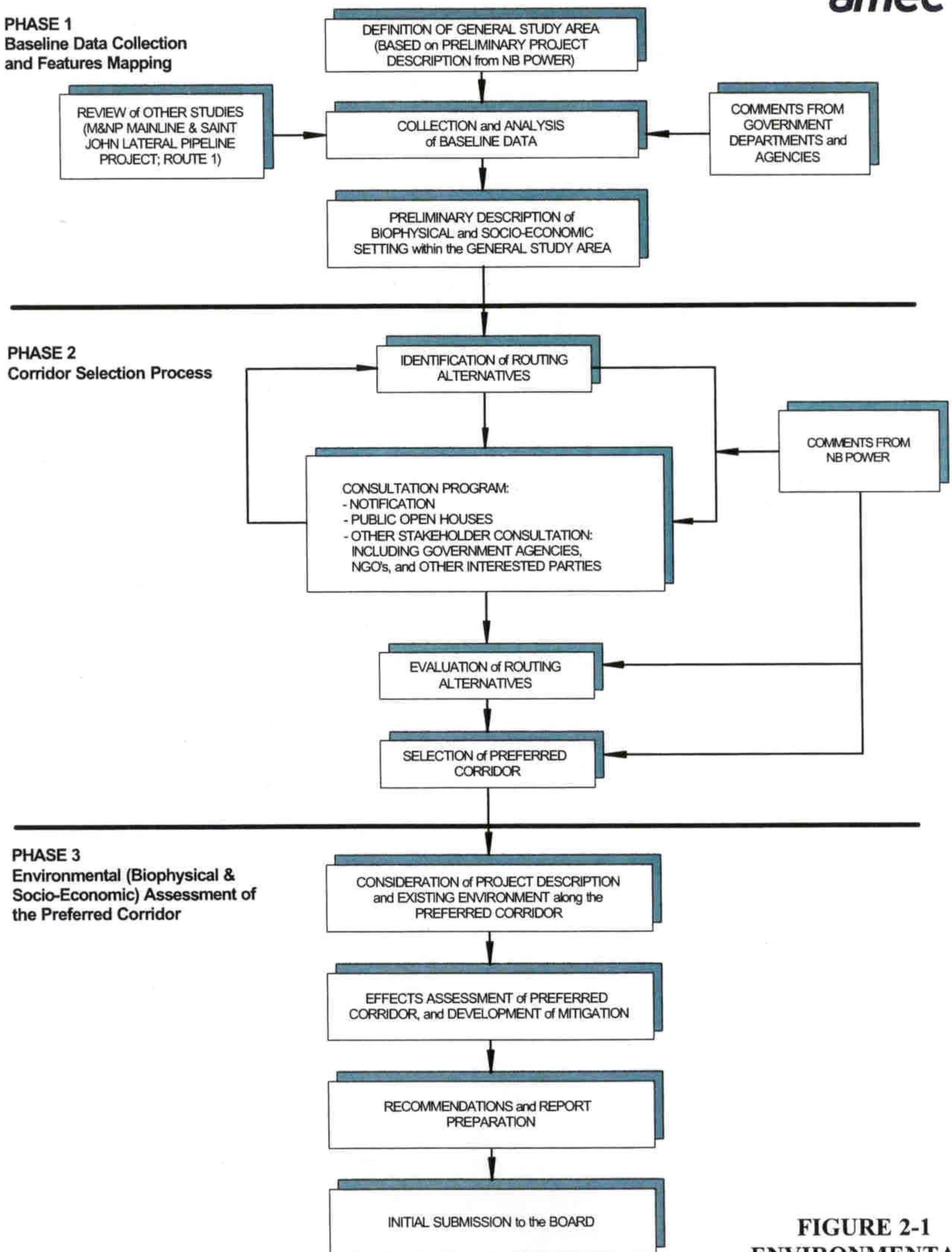

FIGURE 2-1
ENVIRONMENTAL ASSESSMENT STUDY PROCESS

TE21002.3/study process-csr (2002/03/26) amec

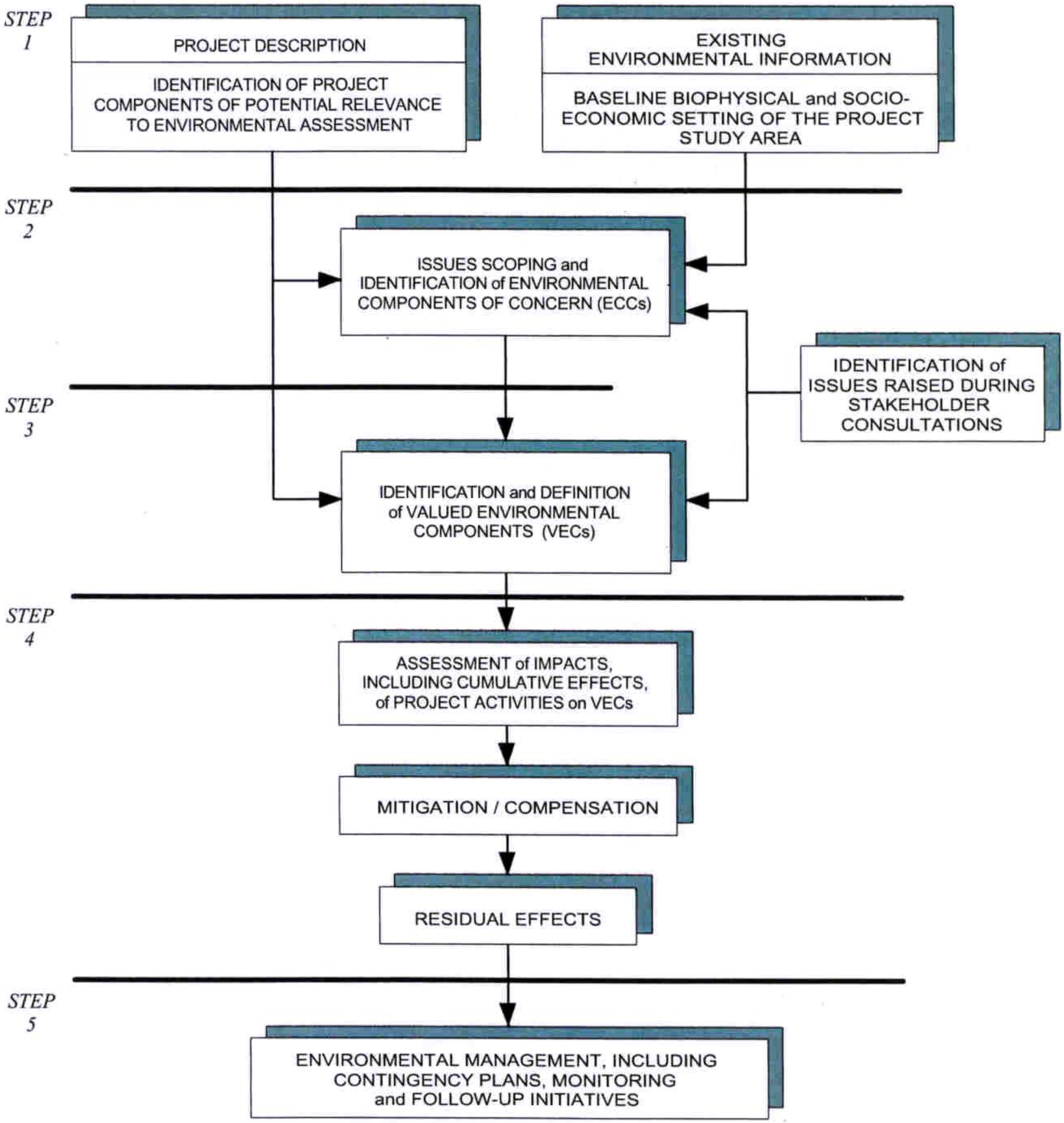

FIGURE 2-2
APPROACH TO ENVIRONMENTAL EFFECTS ASSESSMENT

TE21002.3/approach to assess-csr (2002/03/26)

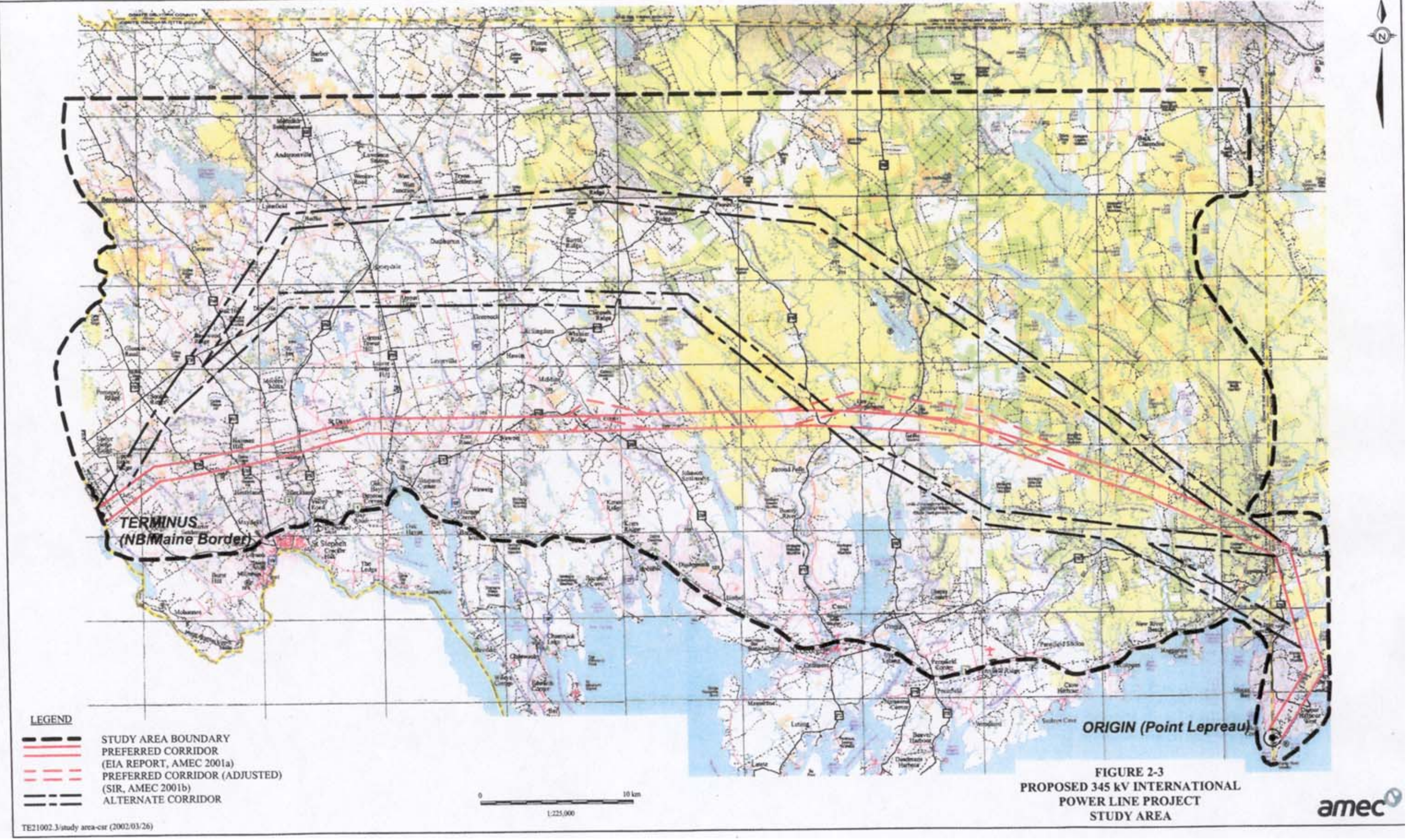

FIGURE 2-3
PROPOSED 345 kV INTERNATIONAL
POWER LINE PROJECT
STUDY AREA

2.1 Public and Stakeholder Consultation

The establishment of an early Public Consultation Program (PCP) was undertaken by NB Power in relation to the proposed IPL Project.

The PCP was undertaken to provide landowners, stakeholders, the general public, and Aboriginal groups with information about the Project, to obtain feedback from these parties, and to facilitate a vehicle for the exchange of information.

The PCP involved the use of a variety of consultation techniques designed to notify, advise and inform all interested parties. These techniques included:

- notification of Information Sessions by letters of invitation, fax, radio ads, media advisories and community signage;
- distribution of printed material/information sheets;
- mapping; and
- establishment of a Toll-free line.

The program has and will continue to provide NB Power with an opportunity to develop an enhanced understanding of potential technical, environmental, economic and social issues in relation to the overall Project.

2.1.1 First Series of Public Information Sessions

Two Public Information Sessions were held early in the planning process to solicit input to the corridor selection process as follows:

- Pennfield, New Brunswick - February 27, 2001
- St. Stephen, New Brunswick - March 1, 2001

Information presented at these sessions included Project constraint mapping, property fabric mapping, construction and operation practices and NB Power corporate and standard transmission line information.

Attendees were asked to complete an Exit Questionnaire summarizing any specific concerns with the proposed Project. Issues relevant to corridor selection/environmental assessment were identified at the sessions (Table 2-1), and were addressed during the selection of the1 km wide Preferred Corridor.

TABLE 2-1
Issued and Concerns Raised at Initial Information Sessions

Name	Association	Issue/Concern	Response	Status
Mrs. Melanie Caldwell	Landowner in the Study Area	Mrs. Caldwell could not attend the session and called to find out if the proposed transmission line would affect her property. She requested a copy of a map depicting the three corridors and additional information about the proposed transmission line. Mrs. Caldwell was concerned because of problems related to a previously constructed RoW through her property (*e.g.* ATV access).	NB Power's Real Estate Agent noted the landowner's coordinates and indicated that the information would be mailed within days. A letter was sent to Ms. Caldwell with the requested information. Ms. Caldwell was invited to contact NB Power with any further requests. No request received to date.	Landowner not affected by any corridors. Mitigation measures for ATV access are provided in Section 6 of this Report.
Mrs. Andrea and Mr. Barry Gilmore	Landowners in the Study Area	Concerned about open water and migratory bird habitat on their property.	NB Power representatives explained that these constraints were avoided to the extent possible during the selection of the preliminary Preferred 50 m RoW and measures identified to mitigate potential impacts.	Landowner's property was avoided during the selection of the 1 km wide Preferred Corridor.
Mr. And Mrs. Neilson	Landowners in the Study Area	Mr. and Mrs. Neilson were not affected by any of the potential corridors. However, they had general concerns about ATV traffic and loss of habitat. Several questions were asked about the purpose of the Project and the Point Lepreau Facility.	NB Power representatives answered all questions. Mr. and Mrs. Neilson stated they were pleased with the information provided. They were invited to contact NB Power in the event they had additional questions. To date, no additional questions have been received from the Neilsons.	The following measures were identified and will be implemented to address concerns: • Avoid critical wildlife habitat to the extent possible • Allow natural revegetation to occur within the RoW to the maximum height allowable for safe operation. • Implement mitigation measure listed in Section 6 of this Report to manage ATV access disturbance.

Following the first series of Information Sessions, the 1 km wide Preferred Corridor was selected and an impact assessment was conducted to identify the potential impacts of the Project and to develop appropriate mitigative measures. Two modifications that extend beyond the width of the 1 km wide Preferred Corridor were identified during additional detailed investigations and information sessions (Table 2-2). These modifications were addressed in the SIR (AMEC, 2001b) and are included in this Report.

TABLE 2-2
Summary of Route Modifications

Route Modification	Issue/Constraint Noted	Status
Located between Rocky Lake and Bonny River	• High aesthetic value – isolated waterfall near Lake Anthony (Environmental constraint) • Red Rock Mountain (Engineering constraint) • Magaguadavic Floodplain near Lee Settlement (Engineering and environmental constraint) • Camps/homes in Lee Settlement (Land use/landowner constraint)	Corridor adjusted to avoid constraints.
Located Between Elmsville and Waweig	• Gravel pit – newly developed (Land use and engineering constraint) • Blueberry field (Land use/landowner constraint) • Homes/Farm (Land use/landowner constraint).	Corridor adjusted to avoid constraints.

Landowners affected by route modifications were notified and invited to attend Information Sessions held in June and July (refer to Section 2.1.2 for details). During these sessions, landowners were provided with the opportunity to view maps and to discuss with NB Power representatives the proposed IPL Project.

2.1.2 Additional Stakeholder Information Sessions

In addition to the consultation initiatives discussed in Section 2.1.1 above, seven Information Sessions were held to provide information and seek input from the general public and other interested stakeholders, as follows:

- St. Stephen, New Brunswick - June 25, 2001
- Pennfield, New Brunswick - June 26, 2001
- Pennfield, New Brunswick - July 10, 2001
- St. Stephen, New Brunswick - July 12, 2001
- St. Stephen, New Brunswick - September 12, 2001
- Pennfield, New Brunswick - September 18, 2001
- Musquash, New Brunswick - October 25, 2001

The intent of the June Information Sessions was to inform affected landowners of the Project and the preliminary Preferred 50 m RoW. Landowners were notified by registered letter and those who did not RSVP to the toll-free number were called and invited to the sessions.

The July sessions were to inform landowners and stakeholders, not directly affected by the preliminary Preferred 50 m RoW, of the Project. Landowners were notified by way of a letter of invitation and those who did not RSVP to the toll-free number were called and invited to the sessions. All key stakeholders were faxed an invitation. The Project Manager gave a presentation that outlined the details of the proposed IPL Project and schedule.

The September Information Sessions were held to obtain public comments on the draft CSR. NB Power utilized road signs and placed posters in various locations throughout the community inviting the public to attend the sessions. The Environmental Technical Specialist gave a presentation explaining the EA process and how to comment on the Final Draft CSR.

In October, an Information Session was held to inform landowners and stakeholders who had been inadvertently omitted from the original mail-out list about the Project and the preliminary Preferred 50 m RoW.

The Information Sessions attracted a total of 194 attendees, with several issues and concerns being raised and recorded on "Issue Management Forms". Subjects raised included Real Estate, Liability, Environment and general inquiries. Details on how each issue and concern was addressed is provided in Appendix A.

NB Power also directly mailed information packages to stakeholders and landowners that included the following information: NEB Information Bulletins, a list of NB Power Key Contacts, NB Power International Power Line Fact Sheets, Map of the 1 km wide Preferred Corridor and All-Terrain Vehicles (ATV)/Snowmobile advertisements. It should be noted that while the Information Packages did not contain specific information on the CEAA, discussions were held with interested stakeholders to explain the CEAA process.

2.2 Aboriginal Consultation

Since February 2001, NB Power has undertaken Aboriginal consultation for this Project. The purpose of the Aboriginal consultation was to provide the Aboriginal communities with an opportunity to voice their issues and concerns relating to the proposed IPL Project and to identify current use of lands and resources for traditional purposes by Aboriginal persons as defined by CEAA.

Consultation began with the identification of Aboriginal groups recognized in New Brunswick. Under the *Indian Act*, Indian and Northern Affairs recognizes the Union of New Brunswick Indians (UNBI) and the MAWIW Tribal Council (MAWIW) as representing the Aboriginal population in New Brunswick. In addition, the New Brunswick Aboriginal Peoples Council were consulted as representing Aboriginal people living off reserve. The Passamaquoddy Tribe is not recognized under this Act in New Brunswick, and therefore, were not included in the consultation process.

NB Power met on various occasions with representatives of MAWIW, UNBI and the New Brunswick APC, which represent Aboriginal people living on and off reserves in New Brunswick. Based on discussions with these groups, it was noted that UNBI represents 13 Bands and some 5,733 individuals while MAWIW represents three Bands consisting of approximately 6,000 individuals. The New Brunswick APC represents some 3,500 individuals living off reserves.

The initial discussions focussed on introducing the proposed IPL Project (*e.g.*, description, regulatory framework, schedule and construction practices) and explaining the purpose of the Aboriginal consultation. During these discussions, it was suggested by Aboriginal representatives that the Chiefs and community members be consulted to identify current use of lands and resources for traditional purposes. In order to facilitate communication with the Chiefs and the Aboriginal communities, both MAWIW and UNBI retained a Liaison Officer as part of an agreement with NB Power. The agreements offer assistance for a Liaison Officer, as well as assistance for the review of environmental documents associated with the Project. In addition, these agreements include a commitment by NB Power to put in place an archaeological protocol which will identify First Nations involvement should a significant heritage resource be located during clearing and construction activities (refer to Section 6 for a copy of the protocol). Liaison Officers report to, and receive direction from, UNBI Executives and MAWIW Tribal Council.

Aboriginal community meetings were held at the following reserves: Madawaska Maliseet First Nation, Big Cove First Nation, Burnt Church First Nation and Tobique First Nation. Interested members were provided with a brief overview of the Project and were invited to view maps of the 1 km wide Preferred Corridor to identify current use of lands and resources for traditional purposes by Aboriginal persons. Although no specific resource locations (refers to an area currently used by Aboriginal person for traditional purposes such as sweet grass and gathering sites) were identified during these meetings, some individuals expressed interest in the consultation process. This interest led to a few individual meetings where Aboriginal persons expressed their views in relation to the proposed IPL Project, and also provided NB Power with general information on lands and resources traditionally used by Aboriginal persons (Appendix B).

There are no current use of lands and resources for traditional purposes by Aboriginal persons which may be affected by the proposed Project. The rationale for this conclusion is based on the information contained in Appendix B which summarizes the Aboriginal consultation undertaken for the proposed IPL Project and also includes a summary of the information collected during the checklist exercise. A checklist was used to document issues and concerns and to identify current use of lands and resources for traditional purposes by Aboriginal persons within the Preferred Corridor. The checklist provided a list of potential resources/issues that may be located within the 1 km wide Preferred Corridor (*e.g.*, burial sites, traditional use sites, reserve and archaeological sites). For each resource/issue identified, a section was provided to identify the location of the resource within the 1 km wide Preferred Corridor, who used the resource (*e.g.*, community, tribal, individual), the source of information and a description of the resource (Figure 2-4). Maps (scale 1:50,000) of the 1 km wide Preferred Corridor were also provided with the checklist to identify the location of a resource within the 1 km wide Preferred Corridor. While resources (e.g., ash trees, salmon, birch bark, sweetgrass, etc.) were mentioned by Aboriginal persons, no specific areas were identified as currently being used for traditional purposes by Aboriginal persons within the Preferred Corridor.

2.3 One-on-One Stakeholder Meetings

NB Power representatives held a number of one-on-one meetings with key stakeholders including, NBDELG, ASU, Nature Trust of New Brunswick, Conservation Council of New Brunswick, Saint John Citizens Coalition for Clean Air, Local Service District representative, Rural District Planning Commission, Town of St. Stephen, St. Croix Estuary Project Inc., Atlantic Salmon Federation, Digdeguash Lake Association, Atlantic Coastal Action Program, Public Health Services and Eastern Charlotte Waterways Inc. The purpose of these meetings was to provide an overview of the proposed Project and to obtain input on the final draft CSR as requested by the NEB in a letter dated August 16, 2001. Items discussed at these meetings included a description of the Project, a review of the consultation process, a description of the final draft CSR and details on how to participate in the regulatory process.

NB Power took issues and concerns expressed by key stakeholders into consideration during the routing process and these will be addressed by mitigative measures and monitoring programs. Details on how each issue and concern was addressed is provided in Appendix C.

2.4 Future Consultation Initiatives

Consultation initiatives will continue as the proposed Project moves forward. These initiatives will include:

- Creating a Liaison Committee for the proposed Project. This Committee will consist of representatives from local communities, interested stakeholders, government agencies and NB Power personnel. The Project Team is currently developing the Terms of Reference for the Liaison Committee, which is expected in the Summer of 2002.
- Any consultation matters which may arise during the course of the NEB and NBDELG regulatory process.
- Ongoing communications with affected landowners, Aboriginal groups, regulators and others.

FIGURE 2-4
Checklist of Current Use of Lands & Resources for Traditional Purposes by Aboriginal Persons

Resource/Issue	Map Location	Use; Tribal/ Community/Family/Individual	Source	Description
Heritage Issues or Concerns				
Archaeological Sites				
Specific or General Aboriginal Heritage Sites				
Burial Sites				
Resource Collection Sites				
Traditional Use Areas				
Reserve				
Historical Period Settlement				
Any other Sites of Concern				

Comments:

Name (Please Print)
Signature
Date

2.5 Alternatives

The following sections describe alternative means of carrying out the Project (*i.e.*, corridor selection), and alternatives to the Project, as required under CEAA, and the NEB *Guidelines for Filing Requirements.*

2.5.1 Alternative Means of Carrying out the Project (Corridor Selection)

This section describes the corridor selection process as required under Section 16(2)(b) of CEAA and Part VII, paragraph 6, of the NEB *Guidelines for Filing Requirements*. This process involved the selection of an environmentally, socially, technically, and economically acceptable corridor for the proposed Project.

The corridor selection process relied upon constraint mapping to identify a Study Area and Alternative Corridors. From this, a 1 km wide Preferred Corridor was selected along with a preliminary Preferred 50 m RoW, which is expected to be finalized following regulatory approval. Information received from the general public, landowners, stakeholder groups, and other interested parties during Information Sessions conducted by NB Power was considered during the selection process. In addition, NB Power contacted other organizations for information regarding the Study Area. An updated contact list is provided in Appendix D.

2.5.1.1 Selection of Alternative Corridors

Three Alternative Corridors were identified within the Study Area (*i.e.,* the northern, central and southern corridors), with three options identified for the central and southern corridors (refer to Figure E-1, Appendix E). These alternatives were identified to avoid Class 1, 2, and 3 (focussing on Class 1) constraints (Table 2-3) and were based on 1:50,000 constraint mapping and a preliminary assessment of constructability. The three central and three southern options were each compared in order to determine the best option for each corridor. The best southern and central corridor options were then compared with the northern corridor to select a 1 km wide Preferred Corridor for the Project. The process to select the 1 km wide Preferred Corridor was iterative in nature, and included a consideration of environmental constraints as well as engineering and land use issues.

Engineering issues included terrain analysis, number and nature of watercourse crossings, road and utility crossings, and analysis of mapped surficial and bedrock geology. All corridors were selected based upon minimizing the number of watercourse, road and utility crossings. Land use issues included consideration of the existing property fabric and land use within the corridors.

Environmental issues included consideration of the constraints identified in Table 2-4 and preliminary assessment of the level of mitigation that would be required to make the alternative environmentally acceptable. Constraints were considered in the comparisons, which were based upon differences between the alternatives. The comparisons were weighted according to the difficulty of mitigation. For example, a corridor with the shortest distance through potential Class 1 constraints would be preferred over other alternatives.

2.5.1.2 Selection of the 1 km Wide Preferred Corridor

Constraints crossed by each Alternative Corridor are summarized in Table 2-3. Overall, the three corridors are similar, however, AMEC decided that the southern corridor, Option 3 (S3) was the 1 km wide Preferred Corridor for the Project. This corridor intersected the least distance through most Class 1 constraints, water supply area, and the fewest tree nurseries or plantations. The S3 Corridor had the shortest total distance, resulting in less environmental disturbance, and lower construction costs.

TABLE 2-3
345 kV IPL – Environmental Constraint List

Class 1 Constraints	Class 2 Constraints	Class 3 Constraints
Constraints for Which Mitigation May Not be Possible	Constraints for Which Mitigation is Possible	Constraints Which May Require Special Construction Practices
• Sugar Bush • Mining Areas (including pits & quarries) • Military Bases • National, Provincial and Municipal Parks • Mature Coniferous Forest Habitat (MCFH) • Wetlands • Environmentally Significant Areas (ESAs) –context specific • Permanent Sample Plots (PSP) • Habitat for Species At Risk (HSR) including: • Bald Eagle Nests • Areas with a high potential to support plant species at risk • Migratory Bird Staging Areas • Deer Wintering Areas (DWAs) • Ducks Unlimited Sites • Airport Runways • Areas with Risk of Subsidence	• Known Historical/Archaeological Sites • Areas with a high potential for historical/ archaeological sites • Mineral & Petroleum Claims & Peat Resources • Agricultural Land • Water Supply Areas • Fish Hatcheries • Watercourse Crossings/ Aquatic Habitat • Wildlife/Ecological Reserves • Game Management Areas • Blueberry Fields • Tree Nurseries and Plantations	• Landfill Sites • Topography • Large Waterbodies

TABLE 2-4
Alternative Corridor Constraint Summary

Constraints	Corridor Alternatives		
	N	C2	S3 Preferred
Class 1			
Sugar Bush (km)	0	0	0
Mature Coniferous Forest Habitat (MCFH) (km)	8.9	7.3	7.3
Wetlands (km)	7.5	6.8	6.8
No. of ESAs	2.0	1.0	1.0
No. of PSPs	5.0	2.0	2.0
No. of HSRs	2.0	1.0	1.0
No. of Migratory Bird Staging Areas	2.0	2.0	2.0
DWAs (km)	3.8	1.4	2.6
Ducks Unlimited Site	0	0	1.0
Class 2			
No. of Archaeological Sites	7.0	8.0	21
Mineral & Petroleum Claims (km)	9.4	12.2	3.2
Agricultural Lands (km)	0.9	0.8	1.0
Water Supply Areas (km)	4.9	11.4	3.0
No. of Water Crossings	48.0	45.0	49.0
Wildlife/Ecological Reserves (km)	0	1.0	0
Game Management Areas (km)	11.7	2.2	1.0
Blueberry Fields (km)	0.5	0.6	0.6
Tree Nurseries & Plantations (km)	5.3	0	0
Class 3			
No. of Landfill Sites	0	1.0	0
Large Waterbodies	4.0	2.0	1.0
Miscellaneous			
Potential Cranberry Lease (km)	0	0	0.3
No. of Road Crossings	19.0	24.0	19.0
No. of Pipeline Crossings	3.0	2.0	2.0
Corridor Length (km)	100.7	95.4	85.9*

* The discrepancy between the stated length of approximately 95 km as was reported in NB Power's application and the 86 km used in the initial AMEC Reports, is due to the 95 km being measured from the Point Lepreau terminal, and the 86 km being measured from the intersection of an existing transmission line and the study corridor.

A desktop environmental review and detailed field investigation were conducted for the additional 9 km portion of the corridor connecting the existing terminal, near the Point Lepreau Generating Station, to the point of origin of the proposed Project identified in the EIA Report (AMEC, 2001a) and SIR (AMEC, 2001b). This 9 km section of the alignment is located within, or directly adjacent to, existing NB Power cleared easements. Environmental constraints identified in this portion were similar to those identified along the preliminary Preferred 50 m RoW, and no new constraints were identified in addition to those assessed in the EIA Report. Field surveys were conducted for this portion, and survey results have been included in Section 4 of this Report.

The 1 km wide Preferred Corridor is approximately 95 km in length, providing a direct route from Point Lepreau to the New Brunswick/Maine border. The 1 km wide Preferred Corridor affects the fewest constraints overall, with the exception of the following Class 1 constraints: Deer Wintering Areas (DWAs) and one Ducks Unlimited site. DWAs are less important for deer populations in southern New Brunswick, due to the relatively mild winter conditions, than they are in northern parts of New Brunswick (WGA,1996). Environmental effects that cannot be avoided will be mitigated with the standard construction and environmental protection measures provided in Sections 3 and 6 of this Report.

2.5.2 Alternatives to the Project

Paragraph 16(1)(e) of CEAA requires that a CSR include a consideration of any “other matter relevant to the comprehensive study, such as the need for the project and alternatives to the project that the responsible authority may require to be considered”.

The NEB, in its scoping letter of 16 August 2001, stated that one of the factors to be considered in the CSR of NB Power’s proposed Project is the need for the project and “alternatives to the project.” NB Power is proposing the Project in order to increase the existing interchange capability of NB Power’s electricity system, to improve reliability and to increase the efficiency of energy delivery. NB Power and the New Brunswick government want to increase this interchange capability in order to encourage the development of new sources of electricity generation in New Brunswick, to provide access to new electricity markets in the northeastern United States, and to improve the diversity of electricity supplies available to New Brunswick electricity consumers.

No alternatives to the proposed Project exist to meet the purposes for increased transmission capability, improved reliability and increased efficiency of energy delivery between NB Power and interfacing United States electricity systems.

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3.0 PROJECT OVERVIEW

NB Power proposes to construct the Canadian portion of a 345 kV transmission line approximately 95 km in length, from Point Lepreau to Woodland, Maine.

3.1 NB Power Transmission System

NB Power operates 6800 kilometers of high voltage transmission lines in New Brunswick ranging in voltage from 69 kV to 345 kV (Figure 3-1). Key components of the transmission network include a 345 kV ring that encircles the Province and interconnects with all of its neighbours. These interconnections with Quebec, Prince Edward Island, Nova Scotia and Maine have an aggregate capacity of approximately 2400 MW.

The interconnections with Quebec are through High Voltage Direct Current (HVDC) ties. While able to transfer energy in either direction they effectively isolate the operation and reliability of the two systems. A single 345 kV line, known as the Maine Electric Power Company (MEPCO) line, provides the only connection to the electricity market of the northeastern United States. This line also links Nova Scotia Power and Maritime Electric Company Limited electricity systems with the United States electricity network.

3.2 Need for the Project

The rationale behind the proposed IPL Project is to improve the reliability, efficiency and market access of the regional electricity system. The proposed IPL will improve the reliability of electric power supply for the Maritime Provinces and northern Maine (the Northeast Power Coordinating Council Maritime Control Area), by providing a second synchronous connection to the New England electricity system. By increasing the transfer capability in both directions, it will provide an additional path for electricity to flow in the event of generation contingencies in either the Maritimes or New England. The proposed IPL will also improve NB Power's overall system stability by providing additional voltage support for southern New Brunswick and central Maine. A single contingency transmission outage will no longer result in the loss of synchronous connection to the New England electricity system.

The proposed IPL will increase the efficiency of energy delivery within New Brunswick as well as Maine by reducing the transmission line losses. The energy transfers between New Brunswick and New England will be distributed over two paths, the existing interconnection and the new IPL. Since losses increase exponentially with line loading, the line savings will be substantial, especially at high levels of transfer since each line will carry less energy. Furthermore, the new IPL will provide a more direct route for energy transfers and its design incorporates a larger size conductor which also aids in the reduction of losses.

Figure 3-1 NB Power Transmission Lines and Terminals

Contact webpublisher@nbpower.com for a copy of Figure 3-1

The proposed IPL will also improve market access to the Maritime Control Area by providing increased transfer capability into and out of the region. The increase in transfer capability in both directions can also improve the overall efficiency of energy consumption as more efficient generation has greater opportunity to reach the market without being constrained. The new IPL will remove an existing constraint that often limits the economic flow of energy from New Brunswick, other Maritime Provinces, and Quebec to the New England market. Currently the flow of energy across the single existing line connecting the Maritime Control Area to New England is limited to 700 MW.

The proposed IPL will introduce the capability for firm transactions between New England and the Maritime Provinces. The existing limitation on firm electricity transfers makes the bilateral energy market in the Maritime Control Area and other areas connected to New Brunswick, susceptible to market power. The new IPL will permit Canadian electricity customers to purchase from sellers in the larger New England market.

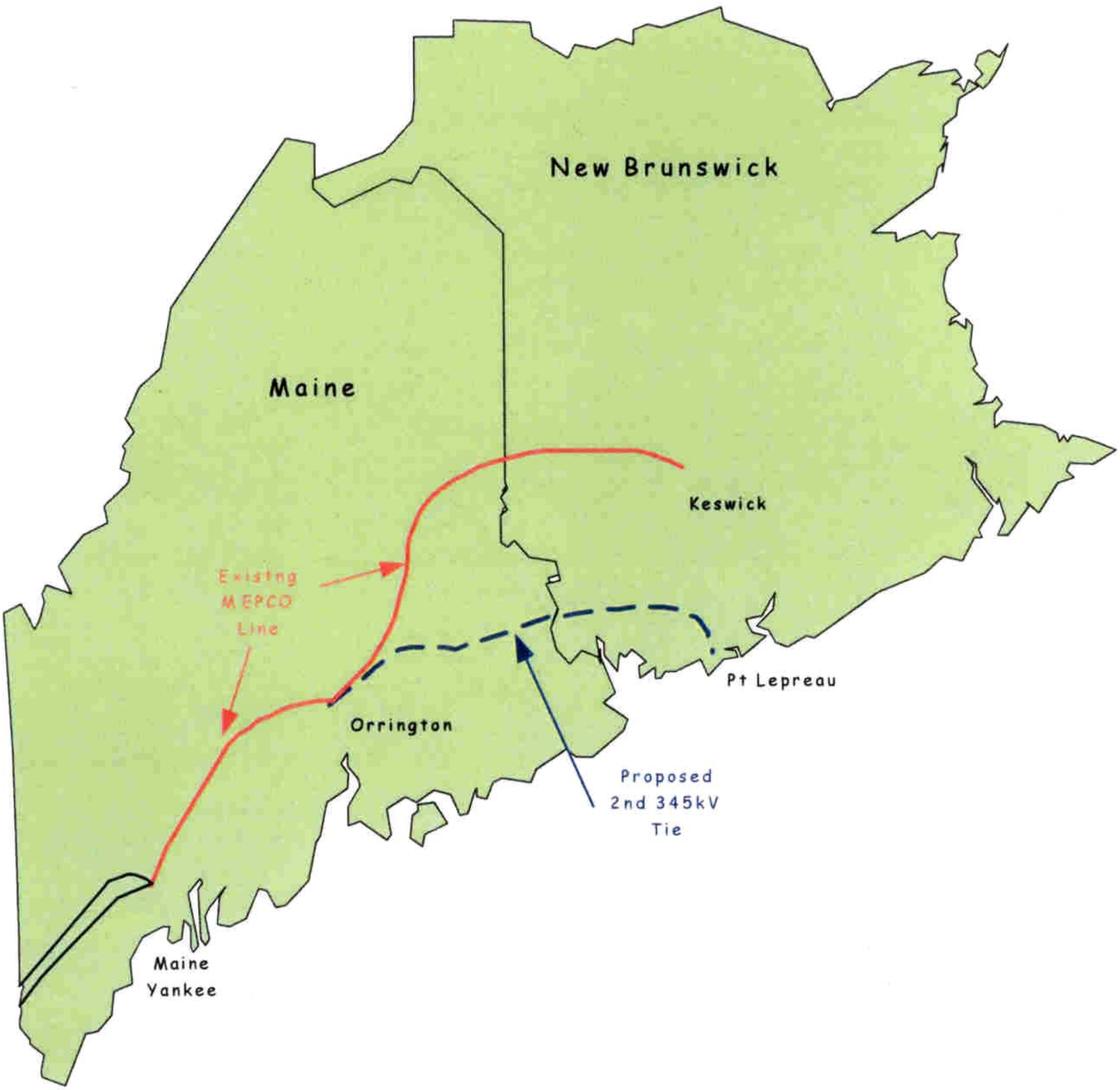
In Spring 2001, the Government of New Brunswick issued a document entitled *White Paper, New Brunswick Energy Policy* which directed that NB Power, "… seek options for resolving physical limitations to participation in neighbouring markets through increased transmission capacity" (see Section 3.1.3.2.1 – page 17 of the White Paper). The proposed Project responds to this directive. It would also increase the reliability of the Maritime power system and significantly reduce transmission losses.

3.3 Initial Planning Decisions

The capacity, voltage levels and connection points for a new transmission line must be chosen early in the planning process.

Since the objective was to connect NB Power with markets in the northeastern United States, the new line had to operate in parallel with the existing MEPCO line. A second 345 kV line was the logical choice. To provide for reliable and efficient operation, the two lines must be comparable in capacity. Operating at the same voltage level will ensure an equal sharing of the load. If one path is interrupted, the other instantaneously picks up the total load and carries it reliably. The design capacity of 1000 MW for the proposed 345 kV transmission line meets these conditions.

NB Power considered two alternatives for the connection points with the exiting transmission network. In Maine, the Orrington Terminal near Bangor is the northern most terminal in Bangor Hydro's 345 kV network and consequently would be the termination point for the new line. In New Brunswick, both Keswick Terminal and Point Lepreau Terminal were considered as they are roughly the same distance from Orrington. The Keswick to Orrington route could follow the existing MEPCO line. A line from Point Lepreau to Orrington required a new corridor (Figure 3-2).



SOURCE: NB POWER, NOVEMBER 2001.

FIGURE 3-2
EXISTING and PROPOSED NB POWER TRANSMISSION LINKAGES to MAINE

TE21002.1/linkages (2001/11/27)

The initial review led by NB Power Engineering to the conclusion that the Point Lepreau to Orrington route was preferred for the following reasons:

- The Keswick to Orrington route would require the addition of a third 345 kV transmission line, 145 km in length, between southern New Brunswick and Keswick. This option was unrealistic in terms of both cost and effect on the environment.
- Line losses for this route are greater due to the fact that much of New Brunswick's electricity is generated in the southern part of the Province (*e.g.,* Point Lepreau, Coleson Cove and Courtenay Bay). Exporting energy directly from southern New Brunswick into the northeastern United States would avoid the need for energy to flow north to Keswick before heading west to Maine.

3.4 Project Schedule

The planned in-service date for the proposed IPL Project is the Fall of 2004. In order to achieve this date, a number of activities must take place:

- Detailed Engineering Design – Spring/Summer 2003
- Easement Acquisition – Spring/Summer 2003
- RoW Clearing – Late Summer 2003 through Winter 2004
- Construction – Spring through Fall 2004

Clearing activities in sensitive areas such as wetlands will be scheduled during the winter months to minimize potential environmental impacts. Clean-up of construction material such as insulator crates and wires are removed by the contractor as the line is being constructed. Final clean-up will occur in the Summer of 2005.

3.5 Right-of-Way Requirements

When calculating the RoW width the main factors considered are conductor swing-over and tree falling distances. The conductors are not rigid and move as a result of wind. The RoW must be wide enough to maintain safe electrical clearances at all times. In addition, trees adjacent to the RoW are subject to falling and, therefore, the RoW must be wide enough to ensure that falling trees do not contact the conductors or cause outages of the line. Based on these requirements, a 50 m wide RoW is necessary for the proposed IPL Project.

3.6 Right-of-Way Selection

Once the 1 km wide Preferred Corridor was identified the process continued with the selection of the preliminary Preferred 50 m RoW. The environmental constraints criteria identified in Section 2.0 (Table 2-3) were used in the initial determination of the preliminary Preferred 50 m

RoW. In addition, detailed maps (1:10,000), aerial photographs and a video recording taken during an initial aerial inspection were used to refine and adjust the selected preliminary Preferred 50 m RoW.

The route was selected with a linear preference (*i.e.*, straight line approach) to minimize environmental effects and any potential engineering problems. For example, it is desirable to minimize the number of angle structures as they result in a greater environmental impact (*i.e.*, bigger footprint), are costly, and require greater maintenance.

Once NB Power selected a preliminary Preferred 50 m RoW, it was adjusted with input from AMEC representatives and a team of NB Power staff from construction, engineering, surveying, environment, and real estate. One additional aerial inspection was carried out to identify potential raptor nests, as well as camps, river crossings, and land usage (farms, gravel pits, etc.). This information was used to further refine the routing (Figure 3-3).

The preliminary Preferred 50 m RoW was transferred onto property maps to identify properties and landowners affected by the proposed routing. Information Sessions were held with landowners to describe the Project and to identify any issues or concerns. As a result of these sessions, modifications were made to the preliminary Preferred 50 m RoW.

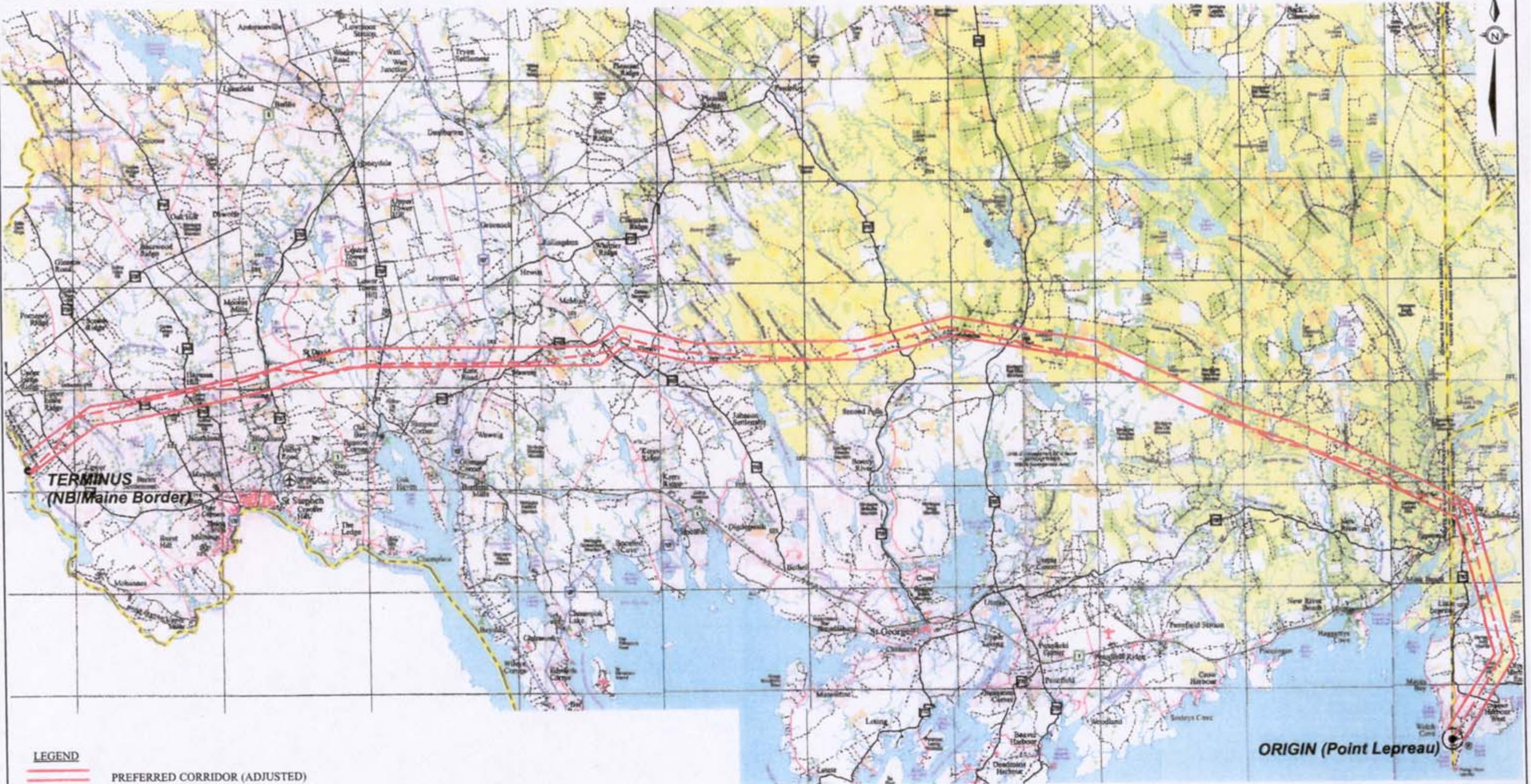
Lastly, access permits were obtained from landowners and Crown Land to proceed with the environmental fieldwork assessment and the centerline survey. A Provisional Watercourse Alteration Permit, pursuant to the *Watercourse Alteration Regulation* under the New Brunswick *Clean Water Act*, was obtained from the NBDELG for the work associated with the centerline survey.

3.7 Land Acquisition

The process for the acquisition of land rights required for the construction and operation of the proposed IPL is underway. Land rights will be acquired pursuant to the *NEB Act* and compensation will be paid to landowners based upon appraised value of the affected lands. As of March 26, 2002 approximately 89% of the Section 87 Notices required to be served pursuant to the *NEB Act* have been completed. In addition, 66% of the landowners affected by the preliminary Preferred 50 m RoW have signed an Option for Easement Agreement with NB Power. The acquisition of the Easement for the 50 m RoW is expected to begin following the issuance of the CPCN from the NEB and completion of a legal survey.

3.8 Line Design

The proposed tubular steel H-Frame structure design was chosen based upon the recommendations of a study that AMEC/Teshmont conducted at NB Power's request in early 2001.



LEGEND

PREFERRED CORRIDOR (ADJUSTED)
(SIR, AMEC 2001b)

PRELIMINARY PREFERRED 50 m RoW

0 10 km
1:200,000

FIGURE 3-3
PROPOSED 345 kV INTERNATIONAL
POWER LINE PROJECT
PREFERRED CORRIDOR & RIGHT of WAY

amec

TE21002.1/pref-corridor-csr (2001/10/31)

The structures will be designed to meet or exceed Canadian Standards Association (CSA) "Heavy Loading" criteria for ice and wind (CSA Standard C22.3 No.1-M87). In addition, AMEC/Teshmont, on behalf of NB Power, carried out a climatic study to determine what additional load cases will be used in the final structure design.

The study still in draft as of March 18, 2002, identifies the following load cases:

- Heavy Loading (1/2" radial ice with 8 psf wind) as required by CSA Standard C22.3-No.1-M01.
- Heavy Ice and Wind Loading (1" radial ice with 3 psf wind).
- Unbalanced Ice and Wind Loading (1/2" radial ice on conductors on one side of structure and bare conductors on the opposite side of structure, with 3 psf wind).
- Extreme Wind Loading (11.8 psf wind).

The final structure design will be chosen as part of the detailed engineering design process, scheduled for Spring/Summer 2003.

The proposed IPL will also be designed and constructed to minimum clearances as required by CSA standards. The clearances are based on the low point of the line under conditions which produce the greatest sag, taking into consideration temperature, load, wind, length of span and type of supports. As such, the proposed IPL will not obstruct, impede or render a watercourse more difficult or dangerous for navigability.

There will be two 34 mm diameter conductors per phase. The average span length between structures is estimated to be 350 m and the minimum height from ground to conductor at low sag will be 9 m. Angle structures will make up approximately 10% of the total number of structures and may include the use of guys.

The plan and profile for the Project will be provided by NB Power as part of the engineering design. The plan and profile will utilize computerized modelling and design optimization software.

The process to generate the plan and profile will involve first locating the following fixed structures:

- termination structures at each end of the proposed IPL;
- angle structures; and
- any other structures that have fixed location.

Given specified engineering design criteria, RoW topographical data, and selected structure type, the design software will optimize the line design through an interactive process.

3.9 Line Construction

Prior to construction, a survey is conducted to flag the edge of the preliminary Preferred 50 m RoW, property lines and structure locations.

Construction involves the following phases: clearing, erection of structures, stringing conductors and clean-up/revegetation. All phases are subject to environmental protection measures outlined in Section 3 (3.11).

3.9.1 Clearing

Clearing involves the removal of trees from the preliminary Preferred 50 m RoW which would prohibit the construction and safe operation of the transmission line. The extent of cutting will vary depending on the type of structure used in the line design and on vegetation heights. Some areas may not require cutting. Vegetation will be removed by mechanical means, except within 30 m of a watercourse or wetland. In these areas, chain saws and other hand held equipment is used for clearing.

3.9.2 Erection of Structures

The erection of structures involves excavation for pole placement, backfilling of excavated material and the transportation of construction materials (*e.g.,* poles and steel). Excavation is commonly carried out by mechanical auger, excavator or blasting, depending on soil conditions.

Transportation of material from the marshalling areas to structure locations includes a combination of material delivery vehicles and tracked transporters. Permission is requested from landowners to access existing trails and roads intersecting the RoW. Assembly of structures takes place on-site at structure locations followed by erection using off-road cranes.

In cases where better quality backfill is required by design, the material is transported to the site as necessary.

3.9.3 Stringing Conductors

Conductors are strung using a tension-pulling machine and attached to the insulators by hand. Spacers are applied to the conductor followed by the installation of any marking or vibration damping devices.

In areas where the transmission line crosses a road, support structures are used to ensure that stringing activities are conducted safely and do not interfere with traffic flow. The pulling lines are walked or boated across watercourses.

3.9.4 Clean-up/Revegetation

Site clean-up and revegetation of any disturbed areas completes the construction phase of the Project.

Construction waste and other refuse associated with the proposed Project will be reused or recycled. If reuse or recycling opportunities are not available, the refuse will be disposed of at an approved site.

3.10 Construction Monitoring and Quality Control

To ensure that construction activities are conducted in compliance with all applicable federal and provincial regulations and comply with the spirit and intent of the construction contract, NB Power will employ an Environmental Inspector and Quality Assurance Inspector. Prior to construction, fire prevention procedures, training, and contingency and emergency plans will be developed in coordination with NBDNRE. These plans, supported with ongoing training and public education, will reduce the probability of fires and limit damage in the event of a Project related fire. NB Power and contractors will have fire-fighting equipment on site during NBDNRE fire season as required by the NBDNRE. During extreme fire hazard conditions, NBDNRE limits activities in forested areas. In addition, an Evacuation Plan was developed for centerline survey crews in consultation with the New Brunswick Workplace Health, Safety, and Compensation Commission.

NB Power will also provide environmental training to NB Power and contracted personnel present on the construction site. The training program will cover plans and procedures specific to the Project, NB Power policies, protection measures, and any other pertinent information related to the job.

During clearing activities, the Environmental Inspector will be assisted by Clearing Inspectors from NB Power's Transmission Services Group. The Environmental Inspector will have the authority to suspend work in the event of non-compliance with the protection measures, permits and conditions outlined in the construction approval.

Site Specific Environmental Protection Plans (SSEPP) will be developed and finalized following the completion of the detailed engineering design. A SSEPP outlines approval conditions and commitments required to minimize potential adverse environmental effects in a specific area. It also includes detailed mapping and provides clear instructions to the Environmental Inspector and construction personnel regarding procedures, programs and protocols.

Responsibilities

In general, the Environmental Inspector will be responsible for the following:

- Ensure compliance with all applicable permits, NB Power policies and procedures, conditions in the contract documents, and commitments made during the planning and application process;
- Assist in the preparation and delivery of environmental orientation presentations to clearing and construction staff;
- Advise construction personnel on the implementation of commitments;
- Prepare, collect, organize and ensure correct dissemination, of all environmental related information and documentation that arises during construction;
- Advise on the proper course of action to address unexpected environmental conditions and events;
- Report any spills immediately in accordance with applicable federal and/or provincial regulations;
- Advise management and/or contractors on the clean-up, and disposal of material;
- Monitor work site activities and conditions on a daily basis to identify problem areas that may become a fire hazard;
- Ensure that commitments and protocols made with Aboriginal groups are fulfilled in a timely and proactive manner;
- Prepare inspection reports;
- Liase with appropriate regulatory agencies and other interested parties;
- Organize on-site meetings as required to address site-specific issues; and
- Review construction methodologies with the contractor to ensure proper understanding and implementation.

Qualifications

During construction activities, the Environmental Inspector will monitor the environmental aspects of construction. The Environmental Inspector will be trained and qualified from a variety of educational backgrounds and employment experiences.

The Environmental Inspector may be a qualified biologist, forestry professional, agricultural expert and be familiar with clearing and construction activities. The Environmental Inspector hired by NB Power will be required to meet the following criteria:

Educational Background

A university degree, college diploma or technical certificate with an emphasis in environmental planning.

Experience

Preference will be given to applicants having previous experience as an Environmental Inspector working on linear projects such as pipeline projects or highway construction projects.

Communications

The Environmental Inspector will possess a demonstrated positive attitude toward the environment and for achieving a high quality environmental product. In addition, the inspector will possess strong organizational, problem solving and leadership skills. The inspector will also demonstrate effective oral and written communication skills.

Environmental Inspection Training

The Environmental Inspection Training Program will contain components to address policy and procedures, problem identification and resolution, regulatory liaison, documentation, and project specific environmental commitments and concerns.

The environmental inspection training will be mandatory for all inspectors (*e.g.,* Clearing Inspectors, Quality Assurance Inspector and Environmental Inspector). The training will include an overview of all environmental topics with regard to the planning, clearing and construction activities. Presentations will be made by qualified NB Power technical staff, consultants or regulatory agency personnel. The program at a minimum will include the following elements:

- Introduction;
- Project Overview;
- NB Power Policies and Procedures;
- Role of the Inspector (*e.g.,* responsibilities, reporting structure, documentation requirements, Stop-Order Authority);
- Federal and Provincial Commitments and Agreements;
- SSEPP;
- Archaeological Protocol;
- Review of Approvals and Permits;
- Spills and Emergency Response; and
- Communication/Media Relations.

In addition to the environmental inspection training, safety training will be provided to all Inspectors.

An environmental orientation will be mandatory for NB Power and contractor staff who may be present on the construction site. The training will include an overview of all environmental topics with regard to the planning, clearing and construction activities. Presentations will be given by NB Power technical staff, or consultants.

The Environmental Orientation Program will contain components to address policy, and procedure, problem identification and resolution, documentation, and project specific environmental commitments and concerns.

3.11 Transmission Line Environmental Protection Construction Practices

NB Power ensures that all its transmission facilities are constructed and operated in a manner in compliance with applicable federal and provincial regulations. During the preliminary Preferred 50 m RoW selection, environmental constraints are avoided where possible. Where constraints cannot be avoided, appropriate standard construction mitigative measures will be implemented to minimize environmental impacts. These standard measures are summarized throughout Section 3 (3.11) of this document. The SSEPPs will also be developed for this Project upon completion of the detailed engineering design. Additional Project specific measures are outlined in Section 6.0.

3.11.1 General

Project approvals, permits and licenses will be obtained prior to commencement of construction. Environmental training will be provided to NB Power and contracted personnel to ensure they are made aware of and know how to implement specific policies, procedures, and other pertinent information.

3.11.2 Access

Access is required to allow transportation of construction equipment, materials, and personnel to the RoW. Access requirements to the RoW are determined when preparing for clearing and line construction.

Based on existing mapping and aerial photos of the 1 km wide Preferred Corridor there are approximately 70 existing roads and access trails that have been identified. It is not anticipated that any new temporary access trails will be required to be constructed. If this were to change and new temporary access trails were required, siting would avoid the same constraints (Class 1, 2 and 3) identified as part of the corridor selection process outlined in Section 2.5.1.1 of the CSR. In addition, NB Power would undertake field studies and the appropriate environmental assessment. The results of these studies and assessment would be submitted to the NEB, Environment Canada, NBDELG and NBDNRE for review. Existing woods roads and trails that intersect the preliminary Preferred 50 m RoW will be used during construction. All temporary access trails and roads will be identified on mapping as part of the SSEPP and instructions will be provided to the Environmental Inspector and construction personnel regarding procedures (*e.g.,* sedimentation and erosion control) related to access trails.

Permission to access existing trails and roads will be obtained from the NBDNRE and private landowners.

Trails will be used to move machinery between structure locations. These trails will be 3 to 5 m in width. Stumps, rocks and hummocks will be levelled and made suitable for tracked vehicles. Following construction, re-growth of natural vegetation will occur.

Any in-stream construction activity will be conducted between June 1 and September 30. This construction window will ensure that the most sensitive period for resident salmonid populations, when eggs are in the redd or nests, are avoided. For any waters frequented by fish such as smallmouth bass, the in-stream construction window will be adjusted to July 1st to September 30th. This will limit construction to the period of least biological sensitivity for smallmouth bass. Fisheries and Oceans have accepted this "adjusted" construction window on other similar energy projects in the Province of New Brunswick. Environmental measures will also be put in place on approaches to watercourse crossings. All work within 30 m of a watercourse will require a Watercourse Alteration Permit (WAP) and will be conducted in accordance with the measures outlined in this section and the "*Watercourse Buffer Zone Guidelines for Crown Land Forestry Activities*" (NBDNRE, 1999).

3.11.3 Clearing

1. A WAP will be obtained from NBDELG for any watercourse crossed by the proposed Project. Watercourses will be protected by a 30 m buffer zone in which no mechanical equipment will be permitted to work.

2. RoW clearing will be scheduled to occur in the late summer through the winter months to avoid the migratory bird nesting period.

3. Easements will be obtained for all lands within the preliminary Preferred 50 m RoW, including Crown Land. NB Power will obtain easements through the Crown Lands Branch of NBDNRE. On private land, easements will be obtained from the landowners.

4. Clearing activities will be conducted by contractors. Contracts will be let in accordance with the *Crown Construction Contracts Act* of New Brunswick.

5. Vegetation will be largely removed by mechanical means, except within 30 m of a watercourse or wetland. In these areas, only the tall (above 12 feet) vegetation will be removed by manual methods (*e.g.,* chain saws and other hand held equipment) leaving the under growth and duff layer undisturbed to prevent erosion.

6. Clearing contractors will fell trees using mechanical methods or chain saws. Felled trees are de-limbed and piled at the edge of the preliminary Preferred 50 m RoW according to clearing contract requirements. The remaining slash and debris will be windrowed 3 m from the edge of the preliminary Preferred 50 m RoW and compacted to a height no greater than 0.5 m and extending 9 m in width towards the centerline. Approximately 13 m will be left clear on either side of the centerline for structure assembly and erection. The windrows are not continuous for the length of the line. The windrows are broken (left open) at all roads or access trails, along property lines, and along all watercourses. This provides access across the windrow for any wildlife not capable of crossing the low vegetation pile comprising the windrow.

7. Merchantable timber from the preliminary Preferred 50 m RoW will be sold, or cut and piled at the edge of the RoW. At the request of the landowner, the timber can be left for their use. On Crown Land, utilization requirements and royalty payments arrangements will be included in the easement agreement. It is not practical to remove merchantable timber when located between two constraints (*e.g.,* such as watercourses) with no machine accessibility to the preliminary Preferred 50 m RoW.

8. Within the buffer zones, larger trees that need to be cut will be limbed and left laying flat on the ground to act as a deterrent to ATV movement.

3.11.4 Watercourse Crossing

1. A WAP will be obtained from NBDELG for all watercourse and wetland crossings. No watercourse crossings will occur until such an approval is received.

2. No structures will be placed in watercourses (refer to definition of a watercourse in glossary).

3. The number of water crossings will be minimized when selecting the transmission alignment.

4. A 30 m buffer zone will be left at all watercourses and wetlands. The buffer zones at all water crossings will be clearly marked by the Environmental Inspector.

5. No fording will be conducted during construction. Where crossing is necessary, the following methods, in order of preference, will be employed during construction: bridge or culvert. The crossing method will be decided upon after a field inspection has occurred well in advance of construction. This will allow planning, consultation with NBDELG and preparation of a WAP Application.

6. Once a WAP is received from NBDELG, crossing will be designed to protect the beds and banks, minimize clearing of vegetation in the riparian zone, prevent disruption of water flows and minimize disturbance to fish habitat.

7. Where crossing is necessary, a 3 m wide trail will be used for travel in the buffer zone.

3.11.5 Wetlands

Wetland resources serve a variety of important ecological and socio-economic functions.

1. Wetlands will be avoided where possible (refer to definition of wetland in Glossary).

2. Where structures are located in wetlands because they are too large to span, access to structure locations will be in compliance with the WAP issued by NBDELG.

3. Construction in sensitive wetlands will be scheduled outside sensitive waterfowl periods (*i.e.,* late summer through the winter months).

4. Protection measures (refer to Sections 3 and 6 of this Report) will be implemented to minimize the potential effects of alteration/displacement of habitat, soil erosion, water quality, noise/physical disturbance of wildlife, and introduction of invasive plants.

To prevent the introduction of invasive plants the following measures will be taken:

- Prior to entering the preliminary Preferred 50 m RoW, equipment will be inspected for any vegetation and debris that may be lodged in tracks or undercarriage.
- If any vegetation or debris is found on the equipment prior to entering the site, it will be pressure washed using portable or mobile pressure washers.
- The Environmental Inspector or his/her designate will inspect equipment for cleanliness and record location, time, date and equipment number.

Following construction, alien invasive plant species will be monitored and mitigation measures implemented in all areas disturbed.

3.11.6 Marshalling Areas

Temporary marshalling areas are used to store material such as structures, hardware and work equipment. Temporary marshalling areas will be set up during clearing and construction activities. Temporary work camps will not be required for the Project.

1. In selecting marshalling areas, the following criteria will be used:

   - The area will be located at least 30 m from any watercourse or wetland.
   - The area will be of low value with respect to its potential for other uses when compared to other lands in the area. Abandoned gravel pits, abandoned commercial enterprises, or other previously disturbed areas are preferred locations.
   - The area will be located so as to minimize potential traffic hazards.

2. Permits will be acquired from private landowners or NBDNRE for marshalling areas.

3.11.7 Blasting

Blasting may be required in rocky areas, and some pumping of water may be required in wet areas in order to ensure proper foundation construction.

1. Where blasting is required the maximum charge will be 3 kg/hole, detonated with a firing delay of 25 milliseconds.

2. No blasting will be carried out within a 200 m radius of a well. In these cases, a hoe ram will be used.

3. Setback distances will be adhered to in order to protect emergent fish, spawned eggs and alevins.

4. Any water pumped from the excavation area will be discharged into a sediment trap, filter bag or vegetated area to allow sufficient removal of mobilized sediment.

5. An Action Plan which will include a pre-blasting survey will be developed prior to construction and incorporated into an SSEPP.

3.11.8 Borrow Areas

Borrow material is required for backfill in structure and anchor foundations, and in excavations for structures. The material is often available from the excavations required for structure erection. However, it is sometimes necessary to obtain borrow material from other sites.

1. Material from tower excavations will be used whenever possible.

2. Where borrow material is required from alternative sites on Crown Land, all activities associated with the collection of that material will be carried out in accordance with the requirements of a Quarry Permit and any applicable Acts and Regulations.

3. The number of borrow areas opened during construction will be minimized. Existing borrow areas will be used whenever possible.

4. Borrow areas will be located 100 m from a watercourse and from any roadway.

5. Upon completion of excavation, the disturbed area will be graded to slopes of less than 20%.

6. The borrow area will be monitored by the Environmental Inspector to monitor work site activities and conditions on a regular basis.

3.11.9 Erosion and Sedimentation Control

It is very important to keep erosion sediments out of any watercourse as it has the potential to cause the greatest impact. Any disturbance that results in exposure of mineral soils has the potential to allow sediments into streams. This is particularly true during wet periods in spring and early fall.

1. Erosion control techniques will be implemented at all sites along the preliminary Preferred 50 m RoW where vehicle activity results in the creation of wheel ruts that channelize natural drainage or the exposure of soil or subsoil to potential erosion. Vehicle activity would cease until one or all of the following erosion control techniques are implemented:

   - spreading a thin layer of brush or slash over disturbed areas;
   - the installation of baffles or sediment traps, where necessary, within the area of disturbance;
   - the installation of drainage collectors across the disturbed area channelling drainage into vegetated areas; and
   - re-routing disturbed drainage through baffles or sediment traps before allowing it to return into its natural course.

2. As much vegetation as possible will be left around the stream crossing. Stream banks will not be grubbed unless absolutely necessary to provide a gradual approach.

3. A rock or vegetation mat will be placed on the approach if it has been disturbed. A geotextile fabric will be laid over the disturbed soil if light traffic is expected. This fabric will be securely staked and possibly covered with brush if it is subject to any traffic.

4. Alternative tools and materials (e.g. straw) will be used rather than hay bales to control surface water flow or act as a mulch on exposed soils.

5. Diversion ditching will be used on long slopes. Angled berms diverting water into undisturbed ground will prevent sediment-laden water from entering the stream.

3.11.10 Wet Soil Conditions

During construction, NB Power traffic on access trails is restricted mainly to tracked vehicles. Since trails are not grubbed, the vehicles are driving on the duff layer that contains the remnants of roots and debris of the cleared trees and vegetation. During wet periods, this layer holds together better under vehicle traffic than just organic soil.

NB Power employs the following specific criteria in deciding whether to suspend or limit activities due to wet weather:

- current soil conditions;
- forecasted rain and drying weather;
- type of activities scheduled for a particular area;
- type of machinery used for a specific task;
- location of activity;
- potential breakdown of duff and soil structure;
- extent and depth of rutting;
- type of soil in the area;
- land use (agricultural areas, wetlands and areas near watercourses receive special consideration);
- availability and effectiveness of mitigation measures;
- potential breakdown of soil structure; and
- potential for subsoil compaction.

If construction activities were suspended due to wet soil conditions, the following criteria will be employed to determine that soils have dried sufficiently to resume construction:

- forecasted drying weather;
- type of activities scheduled for a particular area;
- type of machinery used for a specific task;
- potential for rutting;
- land use;
- potential breakdown of soil structure;
- potential for subsoil compaction; and
- availability and effectiveness of mitigation measures.

The Environmental Inspector will have the authority to suspend work in the event of wet soil conditions and to determine when conditions are suitable to resume the work.

3.11.11 Petroleum Products Management

A variety of petroleum products (*e.g.,* gasoline, diesel fuel, oil) may be used during construction of a transmission line.

1. Petroleum storage tanks will be properly labelled in accordance with the *Petroleum Product Storage and Handling Regulation* pursuant to the *Clean Water Act*.

2. Storage tanks will be at least 100 m away from any surface waters or wetlands.

3. Any above ground fuel container with a capacity of 230 litres or more will have secondary containment.

4. All spills will be immediately contained, cleaned and reported following NB Power's Standard Operating Procedure as summarized below:

   - Contain and recover all contaminated material.
   - Take proper safety precautions (*e.g.,* protective clothing, footwear)
   - Notify Environmental Inspector immediately.
   - Contact, during working hours, the appropriate authorities and the Project Manager. During outside normal office hours, contact the Energy Control Center, who then contacts the Environmental Emergencies 1-800-565-1633.
   - Store cleaning cloths, absorbents and pads in proper waste container.
   - Fill out Spill Reporting Form and forward to NB Power Environmental Affairs
   - Dispose of waste material at approved disposal facilities.

5. Construction personnel will be trained and made aware of the spill response procedure during Project training and awareness sessions.

6. The Environmental Inspector will conduct inspections of vehicles and storage areas.

7. Vehicles will be equipped with spill containment and clean-up material.

3.11.12 Clean-up/Revegetation

It may be necessary after construction to clean and restore disturbed areas in order to stabilize erodible soils and slopes, restore wildlife habitat and restore the aesthetic appeal of an area.

1. NB Power will identify areas requiring seeding and/or planting for revegetation purposes. These will include:

- areas adjacent to watercourses where erodible soil has been exposed, and where mechanical stabilization (*i.e.*, rip rap techniques) are not judged to be sufficient to guarantee stability, or prevent uncontrolled introduction of sediment into watercourses;
- areas within community boundaries or adjacent to existing roads where erodible soil has been exposed;
- areas which have been identified as providing critical habitat for wildlife species; and
- any other areas judged to require quick revegetation.

2. Native species appropriate for native communities will be used for revegetation and obtained from the proper authorities.

3. Where possible, wetlands will be allowed to revegetate naturally unless adjacent to a watercourse where there are potentially erodible soils. Where wetlands must be disturbed, the “duff” or organic top layer of the wetland will be set aside, and then pulled back and put back in place later during clean-up. Original contours and drainage patterns will be restored.

4. Where stream bank damage has occurred, one of the following methods will be used to restore the disturbed site: trimming and back blading, mulching, seeding, fabric placement in conjunction with rip rap or corduroy.

5. Construction waste will be reused or recycled on a priority basis. Where reuse or recycling opportunities are not available, the waste will be disposed of at an approved site.

6. In the year following construction, NB Power trained personnel will inspect the RoW to determine if any alien invasive plants have been established in wetlands or other areas along the RoW. If sites are found to have alien invasive plants, appropriate measures will be taken to eradicate these plants. The measures implemented would depend on the type of alien invasive species. These measures could include hand pulling, fire, stem girdling and cutting, mowing or inundation. If alien invasive plant species are found, they will be reported to Environment Canada and NBDNRE to finalize the exact measures to be used. Follow-up site investigations will be conducted to ensure that the plants were successfully eradicated.

The most effective mitigation for alien invasive plant species is prevention, and therefore, as stated in Section 3.11.5, equipment will be inspected for any vegetation and debris that may be lodged in tracks or undercarriage prior to entering the 50 m RoW.

3.12 Acceptance and Pre-Commissioning Inspections

Upon completion of construction, NB Power will conduct both ground and air acceptance patrols. The intent of these patrols is to ensure that the line is ready for service. Any deficiencies discovered during these patrols will be corrected by the contractor.

3.13 Operations and Maintenance

The proposed IPL, once declared alive, will be under the direct control of NB Power System Operations personnel at the Energy Control Centre in Fredericton. They will be responsible for the safe and reliable operation of the line, and will direct all switching and/or emergency activities required to operate the system.

Maintenance personnel will ensure the physical integrity of the line. This will include the following:

- Conducting air and ground inspection patrols (*e.g.,* ATV abuse, reliability concerns, broken insulators);
- Responding to emergency events;
- Tracking, recording of, and correcting abnormal conditions;
- Reviewing abnormal conditions to distinguish between single events and common mode failure; and
- Initiating maintenance programs to address issues unique to the Project.

Operations and maintenance personnel will work as a team to ensure that the reliability of the line is maintained in a manner which ensures the safety of NB Power employees and the public.

3.14 Transmission Line Environmental Protection Maintenance Practices

NB Power restricts the growth of trees and brush along transmission lines to ensure a reliable power grid system. Uncontrolled growth can often create outages, fire and safety hazards and hinder routine line maintenance. Manual and mechanical methods are used to control vegetation along transmission lines. The frequency of the vegetation management program varies depending upon growth rate, but it is usually carried out in 5 to 7 year cycles.

During maintenance activities, work is carried out following standard maintenance protection measures (same as subsections 3.11.9, 3.11.10, and 3.11.11). Appropriate approvals will be obtained prior to commencement of maintenance. Environmental training will be provided to NB Power and contracted personnel to ensure they are made aware of and know how to implement specific policies, procedures, and other pertinent information.

3.14.1 Buffer Zone Vegetation Management

1. A WAP will be obtained from NBDELG for watercourse and wetland crossings. No watercourse or wetland crossings will occur until such an approval is received.

2. Where crossing is necessary, the following methods will be employed during maintenance: bridge, culvert or ford. NB Power recognizes that fording is the least preferred watercourse

technique and is only approved under exceptional/rare circumstances, where no other alternative is available. The crossing method will be decided upon after a field inspection has been carried out prior to maintenance. This will allow planning, consultation with NBDELG and preparation of a WAP application. If a fording site is identified by the field inspector, approval will be requested as part of the WAP application. The information that will be attached to the application for fording sites will include: location of crossing, description of physical habitat including bed, banks and approach slopes, fisheries information and a written rationale why no other crossing method is practical.

3. Once a WAP is received from NBDELG, crossing will be designed to protect the beds and banks, minimize clearing of vegetation in the riparian zone, prevent disruption of water flows and minimize disturbance to fish habitat.

4. The buffer zones on each side of a watercourse will be reduced during maintenance activities. Reduction in buffer zones has been approved by NBDELG and included in WAPs. However, restrictions associated with the approval must be adhered to by maintenance personnel. These restrictions include:

- Clearly marking the buffer zones at all watercourse and wetland crossings.
- Suspending mechanical clearing activities within 30 m of a watercourse or wetland as soon as the equipment ruts more than 25 cm. Once work is suspended, the equipment is removed from within 30 m of the watercourse or wetland, and cutting resumes by using manual methods.
- Ensuring the protection of the riparian vegetation on the watercourse banks.
- Ensuring alders, weeds, and small trees under 12 feet, growing on or within 5 m of the edge of the banks of a watercourse are not removed, unless they present a significant hazard to the normal and safe operation of the transmission line.
- Using grappling, bucking, winching and manual methods to remove trees and brush within 5 m of the banks of a watercourse where necessary.
- Removing only danger trees (greater than 12 feet in height) within 5 m of the edge of the bank of a watercourse.

In all cases where rare plants or species at risk have been discovered, a 30 m buffer zone will be maintained at wetlands and watercourses. However, a 1-3 m wide walking trail will be required during the construction phase. This trail would only be required in order to pull the p-line and conductors across the watercourse and mechanical equipment will not be permitted.

3.15 Decommissioning and Abandonment

NB Power facilities are designed, operated and maintained to provide safe and efficient service over the long-term. Some facilities, however, need to be decommissioned or abandoned. Typically, the conductors are removed, structures dismantled and the RoW left to revegetate naturally.

Decommissioning and abandonment of the proposed IPL will require that an application be made to the NEB. Decommissioning and abandonment plans will be developed after consulting with the NEB and other applicable regulatory authorities. Site decommissioning will occur once leave of the Board has been obtained and will meet legislative standards. Sites will be left clean and safe.

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4.0 ENVIRONMENTAL SETTING (BIOPHYSICAL AND SOCIO-ECONOMIC)

This section describes the environmental components which may potentially be affected by the Project, or which may influence or place constraints on the execution of Project related activities. Relevant environmental components in the Study Area are shown on the constraint map included in Appendix E, Figure E-1.

4.1 General Description

The 1 km wide Preferred Corridor passes through the Southern Upland Forest Region (Rowe, 1972). In this region, hill tops and well drained slopes support tolerant hardwoods (sugar maple, beech, yellow birch) while at lower elevations, mixtures of the same species occur, interspersed with red maple, white birch, balsam fir, red spruce, white pine, and eastern hemlock. In swamps, stands of black ash, red spruce, eastern white cedar and red maple typically occur, with peaty deposits supporting black spruce and tamarack.

Near the Point Lepreau Terminal, the 1 km wide Preferred Corridor enters the Fundy Coast Forest Region (Rowe, 1972), characterized by patchy forest on the shore of the Bay of Fundy composed of white spruce, black spruce, balsam fir, and tamarack. Also present are large raised sphagnum bogs. Further inland, balsam fir and red spruce predominate, while at higher elevations white and yellow birch, beech, and sugar maple occur infrequently.

4.2 Atmospheric Environment

The New Brunswick climate is classified as a modified continental type, characterized by a wide range of temperatures.

Coastal waters typically have a major influence on the climate of adjoining land. Areas near the coast have milder winters and cooler summers, with a longer frost-free period than inland locations.

The wind direction and the relationship of land to water is also a major factor determining climatic differences within the region. The southern coast of New Brunswick has one of the highest annual levels of precipitation in Atlantic Canada due to southeasterly storm winds blowing moisture-laden air onshore.

The influence of prevailing westerlies is responsible for bringing air from the interior of the North American continent to New Brunswick. In addition, other air masses originating from the Arctic to the Gulf of Mexico also influence weather patterns in New Brunswick. As a result, this region has storms more frequently throughout the year than any other part of the country (Dzikowski, *et al.,* 1985).

Air quality is influenced by the concentrations of air contaminants emitted by both natural and anthropogenic sources within the atmosphere. These contaminants are transported, dispersed, redistributed or concentrated by meteorological and topographical conditions; and eventually settle or are washed out of the atmosphere by rain and are deposited on vegetation, livestock, soil, water surfaces, and other objects.

Air quality data are based on results from monitoring stations near the 1 km wide Preferred Corridor, operated by the National Air Pollution Surveillance Network (NAPS) of the Environment Protection Service of Environment Canada, and the Air Quality Branch of NBDELG. Total suspended particulates (TSP), carbon monoxide (CO), nitrogen dioxide (NO_2), sulphur dioxide (SO_2), and ground level ozone (O_3) are continuously monitored. From 1961 to 2000, there were no 1-hour exceedances for TSP, CO, NO_2, and SO_2. However, ground level ozone concentrations had three 1-hour exceedances between 1996 and 1997 (NBDELG, 1999) in the City of Saint John which is well outside the Study Area.

4.3 Terrestrial Physical Environment

4.3.1 General Topography and Physiography

The 1 km wide Preferred Corridor generally lies within the St. Croix Highlands physiographic division.

4.3.2 Surficial Geology

The ground surface of the majority of the 1 km wide Preferred Corridor is covered by glacial till deposits of varying thickness, texture, and stoniness. Glacial till can be described as poorly sorted to largely unsorted material with particle sizes ranging from clay to boulders (Rampton, *et al.,* 1984). Till typically has a loamy to sandy loam texture, reflecting the characteristics of the underlying bedrock and the stone content varies, exceeding 35 % in some areas. High stone contents are more prevalent in areas where till deposits are relatively thin. The thickness generally exceeds 1.5 m and in certain areas may be far greater. Near the coast close to Point Lepreau, till is generally less than 0.5 m thick and rarely exceeds a thickness of 2.0 m. Bedrock outcrops are common.

Other surficial deposits along the 1 km wide Preferred Corridor include glaciofluvial deposits and morainal blankets and plains. Glaciofluvial deposits typically occur in river valleys and typically consist of sand and gravel with minor silt. These deposits are generally much thicker than 1.5 m. The morainal blankets and plains consist of sand, silt, some gravel and clay, and range in thickness from 0.5 to 3 m.

4.3.2.1 Overburden Depth

The overburden depth along the 1 km wide Preferred Corridor varies greatly, even within a short distance. Several areas with shallow overburden have been identified along the 1 km wide Preferred Corridor on the available surficial geological map of the province (Rampton, *et al.,* 1984). Miscellaneous bedrock outcrops have also been frequently documented in the Study Area.

4.3.2.2 Erodible Soils

Erodibility, the susceptibility of a soil to erode, depends upon parameters such as soil texture, moisture content, void ratio, exchange ions, pH, and composition or ionic strength of the eroding water (Gray, 1996). Some soils are inherently more erodible (silts) than others (coarse well-graded gravels), and in general, increasing organic content and clay size fraction decreases erodibility. Typically, the erodibility of soils, rated in order of lowest to highest are peat, coarse textured fluvial deposits, morainal deposits, lacustrine deposits, fluvial (silts and fine sands) deposits, and aeolian deposits (Brusnyk, 1985).

According to the Water Erosion Risk mapping produced by Agriculture Canada (1992), the majority of soils encountered along the 1 km wide Preferred Corridor would have a severe risk of erosion due to water, if left bare and unprotected. Severe erosion potential is defined as the potential to erode greater than 33 tonnes/ha/year, for exposed, unprotected soil. The natural erosion rate of these soils in undisturbed areas will be significantly lower due to the presence of surface vegetation and an organic duff layer.

4.3.3 Bedrock Geology

The 1 km wide Preferred Corridor is underlain by intensely deformed Ordovician, Silurian, and Lower Devonian sedimentary and volcanic rocks. These rocks have been intruded by granitoid rocks of Middle Devonian and early Carboniferous age making the bedrock geology in this region very complex (NBDNRE, 2000).

4.3.3.1 Historic Seismic Activity

The 1 km wide Preferred Corridor crosses a number of old geologic fault lines (NBDNRE, 2000). All of the faults are dormant with no recent historical seismic activity. However, there are several areas identified in southwestern New Brunswick where earthquakes have been reported, and have been of sufficient magnitude to be potentially damaging. One of these areas is located west of the 1 km wide Preferred Corridor in the Passamaquoddy Bay area.

Passamaquoddy Bay has been identified as a seismically active area with more than 50 earthquakes reported since 1870. However, most of the earthquakes were minor and did not cause property damage. A correlation is suggested between earthquakes in this area and the Oak Bay Fault in the region. The Oak Bay Fault is an old geologic structure extending northwest from Campobello Island up the St. Croix River to a point west of Lawrence Station, and overlaps with the 1 km wide Preferred Corridor. However, New Brunswick geologists report that no movement has occurred in this structure since pre-glacial times.

4.3.3.2 Sinkholes and Subsidence

Sinkholes are unique geologic structures that result from surface water infiltration into or groundwater flow through, soluble geological formations, leading to the creation of cavities that may or may not be filled with water. Sinkholes occur when overburden and near surface bedrock collapse into a dissolution cavity in underlying bedrock. Sinkholes are the identifying feature of karst topography that are visible on the earth surface in areas underlain by soluble rocks. The category of rocks that are subject to dissolution are referred to as evaporites. No areas with potential for subsidence occur within the 1 km wide Preferred Corridor (C. St. Peter, pers. comm., 2001).

4.3.3.3 Mineral Occurrences, Mining Claims, and Aggregate Resources

Gold and/or base-metal occurrences are intimately associated with most major faults throughout the study region. Many of these faults or fault zones, particularly along the shore of the Bay of Fundy, and possibly along the northwestern margin of the Silurian Belt, reflect the brittle nature and effects of terrain accretion. The St. Croix terrain contains the high-grade “Annidale Copper Deposits” and several gold occurrences of economic interest (Ruitenburg *et al*., in preparation).

Two areas of mining claims are crossed by the 1 km wide Preferred Corridor (totalling 2.95 km in length), south of New River Mountain and near St. David Ridge.

Aggregate deposits are found scattered throughout the Study Area, with a number of pits being actively worked on an “on demand” basis. Potential aggregate reserves vary in size from a few acres to very large reserves such as those located at and around the Pennfield area (Anonymous, 1987). One gravel pit has been identified at the edge of the 1 km wide Preferred Corridor, east of Lepreau.

4.3.3.4 Acid Generating Bedrock

Acid generating rocks are a group of mineralized geologic materials that contain various sulfides. When these minerals are disturbed and come into contact with water, oxygen, and iron reducing bacteria, the sulfide minerals become oxidized and acid is generated in the process. The presence of iron reducing bacteria serves as a catalyst which accelerates acid production, and the potential for generation of acid rock drainage (ARD). Carbonate minerals, where present, serve to buffer acid generation. The geologic formations encountered throughout most of the Study Area have a low to moderate potential to produce ARD with localised pockets of high sulphide content (M. MacLeod, pers. comm., 2002).

4.3.4 Hydrogeology

Groundwater originates from precipitation in the form of rain and snowmelt which infiltrates downward to the groundwater table. This water then flows from areas of high hydrostatic pressure (recharge areas) to areas of low hydrostatic pressure (discharge areas). Groundwater resources may be developed for municipal water supply purposes, for which a large volume of groundwater is typically extracted from a group of production wells and distributed to areas of a municipality. For such uses, the groundwater pumping rate is high and influences a relatively large area referred to as a capture zone.

The NBDELG has identified groundwater protection areas for a number of municipalities, and is also in the process of identifying groundwater protection areas for other municipalities which use groundwater as their water supply source. Certain developments within the capture zones of the municipal wells may affect the public water supply, both in terms of quantity and quality. Thus, developments within a groundwater protection area require approval from NBDELG and affected municipalities. No designated groundwater protection areas are located within the 1 km wide Preferred Corridor (P. Vanderlaan, pers. comm., 2001).

4.3.5 Groundwater Resources Survey

4.3.5.1 Approach and Methodology

The approach and methodology for completion of the groundwater resources field survey is summarized below.

Landowner Survey

NB Power surveyed all private landowners along the preliminary Preferred RoW to identify any groundwater wells or springs developed as a water supply within 200 m of the centerline of the RoW. A total of 56 surveys were completed and reviewed. Of these 56 surveys, ten landowners reported having a well within 200 m of the centerline of the RoW. There were five landowners unsure of their well location with respect to the RoW and one landowner did not reply to the survey.

Well Development Database Search

In order to confirm the results of the landowner groundwater survey, a formal request was made to NBDELG to search their well development database for records of wells occurring along the preliminary Preferred RoW.

4.3.5.2 Results

Landowner groundwater survey results are presented in Table 4-1 and indicate that ten wells or springs developed as a water supply occur within 200 m of the centerline of the RoW.

TABLE 4-1
Groundwater Wells and Springs Identified by Landowner Surveys
Within 200 m of the Centerline of the RoW

PID	
1247873	1265784
1235043	1265289
1597083	15046311
1259142	1275155
1268044	1274505

The NBDELG has no records for wells or developed springs along the preliminary Preferred RoW. This database has no records prior to 1994.

In February 2002, NB Power reviewed the 10 landowner surveys and also followed-up with the five landowners unsure of their well or spring location. In addition, landowners between KP 0+000 to KP14, that were inadvertently omitted from the original groundwater resources survey list were also contacted. As a result, 61 surveys were completed and seven landowners reported have a well located within 200 m of the centerline of the preliminary Preferred Row.

The discrepancy between the original groundwater resources survey (Table 4-1) and the survey conducted in February 2002, is due to the fact that two landowners (PID 1247873 and PID 1275 155) mistakenly reported having a well within 200 m of the centerline of the 50 m preliminary Preferred RoW. One landowner (PID 1274505) was no longer affected by the RoW due to survey information.

One landowner will not reply to the survey. The property is uninhabited and undeveloped, therefore it is unlikely that a well or developed water supply would be located on the property.

4.4 Terrestrial Biological Environment

New Brunswick supports a variety of flora and fauna, including many wildlife species that provide important tourism and recreational opportunities (*e.g.*, hunting, fishing, eco-tourism).

There are 57 known species of mammals native to New Brunswick (Dilworth, 1984). Due to the variety of habitat conditions within the Study Area, it is reasonable to expect that mammals using habitat in the vicinity of the 1 km wide Preferred Corridor could include herbivores (*e.g.*, deer, moose), insectivores *(e.g.,* bats), carnivores (*e.g.*, bobcat), and omnivores (*e.g.*, bear, fox).

Approximately 350 resident and migratory bird species have been reported in New Brunswick (Squires, 1976). Avian species diversity in temperate regions is, in part, a function of foliage height diversity (*i.e*., the greater the height diversity, the greater the number of species using that habitat) (MacArthur and MacArthur, 1961). This is particularly true in deciduous forest stands. Species diversity is also related to floral species diversity (Morrison, 1972). Thus, grasslands would support limited species diversity, while a successional deciduous forest may support relatively higher species diversity.

Bird mortality is reported to be greatest during the first year of life. Therefore, breeding and fledgling populations are considered to be the avian life stages most sensitive to potential disturbance. Erskine (1992) summarizes the results of breeding bird surveys conducted in New Brunswick to the date of publication. Of these, the majority of species (approximately 62%) breed in forested habitat.

There are approximately 25 species of amphibians and reptiles that inhabit New Brunswick, including various species of salamanders, frogs, turtles, and snakes (Gorham, 1970).

4.4.1 Species at Risk

Available information on the known occurrence of all species at risk (including, flora and fauna) in the Study Area was compiled and reviewed to determine their presence relative to the 1 km wide Preferred Corridor. Sources included published and unpublished listings of occurrences of such species (*e.g.*, COSEWIC, 2000; Hinds, 2000), as well as consultations with provincial government agencies and researchers (*e.g.*, the New Brunswick Museum, Atlantic Canada Conservation Data Centre (AC CDC) and University of New Brunswick).

The *Canada Wildlife Act* states that the Minister of the Environment, in cooperation with any provincial government, may take any measures deemed necessary to protect endangered wildlife species. In keeping with the intent of this statute, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) was formed and given the mandate of identifying species of special status in Canada. The COSEWIC is comprised of federal, provincial, and territorial wildlife officials, as well as representatives of various wildlife organizations. Based on the most reliable sources and information available, COSEWIC prepares species status reports and assigns special status to sensitive species of birds, mammals, plants, fish, amphibians, and reptiles.

The COSEWIC employs a five-level classification system as follows:

- extinct - no longer exists on the planet;
- extirpated - no longer existing in a specific location, but found elsewhere;
- endangered - threatened with imminent extinction or extirpation;
- threatened - likely to become endangered unless situation changes; and
- special concern - at risk because of low numbers or restricted occurrence.

Once status designations are made, it is up to the respective provincial and territorial jurisdictions where the species occurs to take whatever actions are appropriate to address the threats and limiting factors placing a species at risk. The COSEWIC currently has no legislative role or authority (COSEWIC, 2000), although new federal species at risk legislation is currently being developed (which would presumably give COSEWIC a legislative role).

The Province of New Brunswick provides species protection through its *Endangered Species Act*. Under this Act, an endangered species (or sub-species) is defined as, "…any indigenous species of fauna or flora threatened with imminent extinction or imminent extirpation throughout all or a significant portion of its range and designated by regulation as endangered." Species included in the Act include both species designated by COSEWIC and species not designated by COSEWIC. This Act prohibits the destruction or interference of, and the attempt to destroy or interfere with, any member of an endangered species or the habitat of an endangered or regionally endangered species.

The AC CDC, is part of a network of nearly 90 conservation data centers throughout the western hemisphere, including six others in Canada. The AC CDC exists to assemble and provide information and expertise on species at risk and natural communities in Atlantic Canada.

The AC CDC ranks species in the Province as S1 through S5, using the Nature Conservancy Ranking System where species ranked S1 to S3 are considered at risk. An information request was made to AC CDC for all occurrences of species ranked S1 to S3 in the Study Area (Appendix F).

Species designated as rare by species experts (*e.g*., Hinds, 2000; Clayden, *et al.*, 1984) have been included to provide a more regional context for the assessment. In some cases, species may be common to more than one list.

4.4.1.1 Plant Species at Risk

The COSEWIC has designated the following plant species as either endangered, threatened, or of special concern in New Brunswick (COSEWIC, 2000):

- Furbish's lousewort (*Pedicularis furbishiae*) - endangered
- Anticosti aster (*Aster anticostensis*) - threatened
- Bathurst aster (*Symphyotrichum subulatum*) - special concern
- Gulf of St. Lawrence aster (*Symphyotrichum laurentianum*) - special concern

Eight species of flora are listed as endangered under the New Brunswick *Endangered Species Act*:

- Furbish's lousewort (*Pedicularis furbishiae*)
- Anticosti aster (*Symphyotrichum anticostense (Aster anticostensis)*)

- Bathurst aster (*Symphyotrichum subulatum (Aster subulatus var. obtusifolius)*)
- Gulf of St. Lawrence aster (*Symphyotrichum laurentianum (Aster laurentianus)*)
- Parkers' pipewort (*Eriocaulon parkeri*)
- Pine-drops (*Pterospora andromedea*)
- Prototype quillwort (*Isoetes prototypus*)
- Southern twayblade (*Listera australis*)

Rare plants include those species that are known to grow, uncultivated, in only a few locations, or are thought to be represented by a small number of individuals in the region (Roland and Smith, 1969). Most rare plant species in the Province are species present at the edge of their geographic/climatic range (WGA, 1998).

None of these floral species have been reported to occur within the Study Area. Field surveys were conducted to identify any plant species at risk in the preliminary Preferred 50 m RoW.

4.4.1.2 Plant Species at Risk Field Survey

Plant species at risk for the purpose of this field survey, included those listed by COSEWIC as endangered, threatened or of special concern, those protected under the New Brunswick *Endangered Species Act*, those listed by AC CDC as ranked S1, S2, or S3, and those designated as rare in New Brunswick (Hinds, 2000).

The survey methodology employed predictive modelling followed by field surveys at 38 locations.

Predictive Modelling

A predictive modelling exercise was conducted to identify areas along the preliminary Preferred 50 m RoW with elevated potential to support plant species at risk. A list of rare plants occurring in the Study Area was obtained from AC CDC that included all plant species with Nature Conservancy ranks of S1, S2 or S3. This list was reviewed for species location and habitat characteristics. Rare plants from this list were considered to potentially occur along the preliminary Preferred 50 m RoW if they occurred within a similar geographic setting and occupied habitats that also occurred along the preliminary Preferred 50 m RoW. Habitat requirements for the selected plant species were identified along the preliminary Preferred 50 m RoW, as well as other habitat characteristics, which generally increase the likelihood of rare plant occurrence (*e.g.,* calcareous soil, steep terrain, and micro-environments).

All watercourses and wetlands were surveyed to establish the potential for plant species at risk to occur. Any watercourses or wetlands which were identified as having elevated potential to support rare plants, were field surveyed for the presence of plant species at risk. Several upland areas were also identified as having elevated potential to support plant species at risk due to the presence of calcareous soil.

Field Survey

Field surveys were conducted for all high-potential sites located along the preliminary Preferred 50 m RoW between June 27 and September 17, 2001 with two exceptions (Fowle Lake Outlet and Bush Brook) and consisted of the following:

- reviewed species habitat requirements and potential distribution of species at risk;
- reviewed taxonomy of species at risk potentially found in the Project area at local herbarium and/or speaking to botanical expert;
- conducted preliminary habitat overview at each high-potential site, including description of area to be surveyed (size and type of habitat) and estimate of the approximate location of the proposed alignment and connecting or adjacent areas of similar habitat;
- prepared habitat description including dominant vegetation community, level of disturbance, standing water presence, unique features (*e.g.,* cliffs, falls);
- prepared rough sketch of survey site;
- determined presence/absence of species at risk;
- if a species at risk was present, confirmed extent and degree of interspersion of population; photograph population and surrounding habitat as reference; and
- where necessary, plants not identified in the field were collected and placed in a ziplock bag and stored in a cooler for later taxonomic identification.

An experienced botanist was used and a field technologist to conduct field investigations in accordance with methodologies outlined in Recommended Methods for the Surveying of Vascular Plants at Risk for EIA or Similar Studies (Hinds, 1993). Surveys were conducted at high potential areas where the preliminary Preferred 50 m RoW may intersect habitat, which could support plant species at risk. The field survey area at each site included the preliminary Preferred 50 m RoW, plus a small distance outside of it, and extended along the RoW for the entire length that it crossed habitat with high potential to support plant species at risk. Typical survey areas ranged from 0.6 ha at riparian sites up to 3.6 ha in the large bog at Hanson Stream Reservoir. Field surveys were conducted during 12 hour work days, which, combined with very good access, allowed 2 to 4 hours survey time per site.

Survey results for each high potential area are summarized in Table 4-2. Plant species at risk were identified at 15 locations along the preliminary Preferred 50 m RoW.

TABLE 4-2
Plant Species at Risk[1] Survey Summary

Location	Date of Survey (2001)	High Potential Observed (Yes/No)	Plant Species At Risk Observed (Yes/No)	Comments
Dipper Harbour Creek (near Lepreau)	August 15	No	No	Tidal Marsh habitat is under extreme pressure due to past development in New Brunswick
Tributary to Little Lepreau Basin (near Point Lepreau[2])	June 28	No	No	Tidal Marsh habitat is under extreme pressure due to past development in New Brunswick
Hanson Stream Reservoir (near Point Lepreau[2])	June 28	Yes	Yes	*Calopogon pulchellus*-S3/S4, *Arathusa bulbosa*-S3
Meadow Brook (near Point Lepreau[2])	June 29	No	No	None
Atkinson Brook (near Point Lepreau[2])	June 29	No	No	None
Lepreau River	July 5	Yes	Yes	*Juncus militaris*-S2/S3, *Carex foliculata*-S3
Roger's Lake Outlet	July 13	Yes	Yes	*Carex foliculata*-S3
Fowle Lake (original alignment)	July 12	Yes	Yes	*Proserpinica pectinata*-S1 (new for New Brunswick), *Utricularia purpurea*-S2, *Aster borealis*-S2, *Juncus militaris*-S2/S3, *Carex foliculata*-S3
Fowle Lake Outlet (new alignment)	October 2	Yes	Yes	*Juncus militaris*-S2/S3
New River	July 12	Yes	Yes	*Juncus militaris*-S2/S3, *Carex foliculata*-S3
West of Hawkins Lake	July 25	Yes	No	Over-mature coniferous forest on steep slope.
Newton Lake Outlet	July 19	No	Yes	*Utricularia geminiscapa*–S2
Lake Anthony Brook	July 19	No	Yes	*Utricularia geminiscapa*–S2, *Utricularia minor*-S2, *Sparganium natans*-S2/S3
Back Meadow Brook	July 19	No	No	None
Tributary to Front Meadow Brook	July 20	No	No	None
Front Meadow Brook	July 19	No	No	None
Magaguadavic River	July 13	Yes	Yes	*Juncus militaris*-S2/S3
Bonny River	July 26	No	Yes	*Utricularia minor*-S2
Dowdall Meadow Brook	July 20	No	No	None
West of Dowdall Meadow Brook	July 20	No	No	None
Guntree Brook	July 23	No	No	None
Clarence Stream	July 31	Yes	Yes	*Platanthera grandiflora*-S2
Black Brook	July 23	No	No	None
Digdeguash River	Aug 16 & September 17	No	Yes	*Utricularia minor*-S2
Tributary to North Campbell Brook	July 23	No	No	None
North Branch Campbell Brook	August 1	No	Yes	*Utricularia geminiscapa*-S2

TABLE 4-2
Plant Species at Risk[1] Survey Summary

Location	Date of Survey (2001)	High Potential Observed (Yes/No)	Plant Species At Risk Observed (Yes/No)	Comments
Doyle Lake	July 23	No	No	None
West of Catchcart road	July 24	No	No	Mature cedar stand on calcareous soil; stand was harvested prior to investigation.
Meadow Brook	July 24	No	No	None
Sawyer Brook	July 24	No	No	None
Berry Brook	July 25	No	No	None
Allen Brook	August 1	No	No	None
Dennis Stream	August 1	No	No	None
Bush Brook	September 25	Yes	Yes	*Eleocharis cf. olivacea*-S1, *Rosa palustris*-S2
Soap Brook	July 30	No	No	None
Tributary to Soap Brook	July 30	No	No	None
Mohannes Stream	August 16	Yes	Yes	*Viburnum dentatum var. recognitum*-S1, - *Utricularia geminiscapa*-S2
St. Croix River	August 1	Yes	Yes	*Utricularia purpurea*-S2, *Juncus militaris*-S2/S3

Note:
1. Plant species at risk included those listed by COSEWIC as endangered, threatened or of special concern, those protected under the New Brunswick *Endangered Species Act*, those listed by AC CDC as ranked S1, S2, or S3, and those designated as rare in New Brunswick (Hinds, 2000).
2. Adjacent to existing NB Power corridor near Point Lepreau.

Most plant species at risk identified in the preliminary Preferred 50 m RoW were aquatic or emergent and were confined in occurrence to the area within or directly adjacent to a watercourse or wetland (*i.e.*, within the 30 m buffer zone required by the New Brunswick *Clean Water Act*). The observed populations were sizeable and healthy.

Two sites were surveyed in the fall due to uncontrolled circumstances. Bush Brook was surveyed on September 25, 2001 due to property access issues with the landowner and Fowle Lake Outlet was surveyed on October 2, 2001 due to a route alignment change caused by the discovery of rare plants in the original alignment. It was necessary for NB Power to realign the preliminary Preferred 50 m RoW to an alternative alignment 150 m south of Fowle Lake, following the discovery of a new plant species in New Brunswick (comb-leaved mermaid weed – *Proserpinica pectinata*). The new species (as well as four other rare species) are located in the seasonally flooded lake margin. The alternative alignment provides a larger buffer between Fowle Lake and the preliminary Preferred 50 m RoW and avoids the comb-leaved mermaid weed.

4.4.1.3 Mammal Species at Risk

Mammal species at risk include those listed by COSEWIC as endangered, threatened, or of special concern, those protected under the New Brunswick *Endangered Species Act*, and those designated as rare on a provincial basis (S. Gerriets, pers. comm., 2001; Dilworth, 1984).

Under the New Brunswick *Endangered Species Act*, two species of mammals are protected as endangered or regionally endangered in the province:

- Eastern cougar (*Felis concolor cougar*)
- Canada lynx (*Lynx canadensis*)

The occurrence of these species has not been confirmed in the Study Area. The most recent confirmation of the cougar being present in New Brunswick was in 1992, near Juniper (Cumberland and Dempsey, 1994). However, it is not known if this was an eastern cougar. The habitat requirements of the eastern cougar are not well known. However, elsewhere throughout their range, cougars have been found in a variety of habitats ranging from large swampy areas to dense coniferous stands. The major prey species for cougar in these areas is white-tailed deer.

In New Brunswick, lynx are reported to mostly inhabit the northern portion of the Saint John River basin (Choates, 1973). A set of lynx tracks were found north of the 1 km wide Preferred Corridor in 1995, but the animal was never sighted (C. Libby, pers. comm., 2001). Lynx tend to inhabit wooded and swampy areas where snowshoe hare are abundant for food (Peterson, 1966). Both lynx and eastern cougar tend to be wide-ranging, and suitable habitat for both species is likely found distributed throughout the 1 km wide Preferred Corridor, and Study Area. The 1 km wide Preferred Corridor is not known to represent limiting or critical habitat for either species.

Several marine mammals have been identified as threatened by COSEWIC, but will not be affected by the proposed Project.

The COSEWIC designates two mammals as species of special concern in New Brunswick: Gaspé shrew (*Sorex gaspensis*) and Southern flying squirrel (*Glaucomys volans*). This Gaspé shrew has previously been reported to inhabit an extremely restricted range in northern New Brunswick (near Mount Carleton and Moose Mountain) (Environment Canada, 2001). While suspected to inhabit New Brunswick, the southern flying squirrel has yet to be reported in the province (D. McAlpine, pers. comm., 2001). Thus, neither species is likely to inhabit areas within the 1 km wide Preferred Corridor.

Dilworth (1984) identified several mammalian species as rare within New Brunswick, including two species of shrew (water shrew (*Sorex palustris*) and smokey shrew (*Sorex fumeus*)) and one bat species (big brown bat (*Eptesics fuscus*)). These shrew species typically inhabit damp areas, or areas close to water. The big brown bat inhabits forested areas. Their presence has not been confirmed in the Study Area.

Other than those species previously listed, Clayden, *et al*. (1984) identified the long-tailed shrew (*Sorex dispar*), two species of bat, and one pipistrelle (little brown bat (*Myotis lucifugus* (LeConte)), eastern long-eared bat (*Myotis septentrionalis* (Merriam)) and eastern pipistrelle (*Pipistrellus subflavus*)), as being vulnerable to disturbance. The shrew species is known only from southeastern New Brunswick, outside the Study Area. The bat and pipistrelle species are typically forest inhabitants. None of the other species have been confirmed to occur in the Study Area.

The AC CDC identified a number of small mammals and bats, which may occur in the Study Area as follows:

- Rock vole (*Microtus chrotorrhinus*)
- Arctic shrew (*Sorex articus*)
- Southern bog lemming (*Synaptomys cooperi*)
- Northern bog lemming (*Synaptomys borealis*)
- Silver haired bat (*Lasionycteris noctivagans*)
- Red bat (*Lasiurus borealis*)
- Hoary bat (*Lasiurus cinerea*)

The silver-haired (*Lasionycteris noctivagans*) bat prefers tree cavities in coniferous forest near water while the red (*Lasiurus borealis*) and hoary (*Lasiurus cinerea*) bats nest in deciduous trees or in ground leaves. The three bat species winter in the southern US and Central or South America. The vole, shrew, and lemmings all inhabit underground tunnel networks in moist boreal forests. None have been confirmed in the Study Area. No critical/limiting habitat for the above species is known to occur within the preliminary Preferred 50 m RoW.

4.4.1.4 Avian Species at Risk

The harlequin duck (*Histrionicus histrionicus*), piping plover (*Charadrius melodus*), Eskimo curlew (*Numenius borealis*) and the roseate tern (*Sterna dougallii*) are listed by COSEWIC as endangered in New Brunswick (COSEWIC, 2000).

Harlequin ducks typically nest on rapid, rocky rivers. In the Maritimes, this species has only been reported to breed in northern New Brunswick. However, the Harlequin duck is known to overwinter near Grand Manan Island, and along the coast near Point Lepreau. This species is unlikely to use habitat in the 1 km wide Preferred Corridor (Erskine, 1992). Similarly, piping plover and roseate terns are unlikely to be found in the 1 km wide Preferred Corridor as they nest and rear their young on open sandy coastal shorelines and offshore islands and islets. The eskimo curlew has not been seen in over 100 years, and historically has bred only in the Northwest Territories (Environment Canada, 2000). Therefore, the Eskimo curlew is not likely to occur in the 1 km wide Preferred Corridor.

In addition to those species designated as endangered by COSEWIC, the New Brunswick *Endangered Species Act* designates the bald eagle (*Haliaeetus leucocephalus*) as regionally endangered. The lower reach of the Saint John River has been reported to be one of the most important eagle summer habitats in eastern Canada. Eagles tend to nest in large trees near water.

The COSEWIC has identified the peregrine falcon (*Falco peregrinus anatum*) as threatened in New Brunswick however, this species is listed as endangered under the New Brunswick *Endangered Species Act*. Following World War II, widespread use of pesticides such as DDT resulted in the decline of peregrine falcon populations throughout North America. By the mid-1960s, no known breeding pairs were reported in eastern North America. With the ban of such pesticides in the 1960s and 1970s, restocking and species recovery programs were launched across North America. Stocking of captive hatched falcons began in 1982 in New Brunswick, with birds released in Fundy National Park. By 1989, stocked birds had begun to nest in New Brunswick. Peregrine falcons nest on cliff faces and similar high sites inaccessible to predators. Peregrine falcons are not known to occur within the 1 km wide Preferred Corridor.

The COSEWIC (2000) has designated the following species known to inhabit southern New Brunswick as species of special concern:

- Least bittern (*Ixobrychus exilis*)
- Ivory gull (*Pagophila eburnea*)
- Barrow's goldeneye (*Bucephala islandica*)
- Short-eared owl (*Asio flammeus*)
- Yellow rail (*Coturnicops noveboracensis*)
- Bicknell's thrush (*Catharus bicknelli*)

The least bittern inhabits dense marshes around freshwater lakes and rivers. In southern New Brunswick, it has been reported in the areas of Red Head Marsh, Musquash, and Piries Lake (Erskine, 1992). The ivory gull typically inhabits the North Arctic but winters further south with a few sightings as far south as New England along the coast. Any inland sightings would be in foraging habitat, not considered critical habitat for this species (Squires, 1976). Barrow's goldeneye are a wintering species in New Brunswick, and are typically found in the salt water habitat along the coast (Alsop, 2001). This species is not known to nest in New Brunswick. In the Maritimes, the short-eared owl is known to breed in wet meadows and marshes, and coastal bogs and grasslands. Their abundance in the region may be limited to the abundance of their main prey species, meadow vole. The yellow rail is typically found in marshes dominated by sedges, grasses, and rushes where there is little standing water. They have also been observed in damp fields, river flood plains and coastal marshes (Environment Canada, 2001). The Bicknell's thrush, nests in high elevation, dense and stunted fir, spruce forests throughout the Maritime region (Environment Canada, 2001).

Due to their more specific habitat requirements (Erskine, 1992), local populations of the following species may be considered sensitive to habitat disturbance (Clayden *et al.*, 1984):

- Virginia rail (*Rallus limicola*)
- Cooper's hawk (*Accipiter copperii*)
- Merlin (*Falco columbarius*)
- Northern saw-whet owl (*Aegolius acadicus*)
- Great crested flycatcher (*Myiarchus crinitus*)
- Northern mockingbird (*Mimus polyglottos*)
- Eastern bluebird (*Sialia sialis*)

The Virginia rail nests in freshwater wetlands. The remaining sensitive species listed above nest in forest and edge habitat. None of these species have been confirmed within the 1 km wide Preferred Corridor.

A review of habitat for bird species at risk in New Brunswick has been conducted and compared to habitat found within the Study Area. The following bird species at risk were considered likely to occur in the Study Area:

- American black duck (*Anas rubripes*)
- American wigeon (*Anas americana*)
- Bald eagle (*Haliaeetus leucocephalus*)
- Black tern (*Chlidonias niger*)
- Brown thrasher (*Toxostoma rufum*)
- Canada goose (*Branta canadensis*)
- Common tern (*Sterna hirundo*)
- Eastern bluebird (*Sialia sialis*)
- Eastern meadowlark (*Sturnella magna*)
- Green heron (*Butorides virescens*)
- Indigo bunting (*Passerina cyanea*)
- Mallard (*Anas platyrhynchos*)
- Northern mockingbird (*Mimus polyglottos*)

- Northern saw-whet Owl (*Aegolius acadicus*)
- Northern shoveler (*Anas clypeata*)
- Pine grosbeak (*Pinicola enucleator*)
- Pine warbler (*Dendroica pinus*)
- Purple martin (*Progne subis*)
- Red crossbill (*Loxia curvirostra*)
- Red-shouldered hawk (*Buteo lineatus*)
- Rough-legged hawk (*Buteo lagopus*)
- Three-toed woodpecker (*Picoides tridactylus*)
- Whip-poor-will (*Caprimulgus vociferus*);
- White-winged Crossbill (*Loxia leucoptera*); and
- Wood thrush (*Hylocichla mustelina*).

The presence of these species within the Study Area is unconfirmed.

4.4.1.5 Aerial Raptor Field Survey

Several species of raptor were identified as potentially occurring in the vicinity of the preliminary Preferred 50 m RoW, including:

- Bald eagle (*Haliaeetus leucocephalus*)
- Osprey (*Pandion haliaetus*)
- Merlin (*Falco columbarius*)

The New Brunswick *Endangered Species Act* designates the bald eagle as regionally endangered. Eagles tend to nest in large trees near water and feed on fish and carrion of other species (Erskine, 1992).

Osprey breed throughout North America, mainly in coastal areas with extensive shallow waters, but also inland near lakes with abundant fish (Erskine, 1992). Nest sites typically include large mature to over-mature trees and artificial nesting platforms (Osprey is not a designated species at risk).

Merlin typically breed in forested areas, sparse woodland areas with moderate edge habitat, mountainous areas, and open areas with scattered trees (Baicich & Harrison, 1997). Nest sites include open tree cavities, cliff-ledges, the abandoned nest sites of other birds (*e.g.*, crows), and open-ground (Merlin is not a designated species at risk).

Due to the sensitivity of some raptor species to human-related disturbance, a field survey was undertaken to identify and protect raptor species nesting in proximity to the 1 km wide Preferred Corridor.

Survey Method

An aerial survey was conducted along the centerline of the preliminary Preferred 50 m RoW on May 18th, 2001 (*i.e.*, the period of least vegetative cover, when nests would be the most visible). A helicopter was flown at treetop level at an average speed of 30 to 40 miles an hour. A Global Positioning System (GPS) using pre-determined way points along the centerline of the preliminary Preferred 50 m RoW, and 1:12 500 scale aerial photographs were used to navigate along the route. All nests and avian species sighted were identified and recorded.

The aerial survey was comprised of:

- A detailed visual inspection to identify bird species observed and raptor nests; and
- A determination of species utilizing identified nest sites.

Results

Aerial survey results identified one raptor nest (*i.e.*, osprey), located along the preliminary Preferred 50 m RoW. The nest is located on a treetop east of Dennis Stream (UTM Grid Coordinate Z19; N50 13 131; E 6 96 374). The osprey nest appears to have been abandoned during its construction, and is at least one or two years old.

One bald eagle was sighted flying over the southern shore of Lake Anthony, however, no nest was noted during the survey.

Two hawks were identified in the New River area. One hawk was observed flying along the west bank of New River, but it flew into the woods, and could not be identified. A second hawk was identified as a Northern harrier (*Circus cyaneus*), and was observed pursuing a seagull over a marsh area, east of New River. No nests were sighted for these birds, however, the behaviour of the Northern harrier is indicative of defending a nest site from a predator.

Immediately east of Lepreau River, a great horned owl (*Bubo virginianus*) was sighted flying above the treetops (UTM Grid coordinate Z19; N 50 08 095; E 6 96 374). This species has a restricted territory for hunting and breeding, typically one pair for an area between 8 to 10 km^2 in size (Environment Canada, 2001). The great horned owl may start breeding, as early as January, but in the Maritime region, young are typically present from mid-April to May.

Other bird species noted during the aerial survey included 4 black ducks (*Anas rubripes*), one Great blue heron (*Ardea herodias*) (feeding) and a Canada goose (*Branta canadensis*) at Black Brook. Black ducks were also noted at Mohannes Stream and New River. One common merganser (*Mergus merganser*) was observed flying along Lepreau River. These species are all common throughout the area.

An additional aerial survey was conducted on March 1, 2002 and no nests were found in the vicinity of Lake Anthony. The preliminary Preferred 50 m RoW is located approximately 100 m from Lake Anthony.

4.4.1.6 Herpetile Species at Risk

The COSEWIC designates the Atlantic leatherback turtle (*Dermochelys coriacea*) as being endangered nationally (COSEWIC, 2000). The Atlantic leatherback turtle is also protected under the New Brunswick *Endangered Species Act.* The leatherback turtle is a marine reptile species known to use marine coastal habitat in the Maritimes (Gilhen, 1984), and thus would not be affected by the Project.

The COSEWIC has not identified any threatened herpetiles in New Brunswick. The wood turtle (*Clemmys insculpta*) has been designated by COSEWIC as a species of special concern, and is ranked S3 by AC CDC. The species is long-lived (40 years) and slow to mature (17-20 years), resulting in vulnerability of adult turtles. The species nests on open sandy areas next to water, such as high riverbanks, roadsides, rail embankments, and wetlands. They hibernate half buried in the substrate of fast flowing watercourses (WGA, 1998).

Three species of amphibians, the four-toed salamander (*Hemidactylium scutatum*), the grey treefrog (*Hyla versicolor*) and the dusky salamander (*Desmognathus fuscus*) have previously been reported to be sensitive to disturbance in New Brunswick (Clayden, *et al*., 1984). However, the status of these species in New Brunswick is based on limited information regarding their distribution (Gorham, 1970). The four-toed salamander is mainly found in, or around, sphagnum bogs, but can also be found in the peaty margins of watercourses and lakes (Clayden, *et al.*, 1984). The four-toed salamander has the least known occurrences in New Brunswick (S1) but it is thought to be more widely distributed in New Brunswick than originally estimated (D. McAlpine, pers. comm., 2001). To date, the four-toed salamander has only been documented at one location in New Brunswick at Marven Lake in Fundy National Park.

A recent article (McAlpine, *et al.*, 1991), suggests that the grey treefrog is neither rare nor endangered in New Brunswick. Previous records of a very limited distribution for this species (*i.e.*, only in the Barkers Point area of Fredericton) resulted from local climate fluctuations, short periods of male chorusing (during breeding period), and small size of choruses during previous assessment exercises. Field observations indicated the species is well distributed on either side of the Canada/US border, from Calais, Maine, north along the St. Croix River, and continuing potentially north of Houlton, Maine.

A wood turtle (*Clemmys insculpta*) was observed at both Black Brook and Dennis Stream during wetland/plant species at risk surveys in August, 2001. A single turtle was observed at each site up to 65 m from the watercourse where they were foraging in the woods. The preferred breeding habitat consists of fully exposed sandy banks or sand-gravel bars in streams. No such habitat occurs within or near the preliminary Preferred 50 m RoW at either site, however, it is remotely possible that nesting may occur in man made embankments like the railroad at Dennis stream. Nesting takes place in the spring (mid May to early June) and wood turtles are likely to gather at favourite locations during breeding. After eggs are laid, the individuals disperse to their home ranges, which include areas between approximately 450 m and 1000 m in length along streams and extending up to 150 m from a watercourse. It is likely that the wood turtles observed were within their summer home range. Home ranges may overlap with one or two other individuals and they are not territorial. Wood turtles hibernate in winter in the substrate of streams or stream banks where water flows all winter. Hibernation may occur within the watercourse at either crossing location.

4.4.1.7 Invertebrate Species at Risk

Only one invertebrate species, the Maritime ringlet butterfly (*Coenonympha inornata nipisiguit*), is designated as endangered by the New Brunswick *Endangered Species Act* and COSEWIC (2000). This invertebrate species is endemic to salt marsh areas and in New Brunswick is known only from the Peter's River marsh, Daly's Point marsh and the Karen Point marsh in Bathurst, New Brunswick (Clayden, *et al*., 1984; Webster, 1994). This species is not likely to occur along the 1 km wide Preferred Corridor.

The monarch butterfly (*Danaus plexippus*) is designated as a species of special concern in New Brunswick by COSEWIC (2000). The monarch butterfly overwinters in coastal Monterey pine, Monterey cypress, eucalyptus groves in California and fir forests in Mexican mountains. These overwintering sites face threatening development, however, Mexican and international efforts are in place to protect the monarch butterflies in Mexico. In New Brunswick, monarch butterflies utilize habitats such as meadows, weedy fields and watercourses where milkweed is present, during breeding season. Milkweed is considered to be common throughout the Study Area.

The AC CDC lists 31 species of butterfly as rare in New Brunswick. Little is known of the lifecycle or habitat requirements of most of these species. Of the six most sensitive species (ranked S1), the early hairstreak (*Erora laeta*) is thought to prefer open areas in mixed wood forests, while the others (bronze copper (*Lycaena hyllus*), Clayton's copper (*Lycaena dorcas claytoni*), Henri's elfin (*Callophrys henrici*), maritime ringlet (*Coenonympha tullia inornata*), and bog fritillary (*Boloria eunomia*)) all inhabit bogs and open grassy wetlands.
Eight species ranked S2 are:

- Indian skipper (*Hesperia sassacus*)
- Two-spotted skipper (*Euphyes bimacula*)
- Short-tailed swallowtail (*Papilio brevicauda bretonensis*)

- Salt-marsh copper (*Lycaena dospassosi*)
- Acadian hairstreak (*Satyrium acadicum*)
- Banded hairstreak (*Satyrium calanus falacer*)
- Striped hairstreak (*Satyrium liparpos strigosum*)
- Gray hairstreak (*Strymon melinus*)

The four hairstreaks and the Indian skipper are all associated with lightly wooded to open areas. They are all highly mobile and utilize a wide variety of habitat. The Acadian hairstreak is thought to prefer willow species for its host plant and is therefore, more likely to inhabit wetland/riparian zones. Salt-marsh copper has only been observed in salt marshes and the short-tailed swallowtail is thought to remain near the coast in conifer forest edge. The two-spotted skipper generally inhabits bogs and marshes.

Seventeen species ranked S3 are:

- Northern cloudywing (*Thorybes pylades)*
- Least skipper (*Ancyloxypha numitor)*
- Roadside skipper (*Amblyscirtes vialis)*
- American copper (*Lycaena phlaeas americana)*
- Hoary elfin (*Callophrys polia)*
- Western pine elfin (*Callophrys eryphon)*
- Bog elfin (*Callophrys lanoraieensis)*
- Western tailed blue (*Everes amyntula maritime)*
- Crowberry blue (*Lycaeides idas empetri)*
- Greenish blue (*Plebejus saepiolus)*
- Purple lesser fritillary (*Boloria chariclea grandis)*
- Slivery checkerspot (*Chlosyne nycteis)*
- Hop merchant (*Polygonia comma)*
- Satyr anglewing (*Polygonia satyrus)*
- Compton tortoise shell (*Nymphalis vaualbum j-album)*

- Milbert's tortoise shell (*Nymphalis milberti)*
- Jutta arctic (*Oeneis jutta ascerta)*

The jutta arctic, bog elfin, hoary elfin, and crowberry blue are observed mostly in bogs (crowberry blue in coastal areas). Milburts tortoise shell, Compton tortoise shell, sayter anglewing, hop merchant, and silvery checkerspot all inhabit riparian zones and wetland edges in boreal forest areas. The greenish blue, the western tailed blue, and the least skipper prefer more open wetland/riparian zones. The American copper and roadside skipper and northern cloudywing have been observed in a very wide range of habitat from wooded to open, riparian or dry. The western pine elfin prefers pine dominated habitats but has been reported in black spruce bogs. The lesser purple fritillary has been observed in spruce forest edge habitat but is restricted to northeastern New Brunswick.

None of the species above have been observed in the Study Area.

4.4.2 Migratory Birds

From available mapping 8 broad habitat types were identified as occurring within the Study Area:

- Softwood
- Old Softwood
- Hardwood
- Old Hardwood
- Mixedwood
- Old Mixedwood
- Wetland
- Open/Edge

The criteria for habitat type were derived by combining habitat criteria used by NBDNRE, reviewing the Maritime Breeding Bird Atlas (Erskine, 1992) habitat criteria, and by incorporating information related to habitat preference found in the Birds of North America (Alsop 2001). In addition, local birders and bird experts were contacted for information on migratory birds (D. Sabine, pers. comm. 2002, S. Makepeace, pers. comm. 2002, M. Betts, pers. comm. 2002, and D. Keppie, pers. comm. 2002). The result is the above 8 habitat types. These sources, as well as the New Brunswick Museum checklist of birds in New Brunswick, were then reviewed to ascertain which avian species had the potential to be found in the Study Area. After reviewing the source material, it was found that of the species that had the potential to inhabit this area, 24 species were ranked S1, S2, or S3 by AC CDC (refer to Section 4.4.1.4). Seven of the 24 species were found to be edge dwellers. Of the remaining 17 species, nine were classified as marsh or wetland species. The eight remaining species are made up of five species that prefer old softwood or softwood habitat of any age. One of the three remaining species relies on old forest regardless of cover type. The two remaining species are found to prefer Old Hardwood habitat.

On April 22, 2002 representatives from AMEC, CWS and the NBDNRE developed a protocol for a migratory bird survey along the preferred RoW, including a list of species of concern. This survey was conducted from June 6 to the 21st, 2002. No significant or critical habitat was encountered during the survey, and only one species deemed sensitive was located during the survey. The purple finch (*Carpodacus purpureus*) was heard singing 10 times during the survey, with at least 4 individuals located in one transect. This species occurs in open coniferous forest and mixed forests, as well as forest edge, open woodlands, areas of silviculture, urban parks and the suburbs. Nesting typically occurs in tall conifer species. Suitable habitat is abundant for the purple finch surrounding the preferred 50 m RoW.

4.4.3 Designated Areas and Other Critical Habitat Features

Available information on designated Environmentally Significant Areas (ESAs) and other habitat features identified as sensitive or critical was compiled and reviewed to determine their location relative to the 1 km wide Preferred Corridor (Clayden, *et al*., 1984; Stocek, 1982; NTNBI, 1995; Wein, 1975; Tims, 1990; N. Craig, pers. comm., 2001). The habitat types and physical features along the 1 km wide Preferred Corridor were reviewed to identify areas that conform to the accepted definitions of these sensitive areas.

Descriptions of ESAs and sensitive/critical habitat, including potential deer and moose wintering areas, mature coniferous forest stands, permanent forest sample plots, and protected areas, located in, and adjacent to the vicinity of the 1 km wide Preferred Corridor, are provided in the following sections.

4.4.3.1 Environmentally Significant Areas

In New Brunswick ESAs are designated by NBDELG as having at least one of the following characteristics (NTNBI, 1995):

- natural areas that are considered to be ecologically fragile with respect to human activities;
- areas that provide habitat for rare/endangered species;
- areas that have unique, or especially distinctive, natural features of biological, ecological, geological, or aesthetic value; and
- areas that have been enhanced through implementation of specific habitat management strategies aimed at specific species and/or ecosystems.

Seven ESAs are located within the 1 km wide Preferred Corridor. One site is Sprague Falls (designated based on rare plants). The other six sites are major watercourses including Dennis Stream, New River, Magaguadavic River, Digdeguash River, Waweig River, and St. Croix River Estuary (designated at the crossing point based on salmon, trout, and gaspereau populations).

4.4.3.2 Wintering Areas

The most restrictive habitat requirement for mammals in the Study Area is wintering areas for deer and moose. Harsh winters are the major limiting factor for deer and moose populations (Choates, 1973; Franzmann, 1978). Thus, suitable wintering areas are important to the maintenance of cervid populations.

A DWA, or deer yard, is considered to be an area currently used by deer during winter and also includes adjacent stands that have a potential for providing shelter and food on a long-term (>50 years) basis (NBDNRE, 1994). Moore and Boer (1977) reported that New Brunswick DWAs tend to consist of spruce and balsam fir stands, in riparian zones or south facing, gentle slopes, with at least 70% canopy closure. Moose wintering areas (MWAs) are similar but with less dense canopy cover (*i.e.,* fir thickets). Both types of winter habitat are usually found in close proximity to water and, especially for DWAs, regenerating hardwoods. In southern New Brunswick, deer tend to use wintering areas more frequently than moose, which use such areas only during winters with extreme snow conditions. Deer typically gather in DWAs when snow depths become approximately 30 cm in depth, and particularly in severe winter conditions when snow depths exceed 50 cm in open areas (NBDNRE, 1996). Though moose and deer are normally solitary throughout most of the year, congregating in suitable wintering areas strongly increases winter survival.

Since MWAs are used only in deep snow conditions, and winters are relatively mild in southern New Brunswick, DWAs represent more critical habitat conditions than MWAs. However, DWAs are not as critical for deer populations in southern New Brunswick, due to the relatively mild winter conditions, as compared to northern parts of the province.

Active DWAs within and/or adjacent to the 1 km wide Preferred Corridor were identified, based on NBDNRE, 2001 mapping. DWAs identified include those defined on Crown Land through regular aerial surveys. An aerial survey was conducted on March 1, 2002 to determine whether there were DWAs on private land. No DWAs were identified during this survey.

The preliminary Preferred 50 m RoW traverses five known DWAs: one in the vicinity of Lepreau River, three near the Magaguadavic River, and one north of Digdeguash Lake.

4.4.3.3 Mature Coniferous Forest Habitat (MCFH)

New Brunswick maintains an inventory of MCFH on Crown Land. The MCFH stands are defined as those stands with the structural and spatial attributes which meet the requirements of old forest-dependant species, such as pine marten, which require large areas of habitat (NBDNRE, 1994). Such areas are typically moderately moist, with mature or over-mature stands of conifers or conifer-dominated mixed woods, with a high degree of crown closure and a high incidence of snags (standing dead wood) and windfalls (NBDNRE, 1996). Such communities can be of three types:

- 75% conifer stands;
- 50 – 74% conifer-dominated mixed wood stands dominated by spruce, balsam fir or cedar; or
- certain hardwood-dominated mixed wood stands with 25 – 49% conifers and a relatively high conifer basal area.

Such stands in New Brunswick are said to reach maturity when 85% of the maximum volume of conifer yield is met, and the crown closure is still greater than 30%.

Forest harvesting and forest road construction are both permitted within MCFH stands. NBDNRE maintains MCFH amounts and stand conditions on a provincial basis, such that MCFH slated for protection (*i.e.,* restriction on cutting) may change from year to year. The MCFH in New Brunswick are not fixed locations and pertain only to specific softwood areas on Crown Land.

Areas designated as MCFH in the vicinity of the preliminary Preferred 50 m RoW were identified near Meadow Brook, McCallum Brook, and west and southeast of Wellington Lake.

4.4.3.4 Permanent Sample Plots

The NBDNRE maintains several permanent forest sample plots in the Study Area, two of which are located within the 1 km wide Preferred Corridor, south of St. David Ridge, and southeast of Wellington Lake. These plots have high educational and research value and contribute to enhancement of forest management practices in the province. These locations were avoided by the preliminary Preferred 50 m RoW.

4.4.3.5 Protected Areas

Protected areas may include national and provincial parks, ecological reserves, and game management areas identified in the Study Area. There are no national parks or designated ecological reserves located in the vicinity of the 1 km wide Preferred Corridor. There are two provincial parks, New River Beach Provincial Park and Lepreau Falls Provincial Park, located in the Study Area. The New River Beach Provincial Park is located approximately 4 km south of the 1 km wide Preferred Corridor (Figure E-1, Appendix E), while Lepreau Falls Provincial Park (a designated ESA) is located approximately 500 m west of the 1 km wide Preferred Corridor. One proposed ecological reserve (Loch Alva New Brunswick Protected Area) is east of the 1 km wide Preferred Corridor in the area of Lepreau River (AC CDC, 2001, M. Marshall, pers. comm., 2001).

The 1 km wide Preferred Corridor passes through the southwestern corner of the Lepreau Game Management Area. There are no restrictions on hunting or trapping in this area, and there are no restrictions on timber clearing on Crown Land (R. Cumberland, pers. comm., 2001).

4.5 Aquatic Environment

Aquatic environments may be characterized as marine, estuarine, or freshwater. There are no marine or estuarine areas crossed by the 1 km wide Preferred Corridor. Freshwater environments are discussed below.

4.5.1 Freshwater Environment

The 1 km wide Preferred Corridor crosses 49 freshwater watercourses (as listed in Table 4-3), including all watercourses identified as permanent on available 1:50 000 scale NTS mapping of the Study Area. In addition, the 1 km wide Preferred Corridor crosses five lakes:

- Little Lepreau River Headpond;
- Roan Lakes;
- Hawkins Lakes;
- Doyle Lake; and
- Lake Anthony

The NBDELG has recently implemented an initiative for the classification of outstanding lakes and rivers in the Province. A water body may be designated as outstanding for a variety of reasons, including (NBDELG, 1995):

- an example of a wild or untouched natural lake or river;
- falls within provincial park waters or headwaters of a designated heritage river;
- waters associated with an ecological reserve;
- environmentally significant waters (*e.g.*, provide habitat for rare aquatic species);
- waters associated with special wetlands; and
- salmon and trout waters containing spawning and nursery areas.

Under this classification, two lakes in the Study Area that have been identified as candidate outstanding lakes: Lake Anthony and Clear Lake (Figure E-1, Appendix E). Lake Anthony is located within the 1 km wide Preferred Corridor, however, it has been avoided by the preliminary Preferred 50 m RoW. Clear Lake is not within the 1 km wide Preferred Corridor.

Little Lepreau River Headpond constitutes a large waterbody (*i.e.,* <200 m width).

TABLE 4-3
Watercourses Crossed by the Preferred Corridor

Crossing Number	Watercourse Name
1	Unnamed Tributary to Black Duck Hole
2	Little Lepreau River
3	Meadow Brook
4	Atkinson Brook
5	Unnamed Tributary to Cranberry Lake
6	Lepreau River
7	Unnamed Tributary to Lepreau River
8	Unnamed Tributary to McCallum Brook
9	McCallum Brook
10	Unnamed Tributary to Fowle Lake
11	Unnamed Tributary to Fowle Lake 2
12	Unnamed Tributary to New River
13	Unnamed Tributary to New River 2
14	New River
15	Hawkins Lake
16	Unnamed Tributary to Wellington Lake
17	Unnamed Tributary to Pocologan Lake
18	Bear Lake Brook
19	Lake Anthony Brook
20	Unnamed Tributary to Lake Anthony Brook
21	Back Meadow Brook
22	Front Meadow Brook
23	Magaguadavic River
24	Williamsons Meadow Brook
25	Bonny River
26	Dowdall Meadow Brook
27	Guntree Brook
28	Clarence Stream
29	Gardiner Brook
30	Black Brook
31	Digdeguash River
32	Unnamed Tributary to Campbell Brook
33	North Branch Campbell Brook
34	Meadow Brook
35	Waweig River
36	Unnamed Tributary to Berry Brook
37	Berry Brook
38	Pout Brook
39	McCarley Brook
40	Gallop Stream
41	Unnamed Tributary to Gallop Stream
42	Allen Brook
43	Dennis Stream
44	Bush Brook
45	Mohannes Stream
46	Ash Brook (1)
47	Ash Brook (2)
48	Ash Brook (3)
49	St. Croix River

A designated surface water supply area, the Dennis Stream watershed, overlaps with the 1 km wide Preferred Corridor. The municipal water supply is taken from wells located immediately adjacent to Dennis Stream and from the existing pumphouse (P. Vanderlaan, pers. comm., 2001).

4.5.1.1 Hydrology

New Brunswick is divided into seven drainage basins, each encompassing a number of smaller sub-basins (Environment Canada, 1989). The 1 km wide Preferred Corridor crosses the Western Coastal Basin (Environment Canada sub-basins 01AQ). The Western Coastal Basin drains to the Bay of Fundy via three main rivers and their tributaries: the St. Croix; the Digdeguash; and the Magaguadavic Rivers.

The hydrologic regime of watercourses along the 1 km wide Preferred Corridor varies according to the seasonality of precipitation. The accumulation of snow during winter and its subsequent runoff are a major influence on the hydrology of watercourses, resulting in a large contribution to watercourse flows in the spring. Generally, it is expected that basins with less than 10 m^2 of catchment area may, at certain times of the year, be essentially dry. This depends on groundwater contribution to watercourse flow as well as on previous rainfall events (WGA 1984).

Approximately 2% of New Brunswick's total land surface is covered by freshwater. The average annual precipitation in New Brunswick is 1 050 mm/yr, with a mean run-off ranging between 500 and 1 000 mm annually (Environment Canada, 1989). Run-off is influenced by many factors, including soil type and moisture conditions, grade or slope, and vegetative cover. Precipitation in the vicinity of the Study Area is typically higher from September to January and lower from March through August. Peak watercourse flows occur in April and May, with a second period of high flow in October and November (Environment Canada, 1989).

4.5.1.2 Water Quality

Natural influences on surface water quality include local geology, watershed size, response to precipitation, topography, vegetation, and proximity to marine waters. The variation in water quality observed between various watershed basins and watercourses is due in part to the bedrock mineral erodibility/solubility and the hydrological cycle of the specific areas.

The rate of response of watercourse flow to precipitation mediates the interaction between water and soils and bedrock, therefore influencing chemical composition. Topography affects the input of mineral sediments and the accumulation of organic deposits in and around watercourses. Where present, vegetation limits erosion, thus influencing suspended solids in watercourses. Where the vegetation is predominantly coniferous, the needles, which are very resistant to decomposition, add organic acids to water and soil while contributing few primary nutrients. Deciduous litter typically releases nutrients more readily. Proximity to marine waters often results in high chloride concentrations from ocean spray mixed with precipitation.

The chemical quality of watercourses in New Brunswick is generally excellent for human consumption. Calcium bicarbonate-type waters predominate, although mixed chemical influences are known to occur in the province (Environment Canada, 1989).

Surface waters in New Brunswick's Western Coastal Basin have low TDS concentrations (Environment Canada, 1989). The majority of watercourses in this drainage basin have TDS values ranging from 12 to 35 mg/L. Table 4-4 lists the calculated average values for selected water quality parameters assessed in the Western Coastal Basin of New Brunswick.

TABLE 4-4
Summary of Selected Water Quality Parameters for the Western Coastal Basin

Parameter	Surface Water*
Alkalinity (total)	9.4
Aluminium (diss.)	0.128
Bicarbonate	7.4
Cadmium (ext.)	0.0017
Calcium	3.3
Chloride	3.7
Chromium (ext.)	0.0007
Copper (ext.)	0.0093
Iron (ext.)	0.217
Lead (ext.)	0.0154
Magnesium	0.7
Nickel (ext.)	0.0048
Oxygen (diss.)	8.8
PH	6.2
Potassium	0.3
Sodium	2.1
Sulphate	4.9
Total Dissolved Solids	21.5
Zinc (ext.)	0.037

Source: Environment Canada, 1989.
Note: * Mean (mg/L).
ext = extractable.
Median in pH units.
diss = dissolved.

4.5.1.3 Fish Habitat and Fisheries Resources

The Study Area supports various species of fish, (including those listed in Table 4-5). Table 4-5 also classifies each species according to the following categories:

- **special status** - designated as having special status by COSEWIC (2000) and/or species experts
- **anadromous -** species which forage in the ocean, and spawn in freshwater **catadromous -** species which spawn in the ocean and forage in freshwater
- **freshwater -** species which spend their entire life cycle in freshwater

TABLE 4-5
Fish Species of Potential Concern in the Study Area

Species	Category	Description
Atlantic salmon (*Salmo salar*)	Anadromous and species of special status	Found in Magaguadavic system, New River, and Pocologan River. Important recreational fishery.
Blueback herring *(Alosa aestivalis)*	Anadromous	Spawns very "low" in the drainage of rivers, and is not at risk from the Project effects.
Alewife (*Alosa pseudoharengus*)	Anadromous	Not normally distinguished from the blueback herring, and together they are commonly referred to as gaspereau. The alewife spawns in ponds and lakes higher in the drainage than do bluebacks.
Rainbow smelt (*Osmerus mordax*)	Anadromous	Spawns in the Magaguadavic and Saint John Rivers and probably in all watercourses that connect directly to the Bay of Fundy. There is a popular recreational fishery for the species in the lower Saint John River system. Landlocked populations spawn in the tributaries and along the shoreline of many lakes within the Study Area.
Striped bass *(Morone saxatilis)*	Anadromous	Important recreational fishery. Forages and may spawn in the Saint John River drainage.
American eel *(Anguilla rostrata)*	Catadromous	Present in all drainages within the Study Area. There is a commercial fishery for the species in the lower Saint John River system.
Redbreast sunfish *(Lepomis auritus)*	Freshwater and species of special status	Very little information is available on the distribution and abundance of this species of special concern (COSEWIC, 2000) in New Brunswick. To date, it has been found in the Canaan, Oromocto, Magaguadavic, and Kennebecasis Rivers, and Oromocto, Anne and Yoho lakes (Scott and Crossman, 1973). Economically unimportant in terms of being targeted for a recreational or commercial fishery in New Brunswick, sensitive to habitat degradation from industrial, silvicultural, and agricultural contaminants.
Brook trout (*Salvelinus fontinalis*)	Freshwater	Important recreational fishery. Present within most drainages in the Study Area.
Smallmouth bass (*Micropterus dolomieui*)	Freshwater	Important recreational fishery. A large population exists in the Magaguadavic system.
Landlocked Atlantic salmon (*Salmo salar sebago*)	Freshwater	Important recreational fishery within lakes occurring in the Study Area. The fishery depends on an intensive stocking program. Natural spawning and nursery habitat in the Study Area are used by landlocked salmon.
Landlocked rainbow smelt *(Osmerus mordax)*	Freshwater	A vital forage fish for landlocked salmon; spawns in tributaries and on the shoreline of many lakes within the Study Area.
Lake Utopia Dwarf Smelt *(Osmerus sp.)*	Freshwater	A threatened species in New Brunswick (COSEWIC, 2000), found only in Lake Utopia. Two streams in the northwestern portion of the lake serve as the spawning grounds for this species.
White perch *(Morone Americana)*	Freshwater	Important recreational fishery in the southwest region of New Brunswick. Although primarily a lake-dwelling species, it also inhabits slow-moving watercourses.

Watercourses crossed by the 1 km wide Preferred Corridor that have historically supported Atlantic salmon include the New River, Pocologan River, Magaguadavic River, Digdeguash River, the St. Croix River and Dennis Stream. The recreational salmon fishery for the Magaguadavic River and its tributaries historically yielded between 60 and 179 grilse that were retained by anglers, as well as a number of Multi-Sea-Winter (MSW) salmon, which, per regulation, were released alive (Marshall and Cameron, 1995). In 1994, the fishery was completely hook and release, and it was estimated that only 23 salmon and grilse were released. The fishery was closed in 1996 and has remained closed.

4.6 Wetlands

Wetlands have been defined as "...lands transitional between terrestrial and aquatic systems where the water table is at, or near, the surface or the land is covered by shallow water at some time during the growing season. Wetlands are characterized by poorly drained soils and predominantly hydrophytic, or water tolerant, vegetation (NBDNRE, 1993).

Both collectively and as individual units, wetland resources serve a variety of important ecological and socio-economic functions. Wetlands function in the maintenance of surface and groundwater resources and quality, as well as providing fish and wildlife habitat. All species of wildlife in New Brunswick rely on wetland habitat at some point in their life cycle. The value of wetlands to society and their ecological value are derived from their biological productivity and biodiversity.

Wetlands are generally characterized by hydrophytic vegetation, and can vary from a closed peat bog to an open lake dominated by submergent vegetation. By providing natural flood control, points of recharge and discharge of groundwater, acting as filters, and by trapping silt, wetlands play an important role in the hydrological cycle and generally enhance the water regime. As they provide habitat for a wide variety of plants and animals, they may be highly productive and often exceed adjacent uplands in their standing crops, productivity, and biodiversity.

The characteristic plant species of wetlands vary with the amount of open water present. Relatively unproductive wetlands include bogs, which are characterized by sphagnum moss and acid waters. Wetlands with more available nutrients are dominated by sedge (*Carex* sp.), bulrush (*Scirpus* sp.), and spikerush (*Eleocharis* sp.). Areas with extensive open water are distinguished by a variety of aquatic macrophytes ranging from shallow-water pipewort (*Ericaulon septangulare*), water lobelia (*Lobelia dortmanna*), and bladderwort (*Utricularia* sp.), to deeper water bur-reed (*Sparganium* sp.), pondweed (*Potamogeton* sp.), and pond lily (*Nuphar bvariegatum*).

Bogs in New Brunswick typically have limited habitat diversity and are dominated by a small number of vegetative species, with little or no standing water. Shrub type wetlands are more diverse, but tend to be dry mid-summer. Emergent type wetlands offer the most diverse habitat of those types encountered, and often support diverse arrays of flora and fauna (*e.g.,* small and large mammals, waterfowl and passerine birds). Aquatic bed/unconsolidated bottom type wetlands have a limited occurrence in the general area, but offer some of the less common functions (*e.g.,* recreational boating, fishing, *etc.)*.

The 1 km wide Preferred Corridor crosses approximately 7.35 km of wetland habitat (all types) distributed almost evenly along the entire Corridor. Most of the wetlands are less than 100 m in width, but one wetland, Hanson Stream Reservoir is greater than 500 m in width.

4.6.1 Wetland Field Surveys

Disturbance of wetland resources may lead to net loss of wetland function including provision of wildlife habitat, benefits to surface water and groundwater quantity/quality, and aesthetic/ educational opportunities. Therefore field surveys were completed for wetland habitat located in the vicinity of the preliminary Preferred 50 m RoW.

Approach and Methodology

The approach and methodology for the completion of the Wetland Field Survey was developed in recognition of the 30 m buffer zone prescribed for wetlands under the New Brunswick *Clean Water Act* and is summarized below.

Identification of Survey Sites

The identification of survey sites consisted of identifying wetlands located within 30 m of the preliminary Preferred 50 m RoW based on the New Brunswick Wetland Atlas (Environment Canada, 1987), and on the New Brunswick Forest Inventory maps. Forest Inventory maps are produced by aerial photographic interpretation based on 1:12 500 scale colour aerial photography. In areas where Forest Inventory maps do not specifically identify wetland habitat, two types of areas were identified which may contain wetland habitat including “wastelands” and “non-productive lands”. “Wastelands” are typified by open areas in the forest, which contain low vegetation and often have visible water at the ground surface. “Non-productive lands” are populated by trees in a suppressed condition (*i.e.*, not growing vigorously) that will not achieve merchantable size and volume.

Field Surveys

Field surveys were conducted for all wetlands identified within 30 m of the edge of the preliminary Preferred 50 m RoW between June 28 and October 2, 2001. Biophysical field investigations were conducted by a botanist and an environmental technologist, according to NBDNRE methodology, which is best defined in Dickinson (undated). Field observations were recorded using standardized field sheets for fresh water and coastal wetlands (Dickinson, undated). Habitat was defined as types, classes and subclasses, based on standardized definitions of wetland habitat. The habitat definitions are largely dependant on vegetative assemblages and permanence and degree of inundation of water.

The methodology employed was developed to ensure that sufficient biophysical information was collected for each wetland to allow completion of a wetland functional analysis, if required for environmental effects monitoring (EEM) purposes. If functional analysis becomes necessary, regional biologists will be consulted for any information they may have describing the recreational, educational and traditional use wetland functions in specific wetlands.

Results

Survey results at each wetland are summarized in Table 4-6.

TABLE 4-6
Field Survey Results for All Wetlands Within 30 m of the preliminary Preferred 50 m RoW

Wetland Location	Wetland Atlas No. (watershed-tributary-wetland)	Forest Inventory No. (stand # /map #)	Size (ha)	Habitat (at crossing)
South of Rte. 790	703-1-1	4931/4768	0.8	Bog
Dipper Harbour Creek	S_o5	5903/4768 5769/4767	13.0	Highmarsh
North of Dipper Harbour Creek	703-4-1	N/A	1.2	Bog
Tributary To Dipper Harbour Creek	703-5-1	7478/4767	4.8	Shallow Marsh
Bog on Andy Mountain	720-1-1	7458/4767, 7354/4767 7455/4767	1.6	Bog
Little Lepreau Basin Inlet	S_o5	7648/4767	0.6	Highmarsh
Bog South of Hanson Stream Reservoir	721-2-1	6720/4767 7022/4767	12.8	Bog
Bog South Side of Hanson Stream Reservoir	N/A	6213/4767 6513/4767, 6312/4767	14.8	Wooded Bog
Bog North Side of Hanson Stream Reservoir	722-A-2	6002/4767, 6099/4766 6696/4766, 6398/4766	30.8	Bog
Bog North of Hanson Stream Reservoir	722-5-2	5978/4766 5877/4766	9.2	Bog
Meadow Brook	722-9-2	6066/4766 5464/4766	21.2	Shrub Swamp
Bog Near New Brunswick Trail	722-9-3	5659/4766	6	Bog
Atkinson Brook	722-9-2	5051/4766 5148/4766	21.2	Shallow Marsh
Keyhole Hills Bog	727-19-1	1106/4766, 1611/4766 1311/4766	21.6	Bog
Tributary to McCallum Bk.	727-19-4	6583/4665, 6973/4665	14.6	Shrub Swamp
West of McCallum Bk.	727-19-3	6275/4666	2	Bog
East of Fowle Lake	740-22-2	1856/4665	1.6	Bog
Fowle Lake Outlet	740-22-5	1856/4665	0.8	Shrub Swamp
Lake of the Hills Stream	740-25-1	6394/4665	25.0	Bog
Caribou Lake Inlet	740-12-57A	8534/4565, 8337/4565	15.6	Shrub Swamp
Caribou Lake Inlet	740-12-57A	8429/4555	15.6	Open Water
East of Roan Lakes	740-32-7	5507/4565, 5402/4565 5207/4565, 5201/4565	14.4	Bog
Roan Lakes Outlet	740-32-20	3493/4564, 3297/4564 3204/4564	13.2	Open Water
West of Roan Lake Outlet	740-32-20	2993/4564, 3191/4564	13.2	Bog, Open Water
Bear Lake Brook	812-43-26	0174/4564	1.6	Bog
Newton Lake Outlet	N/A	8166/4464	1	Bog
Anthony Lake Outlet	812-43-34	8064/4464	7.6	Open Water
Back Meadow Brook	N/A	3753/4464	5	Shrub Swamp

TABLE 4-6
Field Survey Results for All Wetlands Within 30 m of the preliminary Preferred 50 m RoW

Wetland Location	Wetland Atlas No. (watershed-tributary-wetland)	Forest Inventory No. (stand # /map #)	Size (ha)	Habitat (at crossing)
Front Meadow Brook	N/A	1731/4464	16	Shrub Swamp
Tributary to Magaguadavic River	N/A	0243/4464	12	Shrub Swamp
Magaguadavic Floodplain	N/A	N/A	N/A	Shrub Swamp
Williamsons Meadow Brook #1	812-30-8 B-SS	5662/4364, 5762/4364	255.2	Shrub Swamp
Williamsons Meadow Brook #2	812-30-8A M-DM-SS	4458/4364, 4660/4364	2	Open Water, Shallow Marsh
Bonny River	812-30-9A	3368/4364	0.4	Open Water, Shrub Swamp
Dowdall Meadow Brook	812-28-100	169/4364	41.2	Shrub Swamp
West of Dowdall Meadow Brook	812-28-100	9773/4264, 9569/4264	41.2	Wooded Bog
Guntree Brook	812-28-36	6663/4264	28.4	Shrub Swamp
Clarence Stream	N/A	4920/4264	4.5	Seasonally (Flooded) Flats
Gardener Brook	812-28-76	4967/4264, 4762/4264	38.0	Open Water, Shallow Swamp
Black Brook	812-28-83	2671/4264, 3074/4264 2674/4264	86.0	Shallow Swamp, Deep Marsh
West of Digdeguash	824-A-9	6754/4164	1.2	Shallow Marsh
North Branch Campbell Brook	824-27-7	3269/4164, 3264/4164	5.2	Open Water
Doyle Lake	855-A-20	2172/4164, 1972/4164	21.2	Shrub Swamp
Meadow Brook	856-10-1	N/A	0.4	Shrub Swamp
Berry Brook	856-8-14	4776/4064	13.6	Shrub Swamp
Pout Brook	856-8-6	2074/4064, 1970/4064 1971/4064	17.6	Open Water, Deep Marsh
McCarley Brook	856-8-7	1375/4064, 1477/4064	24.8	Open Water, Shrub Swamp
West of 755	N/A	0776/4064, 0473/4064	5.6	Shrub Swamp
Millpond Brook	858-A-3	9375/3964, 9278/3964	0.8	Shrub Swamp
Gallop Stream	858-3-2	N/A	1.6	Shrub Swamp, Shallow Marsh
Tributary to Gallop Stream	858-3-3	7781/3964, 7983/3964	0.4	Shallow Marsh
West of Bush Brook	872-4-24	8789/3864	2.8	Shallow Marsh, Shrub Swamp
Bush Brook	872-4-30	8598/3864, 8605/3865	52.4	Bog, Shallow Marsh
Tributary to Soap Brook	N/A	2022/3865	10.9	Shrub Swamp, Bog
Tributary to Soap Brook	N/A	9233/3865	10.7	Shrub Swamp
East of Mohannes	N/A	1745/3865	21.3	Shrub Swamp
Mohannes Stream	872-10-36	9634/3765, 9734/3765, 0332/3865, 9835/3765, 0133/3895	16.8	Shrub Swamp, Open Water

We identified 57 wetlands along the preliminary Preferred 50 m RoW, which were within 30 m of (*i.e.,* crossed or in close proximity to) the RoW, for which mitigative measures are recommended.

4.6.2 Wetland Management Initiatives

Ducks Unlimited (DU) has been involved in creating and enhancing wetland habitat for wildlife in the Maritimes since the 1960s. The 1 km wide Preferred Corridor crosses one DU project at Black Brook (S. Gerriets, pers. comm., 2001, and J. Harvey, pers. comm., 2001).

Eastern Habitat Joint Venture (EHJV) secures wetlands through partnerships between private, corporate, and government organizations which contribute to the implementation of the north American Waterfowl Management Plan. EHJV wetland habitats include those which are considered critical for breeding, staging and wintering for waterfowl.

There are no EHJV areas located within the centerline of the 1 km wide Preferred Corridor (S. Richard, pers. comm., 2001).

4.7 Socio-Economic Setting

The following sections describe the socio-economic setting of the Study Area, focussing on the 1 km wide Preferred Corridor, where applicable.

4.7.1 Existing Land Use

Approximately 345 properties are located within the 1 km wide Preferred Corridor, based on 1:50 000 scale mapped PIDs.

4.7.1.1 Industrial and Commercial

Three industrial parks are located in west Charlotte County: the provincially owned 235 ha Champlain Industrial park in Bayside near St. Andrews; the 16 ha municipal Fundy Aquaculture Service Centre park in St. George, and the 10 ha municipal McAdam Industrial Park in McAdam. Two industrial parks are located in Saint John. Spruce Lake Industrial park is located in the west end closest to the Point Lepreau Generating Station. It consists of 210 ha of which 42 are serviced with an expansion capability of 1,000 ha. The cost in 2001 was $25,000 per acre. McAllister Industrial Park is located in the east end close to the Saint John airport. It consists of 150 ha of which 50 are serviced with an expansion capability of 100 ha. The cost in 2001 was $25,000 per acre. Spruce Lake can accommodate expansion.

The Saint John CMA has three business parks: Somerset Technical Park, Millennium Business Park and Commerce Park. All parks can accommodate expansion.

4.7.1.2 Housing

Information on housing is drawn from the 1991and 1996 Census, from data compiled by the Canada Mortgage and Housing Corporation (CMHC) and from data compiled by the Canadian Real Estate Association. While detailed information is available for Saint John and the larger centres, less data are available for smaller centres.

In 1996, the number of occupied private dwellings in New Brunswick (Table 4-7) was 271,155 with 47,055 or 17.4% of these being in the Saint John CMA and 29,315 or 10.8% of these being in the City of Saint John. The New Brunswick Second Quarter 2000 *Housing Now* reports single starts are up 17% from 1999 in New Brunswick. Of the total number of single starts in the province, 59% were urban and 41% were rural. The *Housing Now* predicts that positive net migration will continue to support the resale housing market.

TABLE 4-7
Number of Occupied Private Dwellings 1996 Census

Area	Occupied Private Dwellings
New Brunswick	271 155
Saint John CMA	47 055
Saint John City	29 315

Source: M. Melanson, pers. comm., 2001

Housing Price and Sales

The New Brunswick Second Quarter 2000 *Housing Now* states that the percentage increase in the average price of residential units between 1995 and June 2000 in Saint John is 12.6%. The average new home price in Saint John increased by $20,576 from 1998 to 2000.

4.7.2 Medical and Health Services and Facilities

Medical, health services and facilities between Sussex and St. Stephen are provided by one regional health care corporation known as the Atlantic Health Sciences Corporation (AHCC). Services provided include acute care, provincial referral services and emergency care. The primary and largest provincial hospital is located in Saint John and specializes in cardiac care, neurosciences and cancer treatment. St. Joseph's provides general and women's health services. Sussex, approximately 100 km to the east of Saint John, has a small rural hospital that provides emergency services and day surgery. Saint Stephen located near the Maine border to the west of Saint John provides similar services. Fundy Health Care in Blacks Harbour responds to urgent situations, stabilizes patients and arranges transport for those in need to Saint John for additional care. A small psychiatric facility is located in South Bay.

The region has 1100-1200 hospital beds and approximately 300 physicians. The AHCC has an emergency disaster plan, a helicopter pad, fixed wing capacity and a radiation officer on site. The disaster plan is activated on a regular basis.

The AHCC employs approximately 4300 people with the majority of them located on site at the major hospital making it the largest single employer in the area. Shortages facing the health care system in this region include insufficient nursing home beds for an increasingly aging population, general practitioners as many of them are close to retirement age, and depending on the area, some specialists in such fields as acute and psychiatric care.

4.7.2.1 Recreational

Campgrounds are located throughout the southern coast from St. Stephen to Saint John. They include one in St. Stephen, two in St. Andrew's, six in the Saint John CMA, three in Saint John, and one in Kingston (2001 New Brunswick Travel Planner and the Saint John Visitor and Convention).

There are two campgrounds at New River Beach and Pocologan in the immediate area of the proposed Project. Trails utilized for recreation (e.g., biking, snowmobiling, ATV use, etc.) are located throughout the 1 km wide Preferred Corridor.

4.7.2.2 Agriculture Land

The Canada Land Inventory (CLI) Soil Capability Classification for agriculture (Environment Canada, 1971) classifies mineral soils according to the capability to sustain production of common cultivated crops.

The soil capability for agriculture in the Study Area ranges from Class 3 to Class 7 (Environment Canada, 1971). These classes indicate most of this land has severe limitations or no capability for the production of agricultural crops. The limitations referred to, however, cover traditional agricultural crops and do not exclude high productivity for a special adapted crop. In the case of the Study Area, blueberries are such a crop, and their production is the major agricultural activity in the area. The 1 km wide Preferred Corridor crosses several traditional agricultural areas west of Digdeguash River. Crops grown in this area are mostly hay.

4.7.2.3 Forestry

The Canada Land Inventory (CLI) Soil Capability Classification for forestry is based on a national seven-class rating system (Environment Canada, 1971). Land has been rated according to its capability to produce commercial timber in areas stocked with the optimum number of species of trees.

The land in the 1 km wide Preferred Corridor ranges from Class 4 to Class 7 with respect to the growth of commercial forests. These classes range from moderately severe limitations to severe limitations which would preclude the growth of commercial forests. The dominant habitat type within the 1 km wide Preferred Corridor and most of the Study Area consists mainly of forested land. The major species are spruce, intolerant hardwood (white birch, grey birch and poplar), tolerant hardwood (red maple, sugar maple, yellow birch, beech, oak and ash) and balsam fir. (Note: Tolerant refers to species which would be capable of growing in shady areas while intolerant species are less capable of growing in shady areas).

The 1 km wide Preferred Corridor contains approximately 86 km^2 of potentially forested area. Of the 86 km^2, 39.1 km^2 (45.4%) is Crown Land with the remaining 46.9 km^2 (54.6%) being privately owned. One percent (1%) of Crown Land is scheduled to be harvested per year (Dan

Beaudette, pers. comm., 2001) through normal harvesting activities based on approved forest management plans/harvesting plans. Private lands are harvested on an irregular basis and the amounts and types of wood harvested are related to wood market demands.

4.7.2.4 Transportation Infrastructure

Highway

Route 1 extends from Saint John in the east to St. Stephen in the west, providing good access along the south west coast of New Brunswick and across the United States border into Maine. Route 1 is a primary access controlled two-lane highway, but future plans include an upgrade to a four-lane divided highway from Sussex to St. Stephen. A four-lane divided highway exists between Saint John, and Lepreau, and again between St. George and St. Stephen.

Rail

Saint John, New Brunswick is served by CN Rail and New Brunswick Southern Rail (NBSR). CN Rail operates primarily as the main line between Montreal, Quebec and Halifax, NS, with a branch line down to Saint John (New Brunswick Railways Map – Web page (http://www.geocities. com/~rupert_m/nbcn/index.html, 2001). The NBSR, an exclusively freight operation, has direct rail access to New England through McAdam and operates the St. Stephen Subdivision line from McAdam to St. Stephen (Milltown). CN terminates in Saint John, with freight transported on this portion of the line from Montreal, Quebec and Halifax, NS. Passenger travel on the CN line is through VIA Rail and departs out of the Moncton Terminal for Montreal and Halifax.

Air

The Saint John airport is the major regional airport servicing the region. Employing 22 people, the airport has approximately 13 inbound flights and 13 outbound flights per day depending on the season. Daily jet service is provided to Halifax, Montreal and Toronto and regional centres. The airport services national passenger aircraft, most charter flights and air cargo traffic. General aviation activities including military, government, private aircraft and helicopter services.

4.7.3 Archaeological/Heritage Resources

Archaeological and heritage resources within, and adjacent to the 1 km wide Preferred Corridor were identified based on:

- Government inventories
- Review of earlier studies undertaken in the Study Area

- Consultation with resource managers
- Review of mapping and application of predictive modelling criteria

Government inventories and databases at the Archaeological Services Unit (ASU), and the Heritage Branch of the Culture and Sport Secretariat were reviewed for known archaeological sites, designated historic sites, and heritage structures within and adjacent to the 1 km wide Preferred Corridor. The goals of the historical research were to:

- Identify locations of known and potential sites; and
- Identify locations of pre-contact and historic activity.

Resource managers were consulted to identify known and reported heritage resources. Existing information on heritage resources for much of the 1 km wide Preferred Corridor was limited, therefore, predictive modelling criteria were considered to identify areas with elevated heritage potential. The modelling criteria were based on historical, cultural, and environmental factors frequently associated with the occurrence of heritage sites. The nature of the criteria used to evaluate heritage potential included:

- distance to existing water bodies;
- environmental features of canoeable waterways;
- vantage areas;
- transportation routes; and
- known heritage resource areas.

Table 4-8 summarizes heritage resources identified within or adjacent to the 1 km wide Preferred Corridor that could be affected by the proposed Project.

A review of aerial photography (NBDNRE series 1: 12 500; 1989) and Project mapping (1: 50 000 NTS) in consideration of a variety of environmental and cultural characteristics resulted in the identification of 26 EPAs (elevated potential areas). Table 4-9 provides the results of that review.

As a result of the above exercise, generalized EPA locations were identified. The geographic extent (length) of each EPA was determined during the field investigations.

Table 4-10 summarizes the field survey results. Six heritage resources were found in the preliminary Preferred 50 m RoW and eight additional areas where identified as potential areas of subsurface resources.

TABLE 4-8
Heritage Resources Within or Adjacent to Preferred Corridor

Constraint Identification Number	Constraint Type	Constraint Description/Location	Information Source
3	Lepreau River	Area of elevated potential for pre- and post-contact heritage resources. Lepreau River serves as a boundary for Maliseet (east) and Passamaquoddy (west) territories. (Section B-D)	Table top exercise to identify areas of elevated potential, and 1991 Route Selection and Environmental Impact Assessment Report (WGA 1991)
4	Indian Point	Contact Period aboriginal settlement on west side of Magaguadavic River. (Section H-M)	Saint John Lateral Pipeline Project: Heritage Resources (WGA 1998)
11	Heritage Structure	Located east of Highway 770, in vicinity of Lee Settlement. Single dwelling dating to 1900. Abandoned as of 1989. (Section H-M)	Inventory of Historic Buildings, administered by the Heritage Branch of the Culture and Sport Secretariat.
13	St. David Ridge	Area settled by Loyalists (1783 to 1812), and the Cape Ann Association, 1783. Two mills were constructed in this area, circa 1803. (Section S-Y)	1991 Route Selection and Environmental Impact Assessment Report (WGA 1991)
15	Portage Route	Located between Dipper Harbour and Maces Bay. The portage is thought to have run from Dipper Harbour across the lowlands to the head of Little Lepreau Basin at Maces Bay. (Section A-B)	1991 Route Selection and Environmental Impact Assessment Report (WGA 1991)
17	Little Lepreau River	Elevated potential for heritage resources along shore, banks, and terrain associate with both sides of Little Lepreau River. (Section A-B)	Table top exercise to identify areas of elevated potential
28	Fowle Lake	Elevated potential for heritage resources associated with the shoreline and terrain around Fowle Lake. (Section D-H)	Table top exercise to identify areas of elevated potential
29	New River	Elevated potential for heritage resources along the shore, banks, and floodplain of New River. (Section D-H)	Table top exercise to identify areas of elevated potential
30	Red Rock Ridge	Elevated potential for heritage resources associated with eskers comprising the ridge. Located in the vicinity of Red Rock Mountain, Lake Anthony and Upper Notch. (Section H-M)	Table top exercise to identify areas of elevated potential
31	Magaguadavic River	Elevated potential for heritage resources along the shore, banks, and floodplain of Magaguadavic River. (Section H-M)	Table top exercise to identify areas of elevated potential
32	Bonny River	Elevated potential for heritage resources along the shore, banks, and floodplain of Bonny River. (Section M-S)	Table top exercise to identify areas of elevated potential
33	Elmsville/Digdeguash River	Located along Highway 760, approximately halfway between Johnson Settlement and Rollingdam. Area holds elevated potential for heritage resources. Elevated potential for heritage resources along the shore, banks, and floodplain of Digdeguash River. (Section M-S)	Table top exercise to identify areas of elevated potential

TABLE 4-8
Heritage Resources Within or Adjacent to Preferred Corridor (continued**)**

Constraint Identification Number	Constraint Type	Constraint Description/Location	Information Source
34	Waweig	Elevated potential for heritage resources associated with Route 760 and the settlement of Waweig. Located near the border of St. Patrick and St. Croix Parish in Waweig. (Section M-S)	Table top exercise to identify areas of elevated potential
35	Waweig River/Eskers	Elevated potential for heritage resources associated with shore, banks and terrain around Waweig River. Includes eskers north of Oak Bay in vicinity of Route 765. (Section M-S)	Table top exercise to identify areas of elevated potential
36	Berry Brook/Eskers	Elevated potential for heritage resources associated with shore, banks and terrain around Berry Brook. Includes eskers north of Oak Bay in vicinity of Route 765. (Section M-S)	Table top exercise to identify areas of elevated potential
37	Historic Resources	Elevated potential for heritage resources associated with Route 755. (Section M-S)	Table top exercise to identify areas of elevated potential
38	Dennis Stream	Elevated potential for heritage resources associated with Dennis Stream, Route 750, and the Canadian Pacific Railway. Located along Route 750, halfway between Moores Mills and Maxwell Crossing. (Section S-Y)	Table top exercise to identify areas of elevated potential
39	Old Ridge	Elevated potential for heritage resources associated with Highway 3 in Old Ridge. Located along Highway 3 between Moores Mills and Maxwell Hill. (Section S-Y)	Table top exercise to identify areas of elevated potential
40	Hayman Hill	Elevated potential for heritage resources associated with Route 740 and the settlement of Hayman Hill. Located along Route 740 between St. Stephen and Basswood Ridge. (Section S-Y)	Table top exercise to identify areas of elevated potential
41	Mohannes Stream	Elevated potential for heritage resources along the shore, banks, and floodplain of Mohannes Stream. (Section Y-Z)	Table top exercise to identify areas of elevated potential
42	Lower Ridge Road	Elevated potential for heritage resources settlement along the Lower Ridge Road. Located along Route 725 between Lower Ridge and Upper Ridge. (Section Y-Z)	Table top exercise to identify areas of elevated potential
43	St. Croix River	Elevated potential for heritage resources along the shore, banks, and floodplain of St. Croix River. (Section Y-Z)	Table top exercise to identify areas of elevated potential

TABLE 4-9
Elevated Potential Areas (EPA)

EPA #	Name/ General Location	Comment
EPA 1	Point Lepreau	Pre-contact resources associated with coastline, and historic resources associated with lighthouse.
EPA 2	Dipper Harbour Creek	Pre-contact resources associated with watercourse and portage route.
EPA 3	Lepreau Basin	Pre-contact and historic resources associated with watercourse, and portage route.
EPA 4	Little Lepreau River/ Hanson Stream	Pre-contact and historic resources associated with watercourse.
EPA 5	Seven Mile Lake Road/Hardwood Hill	Historic resources associated with a historic period roadway.
EPA 6	Lepreau River	Pre-contact and historic resources associated with a watercourse.
EPA 7	Road Leading South to McCallum Brook	Historic resources associated with a historic period roadway.
EPA 8	Fowle Lake	Pre-contact and historic resources associated with a water body.
EPA 9	New River	Pre-contact and historic resources associated with a watercourse.
EPA 10	Roan Lake Outlet	Pre-contact resources associated with a watercourse.
EPA 11	Rte. 785/Red Rock Mountain/Back Meadow Brook	Historic resources associated with a roadway, and for historic and pre-contact resources associated with a vantage point and watercourse.
EPA 12	Magaguadavic River/Lee Settlement	Pre-contact and historic resources associated with a watercourse, and historic resources associated with the former community of Lee Settlement.
EPA 13	Bonny River	Pre-contact and historic resources associated with a watercourse.
EPA 14	Clarence Stream	Pre-contact and historic resources associated with a watercourse.
EPA 15	Elmsville/Digdeguash River	Pre-contact and historic resources associated with watercourse, and for historic resources associated with community of Elmsville.
EPA 16	Elmsville/North Branch Campbell Brook	Pre-contact and historic resources associated with watercourse, and for historic resources associated with community of Elmsville.
EPA 17	Rte. 127/Waweig River Headwaters: Sawyer Brook, Tributary to Sawyer Brook, Meadow Brook	Historic resources associated with a roadway, and for historic and pre-contact resources associated with watercourses.
EPA 18	Berry Brook/Tributary to Berry Brook	Pre-contact and historic resources associated with a watercourse.
EPA 19	Rte. 755/McCarley Brook	Historic resources associated with a roadway, and for historic and pre-contact resources associated with watercourses.
EPA20	St. David Ridge	Historic resources associated with the community at St. David Ridge.
EPA 21	Rte. 750/Dennis Stream/Allen Brook	Historic resources associated with a roadway, and for historic and pre-contact resources associated with watercourses.
EPA 22	Rte. 3/Old Ridge	Historic resources associated with a historic period roadway, and community at Old Ridge.
EPA 23	Rte. 740/Bush Brook	Historic resources associated with a roadway, and for historic and pre-contact resources associated with watercourses.
EPA 24	Mohannes Stream	Pre-contact and historic resources associated with a watercourse.
EPA 25	Rte. 725	Historic resources associated with a historic period roadway.
EPA 26	St. Croix River	Pre-contact and historic resources associated with a watercourse .

TABLE 4-10
Summary of Fieldwork

EPA #	Name/Location	Extent of EPA as Identified in the Field	Resource Identified Within RoW	Comment
EPA 1	Point Lepreau	Area located within the Point Lepreau Nuclear Generating Site	No	Lighthouse located outside of RoW, will not be affected.
EPA 2	Dipper Harbour Creek	Extends along the current power line, west from Rte. 790 for a distance of approximately 1200m, ending about 700 m west of Dipper Harbour Ck.	No	Elevated potential for heritage resources along the flood plain of Dipper Harbour Creek.
EPA 3	Lepreau Basin	Extends approximately 100 m back from both sides of the watercourse.	No	Elevated potential for heritage resource along the shores of Lepreau Basin.
EPA 4	Little Lepreau River/ Hanson Stream	Extends for 100 m on both sides of the Little Lepreau River.	No	Area is flooded by a dam lower on the River; low potential.
EPA 5	Seven Mile Lake Road/Hardwood Hill	Extends 100 m east and 500 m west of Seven Mile Lake Road	No	Area has been disturbed as a result of logging and gravel pitting; low potential.
EPA 6	Lepreau River	Extends 350 m east and 200 m west of Lepreau River	No	Steep terrain on both side of watercourse, outcropping; low potential.
EPA 7	Road Leading South to McCallum Brook	Extends 200 m east and 100 m west of logging road	No	No environmental characteristics to attract settlement; low potential
EPA 8	Fowle Lake	Extends 450 m east and 50 m west of Fowle Lake	No	Elevated potential for heritage resources along the shore of Fowle Lake.
EPA 9	New River	Extends from Lake of the Hills Outlet to 100 m west of New River	No	Elevated potential for heritage resources between Lake of the Hills Outlet and New River.
EPA 10	Roan Lake Outlet	Extends from the eastern limit of Roan Lake Outlet to 100 m west of Roan Lake Outlet	No	Area is wet and poorly drained, low potential.
EPA 11	Rte. 785/Red Rock Mountain/Back Meadow Brook	Extends from 1500 m east of Rte. 785 to Meadow Brook	No	Meadow Brook has been greatly altered by beaver activity; low potential.
EPA 12	Magaguadavic River/Lee Settlement	Extends 100 m east of Narrow Road to 100 m west of Beney Road	Yes	Isolated find (one projectile point) collected on the west side of Magaguadavic River.
EPA 13	Bonny River	Extends from east side of Bonny River west for 1.8 km	No	Area is wet and poorly drained; low potential.
EPA 14	Clarence Stream	Extends 100 m east and 700 m west of Clarence Stream	No	East side has elevated potential for heritage resources, west side is wet and poorly drained; low potential.
EPA 15	Elmsville/ Digdeguash River	Extends from 100m east of Rte.760 to 100 m west of Rte.760	No	West bank has elevated potential for heritage resources, much of the area, away from the river on the west (Elmsville) side has been affected by a gravel quarry. The east side is poorly drained, and bordered by a steep bank; low potential.

TABLE 4-10
Summary of Fieldwork

EPA #	Name/Location	Extent of EPA as Identified in the Field	Resource Identified Within RoW	Comment
EPA 16	Elmsville/North Branch Campbell Brook	Extends from North Branch Campbell Brook east to Cathcart Road	No	Area is largely cut over; low potential.
EPA 17	Rte. 127/Waweig River Headwaters: Sawyer Brook, Tributary to Sawyer Brook, Meadow Brook	Extends from Rte. 127 to 70 m west of Tributary To Sawyer Brook	No	No outstanding environmental characteristics; low potential.
EPA 18	Berry Brook/Tributary to Berry Brook	Extends from Board Road west 1100 m	No	No outstanding environmental characteristics; low potential.
EPA 19	Rte. 755/McCarley Brook	Extends from McCarley Brook west for 600 m	No	No outstanding environmental characteristics; low potential.
EPA20	St. David Ridge	Extends from Trib. to Gallop Stream west to St. David Ridge Road	Yes	Recorded one concrete foundation, one stone sill, and linear and circular field clearing features.
EPA 21	Rte. 750/Dennis Stream/Allen Brook	Extends from Allen Brook west to train tracks	Yes	Recorded a pre-contact archaeological site on the west side of Dennis Stream, within the RoW.
EPA 22	Hwy. 3/Old Ridge	Extends from GPS point 17 to 150 m west of Hwy 3	Yes	Recorded a linear stone field clearing feature and an oval, rock-lined depression within the RoW on the east side of Hwy 3.
EPA 23	Rte. 740/Bush Brook	Extends from 40 m west of Rte. 740 east for approximately 900 m to Bush Brook.	Yes	Recorded a linear stone field-clearing feature 30 m west of Rte. 740 along the south edge of the RoW in the western end of the EPA. The eastern portion is low lying and poorly drained with low potential.
EPA 24	Mohannes Stream	Extends from 700 m east of stream to west side Mohannes Stream	No	East side has an elevated potential for heritage resources.
EPA 25	Rte. 725	Extends 900 m east of Rte. 725 to Tributary to Ash Brook	Yes	Recorded location of historic debris and linear stone field clearing feature on east side of Rte. 725.
EPA 26	St. Croix River	Extends from Ash Brook to the St. Croix River	No	Elevated potential for heritage resources associated with the St. Croix River.

The eight subsurface resource sites within the preliminary Preferred 50 m RoW will be monitored during clearing and construction activities under the supervision of a licensed archaeologist. In an event a resource is discovered, the Archaeological Protocol will be followed by the Environmental Inspector.

Stage II: Field Assessment

Fieldwork

The main goals of the fieldwork were to identify, collect, and evaluate all sites of archaeological, historical, and architectural significance within the preliminary Preferred 50 m RoW and to supply the information with sufficient detail for incorporation into the Provincial site inventories. To facilitate this task an Archaeological Survey Form was developed to ensure a consistent level of field data collection. Data collected for each EPA included, environmental and cultural descriptions, photographs, and mapping.

Analysis

All heritage resources were recorded during the fieldwork, however, the significance of these resources was determined following the analysis of the data collected in the field and the significance criteria outlined in Table 4-11. Archaeological Services Unit (ASU) provides these criteria for consistency in determining the significance of heritage resources and for developing mitigation measures (Source: Heritage Resource Impact Assessment in New Brunswick, A Guide for Consultants. Culture Division of Tourism, Recreation and Heritage. English Version. 1992).

Of the 6 heritage resource sites found within the preferred Preliminary 50 m RoW, 3 sites were determined not to be archaeologically significant (EPA 22, EPA 23 and EPA 25). These sites were not considered further. The Narrows site in EPA 12, the St. David Ridge site in EPA 20 and the Dennis Stream site in EPA 21 were determined significant. The significance criteria were applied in the assessment of the Narrows site and the Dennis Stream site. These sites were identified as being pre-contact native sites.

The significance criteria were applied as follows:

- a discussion took place with an archaeological team to review the information available on the Narrows and Dennis Stream sites. The information included existing knowledge of the site, evidence collected from the sites (*e.g.,* depth of deposit, extent and nature) and environmental and cultural setting.
- each significance criteria was discussed in relation to the specific site.
- a determination was made on the significance of the site based on four definitions developed on previous projects. These definitions are: Unique (a site unlike others known in the area), Rare (a site with similarities to known, but uncommon sites in the region), Common to Rare (a site which may be relatively common overall, but contains attributes that differ in relation to comparable sites in the area) and Common (a site which is based on current information is comparable to a large number of sites in the region).

Based on the assessment, both sites were categorized as “Common to Rare”.

TABLE 4-11
Significance Criteria (ASNB, 1992)

Archaeological Heritage Sites	Architectural Heritage Sites	Historic Places Heritage Sites.	Social, Public and Economic Value
Cultural Context: the nature of a site and its place in New Brunswick’s past	Architecture: style, construction, age, architect, design, interior	Persons significant to the history of the province	Social Significance: sites which have a traditional, ethnic or religious significance to a group or community today
Chronological Variability: a site’s chronology	History: person, event, context	Events significant to the history of the province	Public Significance: sites which have the potential to strengthen the public’s understanding of New Brunswick’s past
Industry and Trade: a site’s contribution to an understanding of past industry and trade	Environment: continuity, setting, landmark	Trends significant to the history of the province	Economic Significance: sites which may have an effect upon local economies if developed
Subsistence: a site’s contribution to an understanding of past subsistence strategies	Usability: compatibility, adaptability, public, services, cost	Economic Situations significant to the history of the province	
Research Constraints: the extent and form of effects to a site which may inhibit the kinds of knowledge which can be gathered	Integrity: site, alterations and conditions.	Social Situations significant to the history of the province	
Other: such as a site’s sensitivity or uniqueness.			

Following discussions with ASU, additional fieldwork was carried out on the Narrows site in EPA 12, the St. David Ridge site in EPA 20 and the Dennis Stream site in EPA 21. The Narrows and the Dennis Stream sites were tested to determine their boundaries and the St. David Ridge site was subjected to an additional archaeological survey. Also, the stone artifacts recovered from the Narrows and the Dennis Stream sites were analyzed by the University of New Brunswick. Based on the results of both the survey and analysis of the artifacts, it was determined that no further work was warranted at the Narrows and St. David Ridge sites. At the Dennis Stream site, specific mitigation was developed in consultation with ASU (refer to Section 6 of this Report).

4.7.4 Paleontological Resources

Paleontological resources are defined as *in situ* fossil specimens. Currently, paleontological resources are neither protected under provincial legislation, nor is there an identified regulatory

group. There is a national policy and legislation relating to the export of fossils. Paleontological research, and some construction site monitoring for paleontological resources, is undertaken by the New Brunswick Museum.

The 1 km wide Preferred Corridor is underlain by intensely deformed Ordovician, Silurian, and Lower Devonian sedimentary and volcanic rocks. These rocks have been intruded by granitoid rocks of Middle Devonian and early Carboniferous age making the bedrock geology in this region very complex (NBDNRE, 2000). Due to the highly deformed nature of these bedrock units, it is unlikely that any fossil resources occur. Also, due to the limited amount of excavation requirements, the proposed Project is unlikely to encounter fossil resources, therefore, a significant adverse effect on paleontological resources is unlikely (NBDNRE, 2000). Therefore, it is unlikely that any fossil resources occur.

No known paleontological resources have been identified within the 1 km wide Preferred Corridor.

4.8 Current Use of Lands and Resources for Traditional Purposes by Aboriginal Persons

No current use of lands and resources for traditional purposes by Aboriginal persons has been identified within the Study Area. Aboriginal Traditional Use Plants potentially occur along the preliminary Preferred 50 m RoW. Traditional medicinal plants are generally used for sacred ceremonies, the healing of illness, and every day wellness. These sacred medicines hold a particularly significant spiritual value to Aboriginal people. Other plants may occur which have non-medicinal traditional uses as well, such as black ash (used as building material).

A field program was conducted to identify any significant Aboriginal Traditional Use Plant populations along the preliminary Preferred 50 m RoW. A significant population was defined as:

- a plant population known to be traditionally used by Aboriginal peoples; or
- a population that is a relatively uncommon species, and is of a significant size to be harvested sustainably, and is of a significant quality for a specific Aboriginal Traditional Use.

Field surveys were conducted along the preliminary Preferred 50 m RoW, between July 5 and October 2, 2001. Plant populations that were of low quality (*i.e.*, not desirable for a specific Aboriginal Traditional Use), or low abundance (*i.e.*, not sustainable) were not identified as significant.

The field survey results indicate that although significant populations of Aboriginal Traditional Use Plants were identified along the preliminary Preferred 50 m RoW (*e.g.*, white and black ash (*Fraxinus sp*.), gold thread (*Coptis groenlandica*)), those populations were very common in the Study Area. No significant populations of sweet grass were identified within the preliminary Preferred 50 m RoW. During consultation with Aboriginal persons, a number of traditionally / historically used plants were mentioned (such as Ash trees) that may be considered a renewable resource. However, no specific areas where these plants are harvested were identified during Aboriginal consultation. The field survey attempted to identify significant populations of such plants within the preliminary Preferred 50 m RoW that may potentially be used in the future by Aboriginal persons, and to identify if any of these plant populations would be significantly reduced within the Study Area as a result of the proposed IPL. The results of the survey show that no significant impacts will occur on traditionally/historically used plant species which may potentially be used by Aboriginal persons in the future. Table 4-12 identifies plant species observed along the preliminary Preferred 50 m RoW that could potentially be used by Aboriginal persons for traditional purposes, however, none of these specific populations have been identified as being used either now or in the past.

TABLE 4-12
Plants Observed Along the preliminary Preferred 50 m RoW

Plants Observed in Bog Habitat, and Along Rivers and Streams
White Pine
Dogwood
Lambkill
Burdock
Cranberry species
White Ash
Cherry Species
High Bush Cranberry
Pitcher Plant
Boneset
Eastern Cedar
Alder
Labrador Tea
Pond Lily
Plants Observed in Forest Habitat and Rocky Habitat
Balsam Fir
Beech
Golden Thread
Yellow Birch
Bunch Berry
Blueberry
Raspberry
Black Spruce
Hemlock
Mountain Ash
Lady Slipper
Pin Cherry
Juniper
Poplar
Princess Pine
Pussy Willow

Contact with regulatory agencies (government departments), and First Nation Communities and organizations (UNBI, MAWIW Tribal Council, and the NBAPC) was made to identify current use of lands and resources for traditional purposes by Aboriginal persons within the Study Area. In addition, NB Power undertook an Aboriginal Consultation Program for the same purpose.

Although no specific resource location was identified during the Aboriginal consultation process, general information was provided by Aboriginal people on the current use of lands and resources within the Study Area. Detailed information on Aboriginal consultation is provided in Appendix B.

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5.0 VALUED ENVIRONMENTAL COMPONENTS (VECs)

Canadian environmental assessment practice focusses on directly relevant issues and concerns of potentially affected parties (the Agency, 1994). This section describes the issue scoping and pathway analysis process used to determine valued environmental components (VECs). VECs are components of the environment that are valued by society and will be the focus of the EA.

5.1 Issue Scoping

Issues scoping was the first step in identifying VECs from Environmental Components of Concern (ECCs). Because of the broad definition of "environmental effects" in CEAA, ECCs include both biophysical and socio-economic elements. ECCs were identified based on:

- concerns expressed by stakeholders and the public during Information Sessions (refer to Section 2.0), and by non-government organizations (NGOs), the scientific community, and government departments and agencies;
- review of applicable statutes and regulations;
- consideration of available literature and reference materials;
- review of the 1991 Study Report completed for NB Power for the proposed transmission line Project (WGA, 1991);
- previous assessment experience, including proposed developments in the Project Study Area (Figures 1-1 and 1-2); and
- perceived public concerns related to social, cultural, economic, or aesthetic values, as suggested by Beanlands and Duinker (1983).

Issues and concerns were also considered related to resources traditionally used by Aboriginal peoples identified for other relevant projects (*i.e.*, Maritimes & Northeast Pipeline projects) during the issues scoping phase.

The ECCs identified during the scoping exercise are summarized in Table 5-1.

TABLE 5-1
Issues Scoping/Pathway Analysis Summary Matrix - Valued Environmental Components of Concern (VECs): 345 kV IPL, From Point Lepreau to the NB/Maine Border

Environment/ Resources	Environmental Components of Concern (Biophysical and Socio-Economic) (ECCs)	ECC Avoided During Corridor Selection		Pathway of Concern		Possible Pathways	VEC		Rationale for Inclusion/Exclusion as Valued Environmental Component (VECs)
		Yes	No	Yes	No		Yes	No	
Biophysical/Ecosystem Setting:									
Atmospheric Environment	Air Quality		X	X		• Air emissions (*e.g.*, dust, exhaust fumes, leaks)	X		Included as a VEC - Protected by statute/regulation.
	Ozone Depleting Substance		X		X	• Air emissions		X	Excluded as a VEC - Pathway not a concern. Minor (if any) quantities of ozone depleting substances generated during Project activities.
Terrestrial Environment	Groundwater Quality and Quantity		X	X		1-4, 8	X		Included as a VEC – Protected by statute/regulation.
	• Wildlife (mammals, reptiles and amphibians herpetiles, birds, and invertebrates) • Plants		X X	X X		1-8		X X	Excluded as a VEC - Populations of these species are protected/included with other VECs (wetland habitat, designated areas and other critical habitat features, species at risk). The rationale for this is to protect habitat characteristics that occur along the 1 km wide Preferred Corridor deemed limiting to each population.
	Species at Risk (flora & fauna)		X	X			X		Included as a VEC – Protected by statute/regulation. If a species is endangered, effects on individuals may be considered significant.
	Migratory Birds		X	X			X		Included as a VEC – Protected by statute/regulation.
	Designated Areas and Other Critical Habitat Features (ESAs, DWAs, MCFH, PSPs, and Protected Areas)		X	X			X		Included as a VEC – Represents potentially limiting habitat to populations of wildlife.
	Soil Quality		X	X		1-4, 8		X	Excluded as a VEC - Soil quality is protected/included with other VECs (groundwater, fish habitat).
Aquatic Environment	Fish Species		X	X		3, 4, 8		X	Excluded as a VEC – Protected/included with other VECs (fisheries, species at risk, and fish habitat).
	Species at Risk		X	X		1-4, 8	X		Included as a VEC – Protected by statute/regulation. If a species is endangered, effects on individuals may be considered significant.
	Fisheries Resources (commercial, recreational)		X	X		1-4, 8	X		Included as a VEC – Protected by statute/regulation.
	Fish Habitat		X	X		1-4, 8	X		Included as a VEC – Protected by statute/regulation.
	Surface Water Quality and Quantity (protection areas)		X	X		1-4, 8		X	Excluded as a VEC – Protected/included with other VECs (fisheries, species at risk, fish habitat, and groundwater resources).
	Hydrology		X	X		1, 3		X	Excluded as a VEC – Protected/included with other VECs (fisheries, species at risk, fish habitat, and groundwater resources).
	Hydrogeology		X	X		1, 3		X	Excluded as a VEC – Protected/included with other VECs (fisheries, species at risk, fish habitat, and groundwater resources).
Wetland Environment	• Wildlife (mammals, herpetiles, birds, and invertebrates) • Plants		X X	X X		1-8		X X	Excluded as a VEC – Populations of these species are protected/included with other VECs (wetland habitat, species at risk, designated areas and other critical habitat features). The rationale for this is to protect habitat characteristics that occur along the 1 km wide Preferred Corridor.
	Species at Risk		X	X			X		Included as a VEC – Protected by statute/regulation. If a species is endangered, effects on individuals may be considered significant.

Key:
1. Clearing and Grubbing
2. Excavation
3. Blasting
4. Release of Hazardous Materials
5. Light
6. Noise
7. Air Emissions
8. Site Runoff

TABLE 5-1
Issues Scoping/Pathway Analysis Summary Matrix - Valued Environmental Components of Concern (VECs):
345 kV IPL, From Point Lepreau to the NB/Maine Border

Environment/ Resources	Environmental (Biophysical and Socio-Economic) Components of Concern (ECC)	ECC Avoided During Corridor Selection		Pathway of Concern		Possible Pathways	VEC		Rationale for Inclusion/Exclusion as Valued Environmental Component (VEC)
		Yes	No	Yes	No		Yes	No	
Wetland Environment (Cont'd)	Wetland Habitat Function		X	X		1-8	X		Included as a VEC – Protected by regulatory authorities (Federal no net loss in wetland function policy; NBDNRE; NBDELG); represents potentially limiting habitat to populations of wildlife.
	Ongoing Management Initiatives, including DU and EHJV Project Sites		X	X		1-8		X	Excluded as a VEC – Avoided during Corridor selection process and protected with other VECs (wetlands).
	Water Quality		X	X		1-4, 8		X	Excluded as a VEC – Protected /included with other VECs (wetland habitat, fish habitat, and groundwater resources).
	Hydrologic Regime		X	X		1-3		X	Excluded as a VEC – Protected /included with other VECs (wetland habitat, fish habitat, and groundwater resources).
Socio-Economic Setting:									
Economic	Local Economy (expenditures and employment)		X	X		• Construction/ Operations & Maintenance	X		Included as a VEC – Potential to increase beneficial effects of local construction, operational expenditures and employment.
Land Use	Industry/Commercial Local Business		X		X	• Construction/ Operations & Maintenance		X	Excluded as a VEC – No pathway of concern identified.
	Housing		X		X			X	Excluded as a VEC – No pathway of concern identified.
	Cultural/Institutional		X		X			X	Excluded as a VEC – No pathway of concern identified.
	Recreational		X	X			X		Included as a VEC – Pathway of concern identified.
	Agricultural		X	X			X		Included as a VEC – Pathway of concern identified.
	Forestry		X	X			X		Included as a VEC – Pathway of concern identified.
	Transportation Infrastructure		X	X			X		Included as a VEC – Pathway of concern identified.
	Other Infrastructure		X	X			X		Included as a VEC – Pathway of concern identified.
Community & Emergency Services	Emergency Services		X	X		• Construction/ Operations & Maintenance	X		Included as a VEC – Pathway of concern identified.
Mineral Aggregate Resources/Mining Areas	Mineral Claims/Aggregate Resources		X	X		• Presence of RoW; Blasting	X		Included as a VEC – Potential interaction with the Project identified.
Archaeological and Heritage Resources	Archaeological/Heritage Resources		X	X		1-3	X		Included as a VEC – Pathway of concern identified. Required by Regulatory Agency under provincial legislation.
Current Use of Lands and Resources for Traditional Purposes by Aboriginal Persons	Resources traditionally used by Aboriginal Peoples		X	X		1-4, 8	X		Included as a VEC – Pathway of concern identified. Required by Statute/Regulation.
Paleontological Resources	In-ground fossil resources				X	2, 3		X	Excluded as a VEC – No pathway of concern identified.

Key:
1. Clearing and Grubbing
2. Excavation
3. Blasting
4. Release of Hazardous Materials
5. Light
6. Noise
7. Air Emissions
8. Site Runoff

5.2 Pathway Analysis

In the second step for selection of VECs from ECCs, the concerns were examined during issue scoping in order to identify the pathways by which Project activities may affect each ECC. Pathways were looked at for construction, operation, decommissioning/abandonment activities, and potential accidental events, as well VECs identified during the 1991 transmission line study (WGA, 1991).

The possible pathways that link the proposed Project and the environment are summarized in Table 5-1.

There is no pathway of concern for a number of the ECCs, so these ECCs were dropped from the assessment (Section 6.0). The EA focusses on those VECs which may be affected as a result of the construction, operation, or decommissioning/abandonment of the proposed Project.

Table 5-1 summarizes the rationale for exclusion or inclusion of ECCs as VECs. Where pathways were found between ECCs and Project activities, and considered that potential effects may be a concern, the assessment focused on these components and they became the VECs on which the assessment is based.

5.3 Valued Environmental Components

The VECs identified by issue scoping and pathway analysis for which potential effects may be a concern are identified in Table 5-2. These VECs require further assessment to determine the significance of potential effects. The following sections provide a definition of a significant adverse effect for each of the VECs. Each definition was established in the context of a bounded area within which Project activities were measured. Two types of spatial boundaries are described, a point boundary and an area boundary. A point boundary was used to describe a VEC which is unique in each location (*i.e.*, archaeological resources, PSPs). An area boundary was used to describe a VEC which is present in several areas, and each area has the same general function (*i.e.*, DWAs, agriculture). Specific definitions of spatial boundaries are provided below for each VEC.

Temporal boundaries included the proposed construction, operation, and decommissioning schedules. Construction of the Project will occur over approximately a one-year period, while operation of the Project may last for more than one hundred years. NB Power will develop a specific decommissioning plan and schedule following the Project operational phase and prior to decommissioning and abandonment.

TABLE 5-2
Valued Environmental Components List

Valued Environmental and Socio-Economic Components

• Air Quality
• Groundwater Resources (quality and quantity)
• Species at Risk
• Environmentally Significant Areas (ESAs)
• Deer Wintering Areas (DWAs)
• Mature Coniferous Forest Habitat (MCFH)
• Permanent Sample Plots (PSPs)
• Protected Areas (Game Management Areas)
• Fish Habitat (including water quality and quantity) and Fishery Resources
• Migratory Birds
• Wetland Habitat (function)
• Economic (Local Economy)
• Land Use, including:
  • Agriculture
  • Forestry
  • Recreational
  • Transportation Infrastructure (Traffic Circulation)
  • Other Infrastructure
• Community & Emergency Services
• Mineral Aggregate Resources/Mining Areas
• Archaeological/Heritage Resources
• Current Use of Lands and Resources for Traditional Purposes by Aboriginal Persons

The definitions of "significant" were based on scientific determinations, social values, public concerns, and economic judgements. In assessing the significance of potential effects resulting from a proposed Project, the Canadian Environmental Assessment Agency (the Agency, 1994) recommends consideration of the following criteria:

- magnitude
- geographic extent
- duration and frequency
- reversibility
- ecological (and/or socio-economic) context

These criteria were used to establish a definition of a significant adverse effect for each VEC.

Air Quality

The bounded area within which proposed Project activities could potentially interact with air quality was considered to be the provincial and local airsheds. The local airshed is considered to be the area within the preliminary Preferred 50 m RoW, and potentially affected adjacent areas. A significant adverse effect on air quality is defined as an exceedance of provincial regulatory guidelines over a one-year period. The provincial regulations describe the permissible duration and magnitude of emissions. The significance of the effect on the VEC is assessed in Section 6.2.1.1 and summarized in Appendix G.

Groundwater Resources (Quality and Quantity)

The bounded area within which proposed Project activities could potentially interact with groundwater is generally considered to be the area of influence for well systems within and overlapping the preliminary Preferred 50 m RoW (*i.e.*, may encompass wells up to 200 m to 500 m from the centerline of the preliminary Preferred RoW in areas which require hoe rams or blasting). A significant adverse effect on groundwater is defined as an effect of such magnitude that results in a permanent non-compensable loss in quantity below current yield and/or reduction in quality below guideline(s).. The significance of the effect on the VEC is assessed in Section 6.2.1.2 and summarized in Appendix G.

Species at Risk

The bounded area within which proposed Project activities could potentially interact with species at risk is considered to be the Province of New Brunswick because this is used by the New Brunswick *Endangered Species Act*, and AC CDC. A significant adverse effect on species at risk is defined as any effect resulting in a disruption or loss of habitat such that it results in a suppression of fitness for a duration of greater than one lifecycle. For species designated as endangered (or significant for other reasons), the loss of these species at an individual level may be considered a significant adverse effect. The geographic extent of any adverse effects will include the regional population of most species, which would also be the provincial population in the case of extremely rare species. The significance of the effect on the VEC is assessed in Section 6.2.1.3 and summarized in Appendix G.

Environmentally Significant Areas (ESAs)

The bounded area within which proposed Project activities could potentially interact with ESAs was considered to be the ESAs within and overlapping the preliminary Preferred 50 m RoW. A significant adverse effect on ESAs is considered a removal of the entire population/feature for which the ESA was designated (*i.e.*, removal of rare species). The significance of the effect on the VEC is assessed in Section 6.2.1.4 and summarized in Appendix G.

Deer Wintering Area (DWAs)

The bounded area within which proposed Project activities could potentially interact with DWAs was considered to be the Study Area. A significant adverse effect on DWAs is defined as an effect resulting in a reduction of greater than the regulated value of 15% of available DWA habitat within one Crown License over a five-year planning horizon, or an effect which limits the utilization of the DWA for the deer populations during the sensitive yarding period. The significance of the effect on the VEC is assessed in Section 6.2.1.5 and summarized in Appendix G.

Mature Coniferous Forest Habitat (MCFH)

The bounded area within which proposed Project activities could potentially interact with MCFH was considered to be the Study Area. A significant adverse effect on MCFH is defined as an effect resulting in a reduction of the capacity for a Crown License to maintain the regulated value of 12% MCFH within the license land base over a five-year planning horizon. The significance of the effect on the VEC is assessed in Section 6.2.1.6 and summarized in Appendix G.

Permanent Sample Plots (PSPs)

The bounded area within which the proposed Project activities could potentially interact with PSPs was considered to be any PSP within and overlapping the preliminary Preferred 50 m RoW. A significant adverse effect on PSPs is defined as any loss of PSP area, including a 50 m buffer surrounding the PSP. The significance of the effect on the VEC is assessed in Section 6.2.1.7 and summarized in Appendix G..

Protected Areas (Game Management Area)

The bounded area within which proposed Project activities could potentially interact with protected areas was considered to be the entire designated area, which the preliminary Preferred 50 m RoW crosses and part thereof. A significant adverse effect is defined as a loss of critical wildlife habitat, which would prevent achievement of the goal of the Game Management Area. The significance of the effect on the VEC is assessed in Section 6.2.1.8 and summarized in Appendix G.

Fish Habitat and Fishery Resources

The bounded area within which proposed Project activities could potentially interact with fish habitat and fishery resources was considered to be restricted to the 49 watercourses and associated watersheds crossed by preliminary Preferred 50 m RoW. A significant adverse effect on fish habitat is defined as any effect resulting in a decrease in the capacity of the habitat to produce fish in the quantity that it did before construction, which in turn results in a decrease in density of the population below naturally occurring levels for a duration greater than one lifecycle. The significance of the effect on the VEC is assessed in Section 6.2.1.9 and summarized in Appendix G.

Migratory Birds

The bounded area within which proposed Project activities could potentially interact with migratory birds was considered to be the Study Area. An effect would typically be localized, affecting birds which nest or reside in or near the RoW, as well as birds that traverse the RoW during daily feeding and roosting migrations. A significant adverse effect on migratory birds is defined as any effect resulting in a permanent net loss of critical habitat, a decrease in density of the population below naturally occurring levels for a duration of greater than one lifecycle, or a contravention of the *Migratory Birds Convention Act*. The significance of the effect on the VEC is assessed in Section 6.2.1.10 and summarized in Appendix G.

Wetland Habitat (Function)

The bounded area within which proposed Project activities could potentially interact with wetland function (as defined in the Wetland Evaluation Guide (Bond *et al*., 1992)) was considered to be the wetlands within or overlapping the preliminary Preferred 50 m RoW, and wetland-dependent wildlife within the physiographic region. A significant adverse effect on wetland wildlife habitat/species is defined as any effect resulting in a permanent net loss of wetland function as effected by the following pathways:

- alteration/displacement of habitat;
- soil erosion;
- water quality effects;
- noise/physical disturbance of wildlife; and
- introduction of alien invasive plant species.

The significance of these effects on the VEC is assessed in Section 6.2.1.11 and summarized in Appendix G.

Local Economy

The bounded area within which proposed Project activities could potentially interact with the local economy was considered to be the Study Area, and surrounding communities (*i.e.,* Saint John, Fredericton). A significant effect on the local economy is defined as an effect resulting in any increase in economic benefits during construction and maintenance activities. The significance of the effect on the VEC is assessed in Section 6.2.1.12 and summarized in Appendix G.

Agriculture

The bounded area within which proposed Project activities could potentially interact with agricultural resources was considered to be areas located within or overlapping the preliminary Preferred 50 m RoW. A significant adverse effect on agriculture is defined as an uncompensated net loss of area currently under agricultural crop production. The significance of the effect on the VEC is assessed in Section 6.2.1.13 and summarized in Appendix G.

Forestry

The bounded area within which proposed Project activities could potentially interact with forestry resources was considered to be the preliminary Preferred RoW. A significant adverse effect on forest resources is defined as an effect resulting in an uncompensated loss of merchantable timber. The significance of the effect on the VEC is assessed in Section 6.2.1.14 and summarized in Appendix G.

Recreation

The bounded area within which proposed Project activities could potentially interact with recreation (*i.e.,* recreation trails) was considered to be trails overlapping the preliminary Preferred 50 m RoW. A significant adverse effect on recreation trails is defined as any interruption of recreational trail access (*i.e.*, hiking trails, NB Trail, etc.) for greater than one week during peak usage times (seasonally dependant, i.e., snowmobile trails in the winter, ATV and hiking trails during the summer). The significance of the effect on the VEC is assessed in Section 6.2.1.15 and summarized in Appendix G.

Transportation Infrastructure (Traffic Circulation)

The bounded area within which proposed Project activities could potentially interact with traffic circulation was considered to be areas immediately adjacent to the preliminary Preferred 50 m RoW. A significant adverse effect on traffic circulation is defined as an increase in peak traffic volumes over and above the designed level of service as defined in “Geometric Design Guide for Canadian Roads” (TAC, 1999). The significance of the effect on the VEC is assessed in Section 6.2.1.16 and summarized in Appendix G.

Other Infrastructure

The bounded area within which proposed Project activities could potentially interact with infrastructure (including municipal water and sewer mains and service lines, conduits carrying electrical, telephone, fibre optics and cable services and natural gas lines), was considered to be those areas overlapping the preliminary Preferred 50 m RoW. A significant adverse effect on infrastructure is defined as an effect of such magnitude that results in reduction of infrastructure function, or an increased difficulty in accessing/repairing infrastructure. The significance of the effect on the VEC is assessed in Section 6.2.1.17 and summarized in Appendix G.

Community and Emergency Services

The bounded area within which proposed Project activities could potentially interact with emergency services was considered to be the Study Area and surrounding communities. A significant adverse effect on emergency services is defined as an effect of such magnitude that results in an increased demand for emergency services within the Study Area, and surrounding communities due to construction accidents or third-party damages on a daily basis. The significance of the effect on the VEC is assessed in Section 6.2.1.18 and summarized in Appendix G.

Mineral Aggregate Resources/Mining Areas

The bounded area within which proposed Project activities could potentially interact with mineral aggregate resources/mining areas was considered to be the entire resource/mining (claim) area located within the preliminary Preferred 50 m RoW. These represent areas of potential mineral development (*i.e.*, are currently being explored for mineral development or mined). A significant adverse effect on mineral aggregate resources/mining areas is defined as an effect of such magnitude that results in additional restrictions to future development potential. The significance of the effect on the VEC is assessed in Section 6.2.1.19 and summarized in Appendix G.

Archaeological/Heritage Resources

The bounded area within which proposed Project activities could potentially interact with archaeological/heritage resources was considered to be the entire resource and adjacent areas associated with heritage resources that occur within the preliminary Preferred 50 m RoW. A significant adverse effect on archaeological/heritage resources is defined as any effect that results in the disturbance of a heritage resource that compromises the integrity of that resource and/or the loss of knowledge. Any effect would be immediate and irreversible. The significance of the effect on the VEC is assessed in Section 6.2.1.20 and summarized in Appendix G.

Current Use of Lands and Resources for Traditional Purposes by Aboriginal Persons

The bounded area within which proposed Project activities could potentially interact with Aboriginal resources was considered to be the entire traditional use area or plant population within or overlapping the preliminary Preferred 50 m RoW. In this context, a significant adverse effect on Aboriginal resources is defined as an effect of such magnitude that results in the long-term loss of use/access to identified resources. Such an effect would be reversible. The significance of the effect on the VEC is assessed in Section 6.2.1.21 and summarized in Appendix G.

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6.0 ENVIRONMENTAL EFFECTS ASSESSMENT MITIGATIVE MEASURES, AND RESIDUAL EFFECTS

This section presents the analysis of environmental effects and will focus on the VECs identified in Table 5-2. The analysis considers all phases of the Project including construction, operation and abandonment associated with both normal and accidental events. We also describe cumulative effects, which may result from Project related effects acting together with effects from activities of other projects in the area. In addition, we consider effects of the environment on the Project.

The approach to the analysis considers whether or not an effect is adverse, is significant, and whether the identified significant adverse effect is likely to occur if appropriate mitigative measures are used. The significance of an effect is determined by its magnitude, geographic extent, duration and reversibility. The geographic extent of the effect is assessed by considering over what portion of the bounded area (identified for each VEC), the effect is likely to occur. The magnitude of the effect is evaluated by comparing it to existing standards or information that describes effect-levels from activities as well as consideration of how much of the VEC or function of the VEC is removed by the effect. The duration considers the length of time that the VEC may be exposed to the effect. Reversibility relates to the permanence of the effect (*i.e.*, can the effect be reversed).

6.1 Malfunctions and Accidental Events

During all phases of the Project there is potential for accidents to occur. Some accidents may have significant consequences. Such events may include fires and uncontrolled releases of materials such as petroleum, oils, lubricants, solvents and epoxy resins. Uncontrolled release of such materials may affect the health and safety of individuals, air quality, water quality, including surface or ground water and terrestrial or aquatic habitat.

As with any woods operation, there is a possibility of fires starting during clearing and construction. These events could lead to the loss of forest products, poor air quality and loss of wildlife habitat. A Forest Work Permit must be obtained from NBDNRE for the construction and maintenance of transmission lines. This permit specifies the work locations, the equipment to be used and the fire-fighting equipment required for all crews. In addition, an early fire detection program, managed by NBDNRE includes air and ground patrols during the fire season.

Petroleum product spills can also occur during clearing and construction due to equipment malfunctions and refuelling activities. NB Power has an established spill management procedure (refer to Section 3.11.11) that is followed when a spill occurs. Spill kits are mandatory on equipment. Any discharge will be cleaned immediately and authorities notified (*e.g.*, NBDELG, DFO).

NB Power also designs transmission lines to current standards and to meet expected conditions in order to prevent failure and subsequent repair of hardware. Structures, insulators and line hardware are selected to minimize the risk of failure. In addition, lines are patrolled on a regular basis to ensure that potential failures are identified in advance of actual failure in order to allow for proper outage period and environmental mitigation planning. To minimize effects of repair activities, NB Power plans repairs to reduce the number of trips and/or travel to the associated area. In addition, appropriate protection measures such as bridging is used for stream crossing. The use of a helicopter is also an option available in difficult areas.

With respect to emergency repairs, section 7.1 (c) of CEAA states that: “Notwithstanding section 5, an environmental assessment of a project is not required where, the project is to be carried out in response to an emergency and carrying out the project forthwith is in the interest of preventing damage to property or the environment or is in the interest of public health or safety.”

Mitigation

The fundamental approach to accidents is one of prevention through training and being prepared to respond to any emergency. The preventative measures and contingency planning identified below will be developed with reference to the CSA publication, Emergency Planning for Industry (CAN/CSA – Z731-99).

The recommended mitigation measures include:

- Reducing the need for hazardous substances by substituting for less harmful ones.
- Incorporating appropriate preventative and response measures and construction practices.
- Providing environmental awareness training to contractors and workers involved in the Project. Training will include the handling, clean-up, reporting and disposal of contaminated material.
- Maintaining appropriate spill response equipment *(i.e.,* boom, absorbent pads, barrels) in a readily accessible location.
- Reporting all spills to applicable authorities (*e.g.*, 24-hour emergency reporting system 1-800-565-1633).
- The inspection of equipment (*e.g.*, construction vehicles, exhaust systems, fire-fighting equipment) by the Environmental Inspector to ensure that crews are compliant with the conditions outlined in the forest work permit.
- With the implementation of mitigation measures, significant adverse residual effects due to accidents are unlikely to occur (refer to Appendix G for a Summary of Residual Effects Assessment).

6.2 Normal Activities

The following sections describe effects associated with normal activities during the construction and operational phases of the Project. Potential accidental events, discussed in Section 6.1 primarily involve preparation (training) and preparedness (contingency planning), and will not be discussed further in this section.

6.2.1 Construction and Operation Phases

The construction phase of the Project includes the following activities: clearing, erection of structures, stringing conductors, clean-up and revegetation.

As a linear Project, the duration of construction related effects in any area is short (a matter of days). Similarly, the physical space required for the Project (50 m RoW) is small. Finally, the nature of the Project (*i.e.*, several wires suspended above ground and linked by a series of structures), limits the actual long-term footprint to the structures and the access required for maintenance of the line. There are however aspects of construction and operation activities that may pose risks to sensitive environmental features, for both the short- and long-term, along the preliminary Preferred 50 m RoW. These risks and proposed mitigation to limit these risks are described below.

Linear corridor construction activities can directly or indirectly affect plant and wildlife habitat in a number of ways, including landscape fragmentation and ecosystem disruption. Clearing, grading or resurfacing of land that previously supported forests and other wildlife habitat will result in habitat loss and a potential reduction in the overall carrying capacity for some species. Carrying capacity has been defined as the maximum number of individuals the environment, or a defined area of habitat, can indefinitely sustain (Robinson and Bolen, 1989). The carrying capacity will change over time with fluctuations in water availability, food production, cover availability, and other environmental factors (*e.g.*, weather, disease). Reductions in the carrying capacity of an area resulting from Project activities can lead to displacement of wildlife to other areas and/or mortality if additional similar habitat is not available.

Increasing the concentration of wildlife in an area may result in a number of negative effects including: potential mortality resulting from depletion of food sources (Doman and Rasmusen, 1944; Carhart, 1945; Erickson, *et al*., 1961); an increase in vulnerability to predators such as coyotes, dogs, and black bears (Coté and Laliberté, 1989, BCME, 1991); an increase in the potential for propagation of diseases and parasites (Ellingwood and Caturano, 1988; Voigt, *et al*., 1989; OMNR, 1990; BCME, 1991); an increase in intra- and inter-species competition (*e.g.*, Hesselton, 1964); and an increase in the potential for poaching (Morasse and Beauchemin, 1976; Coté and Laliberté, 1989).

Increased edge creation is a key factor in the overall effect of linear corridors on wildlife. Edge habitat or "edges" occur where two habitat types meet (*e.g.*, forest and field). Edge effects are the result of the interaction between two adjacent ecosystems, when the two are separated by an abrupt transition (Murcia, 1995). In forested areas, RoW clearing will essentially produce two new edge habitats on either side of the preliminary Preferred 50 m RoW. The effects of edge creation in forested areas are typically restricted to a distance into the forested stand equal to half the height of the trees in the stand (*i.e*., if the trees are 20 m high on average, the effect of edge creation will be limited to 10 m into the stand on either edge (I. Miller, pers. comm., 1997). Edge effects can be both positive and negative for area wildlife and habitat.

Potential positive factors may result due to increased edge creation resulting from the proposed Project. The edge area typically provides more resources per unit areas, including food types and cover habitat, than do individual adjacent habitats (Robinson and Bolen, 1989). Increased edge creation is a key factor in the overall effect of linear corridors on wildlife, including birds. Such corridors provide wildlife with simultaneous access to resources including food and shelter and contain a greater variety of vegetation, providing a more diversified habitat. This edge habitat is particularly valuable for some species and may provide improved hunting success for some raptors (Leedy, 1975) and increased browse for wildlife including deer. Potential negative effects resulting from edge creation are most significant in relatively small, isolated, and/or fragmented ecosystems.

Negative effects of edge area can include the opportunity for spread of invasive plant species, increased pressure on bird nests by species such as brown headed cowbird or skunks, increased noise levels, and increased poaching (access).

Since the preliminary Preferred 50 m RoW will be allowed to contain vegetation up to 12 feet in height, it is not anticipated that significant reductions in the carrying capacity of wildlife habitat crossed by the RoW will result from Project activities. Also, because the Study Area is largely forested, creation of edge habitat is not expected to result in an overall negative effect on wildlife habitat in the Study Area. Potential critical habitat loss related to specific VECs is discussed in the following sections.

6.2.1.1 Atmospheric Environment

The sources of effect include overburden disturbance and equipment operation. The potential effect involves reduction of local air quality to unacceptable levels. The bounded area for air quality is the provincial and local airsheds (local being defined as the preliminary Preferred 50 m RoW). The consideration of significance then focused on intensity (*i.e.*, the potential to exceed provincial guidelines). Overburden disturbance has the potential to result in local levels of dust that may exceed provincial guidelines of 70 micrograms per cubic metre over a one-year period. Clearing is now scheduled for late summer through fall and winter, so the likelihood of dust generation is reduced as these periods are generally wetter then mid-summer. NB Power is committed to using water as a dust suppressant, when warranted, at the discretion of the Environmental Inspector or when concerns are received from local residents.

Mitigation

The recommended mitigation measures include:

- Controlling dust with the use of water.
- Keeping construction equipment in good working order to limit atmospheric releases.
- Controlling blasting activities to minimize atmospheric releases.
- With the implementation of mitigation measures, significant adverse residual effects on the atmospheric environment are unlikely to occur (refer to Appendix G for a Summary of Residual Effects Assessment).

6.2.1.2 Groundwater Resources (Quantity and Quality)

The Project has the potential to interfere with groundwater supplies through disturbance of water quality or quantity from excavation or blasting.

There are no groundwater protection areas for municipal water supplies located within the Preferred Corridor. However, there are 7 private wells within 200 m of the centerline of the preliminary Preferred 50 m RoW. During construction, only minor excavation will be required for placement of structures (to a depth of 4-6 m). The groundwater table may be encountered within this depth. Dewatering may be necessary in these areas to facilitate construction and/or may be a result of construction activities. If dewatering occurs, the groundwater table in shallow aquifers will be depressed and the yield for shallow wells in the vicinity could potentially be reduced. Effects on these wells will depend on the proximity of the wells to the preliminary Preferred 50 m RoW (once selected), their depth, hydraulic characteristics of the aquifer material, and extent of dewatering. Where dewatering takes place, it is expected that these effects will be temporary (reversible) and limited to shallow wells (if present) in the vicinity of the tower locations. If the effects are not reversible (i.e., well yields may not recover), compensation may be required (see Mitigation section below).

To prevent corrosion of tubular steel poles, a portion of the embedded section of each steel pole will be coated with Corrocote II Classic, a polyurethane product manufactured by Madison Chemical Industries Inc. (MCII) of Milton, Ontario, Canada. The product will be applied to the structure during the steel pole manufacturing process. The coating contains no VOCs, and will not have any environmental effects.

If acid producing geologic formations are encountered during construction, the water quality of nearby, down gradient wells may be affected through the generation and migration of acid rock drainage (ARD). If blasting is required, the rock mass in the immediate vicinity may be disturbed and new fractures created. Groundwater flowing through these fractures may have elevated concentrations of metals and low pH values. The potential effect of ARD on groundwater resources will depend on the acid-producing potential of the bedrock, extent of disturbance to the bedrock during construction, local hydrogeologic characteristics, and groundwater use of the area. In extreme cases, ARD may cause some parameters of the affected groundwater to exceed the Canadian Environmental Guideline (CCME, 1999).

Problems related to sulfide bearing rock (*i.e.*, acid generating) are not anticipated. The Project will involve the placement of approximately 300 tower sites. The amount of excavated material is expected to be in the order of 5,000 to 15,000 m^3. The total excavation quantity for the preliminary Preferred 50 m RoW will be in the order of 150 m^3 per kilometre (maximum). Of this, a very small portion may be sulfide bearing rock. In previous linear corridor projects it has been deemed acceptable to leave exposed a maximum amount of 50 m^3 of sulfide bearing rock per kilometre of RoW (R. McAffee, pers. comm., 2001). This is not considered to represent a significant source of acid rock drainage with respect to the typical acid producing ability of bedrock and buffering capacity of the receiving watersheds in this part of New Brunswick. Where lime is applied to neutralize acid producing rock, it has been deemed acceptable to leave up to 300 m^3 of exposed sulfide bearing rock per kilometre of RoW (R. McAffee, pers. comm., 2001). Therefore, where excavated bedrock volumes are less than 50 m^3 per kilometre, no mitigation is required. Excavated bedrock volumes will not exceed 300 m^3 per kilometre, therefore, any excavated sulfide bearing rock volumes greater than 50 m^3 may be treated with limestone..

Potential environmental effects of blasting agents, such as ANFO, (ammonium nitrate and fuel oil) include hydrocarbon contamination.

The geographical extent of Project related effects on groundwater resources is localized, including areas up to 200 m from the centerline of the preliminary Preferred 50 m RoW (*i.e.,* the area of influence for well systems within and overlapping the 50 m RoW (WGA, 1996)), except for blasting, where effects may extend up to 500 m from the blast site.

Even though excavation and blasting are minor activities, these activities could have an effect on shallow well yields. During operation, no ground disturbing activities are required, and therefore will not affect groundwater resources.

Mitigation

Project related effects will occur over the short-term, and are expected to be reversible, however, quantity effects may not be reversible if a shallow well is encountered.

The recommended mitigation measures include:

- The development and implementation of a blasting plan that will include a procedure (*e.g.*, containment and storage of explosives, recovery of undetonated blasting agents, and treatment of contaminated drainage, if necessary), protection measures, drainage control and monitoring.

- Conducting a pre-blasting survey once structure locations have been finalized to identify wells or springs located within a 200 m radius of structure locations.
- Using a hoe ram to break up the bedrock in an area where a well has been identified within a 200 m radius of structure locations.
- Seismic monitoring of wells located between 200 m and 500 m of the blast area.
- The Environmental Inspector ensuring that where greater than 50 m^3 per kilometre of bedrock is excavated, the acid producing potential be determined and if the rock is identified as acid generating (i.e. if the sulphide sulphur content is equal to or greater than 0.4% (12.51 kg H_2SO_4/tonne), then limestone mixed with exposed sulfide bearing rocks to counteract the effects of acid drainage.
- Controlling dust with the use of water.
- Conducting pre and post-construction water quality and quantity tests on wells identified within 200 m of the centerline of the preliminary Preferred 50 m RoW, with the New Brunswick Department of Health and Wellness.
- Compensating landowners for loss of a spring or well (*e.g.*, providing a new supply of water by drilling a new well). Loss of a spring or well means that the quantity or quality of water has changed from the pre-construction baseline to the extent that the well or spring is no longer usable (e.g. no longer meets water quality guidelines (CCME, 1995) and significant changes in yield from baseline monitoring that would impede the intended use of the well as a result of the Project). It will be deemed not possible to restore a well (or spring) to is pre-construction state if, within 3 months of the completion of construction activities in the vicinity, the water quantity and quality cannot be restored to acceptable levels. Should such an event occur, NB Power will make arrangements to have a new water supply provided.

With the implementation of mitigation measures, significant adverse residual effects on groundwater resources are unlikely to occur (refer to Appendix G for a Summary of Residual Effects Assessment).

6.2.1.3 Species at Risk

The Government of New Brunswick provides species protection through its *Endangered Species Act*. Under this Act, an endangered species (or sub-species) is defined as "…any indigenous species of fauna or flora threatened with imminent extinction or imminent extirpation throughout all or a significant portion of its range and designated by regulation as endangered." The Act includes species designated by COSEWIC, and species not designated by COSEWIC. This Act prohibits the destruction or interference with, and the attempt to destroy or interfere with, any member of an endangered species or the habitat of an endangered or regionally endangered species. Species designated as rare by species experts (*e.g.,* Hinds, 2000; Clayden, *et al.,* 1984) and the AC CDC have been included to provide a more regional context for the assessment. In some cases, species may be common to more than one list.

The focus of the species at risk assessment for this Project has been those species that may suffer significant adverse effects due to Project activities (including cumulative effects). This includes those species of which a significant number of individuals may be directly harmed (this may be a single individual for some species) and/or those species for which critical or limiting habitat occurs within the Study Area. The bounded area for potential effect on species at risk is the entire Province of New Brunswick. Species at risk considered for the Project included plants, mammals, birds, herpetiles, and invertebrates. The first step in prevention of effects to species at risk was to determine their presence in the potentially affected areas. We discussed species at risk with local resource managers and researchers and undertook field investigations for plant species at risk and raptors.

Noise and physical disturbance may result in the displacement of wildlife and avian species. Such displacement will be localized and of short duration during the construction period. Clearing activities are currently planned to take place during late summer through winter months, which would avoid interaction with migratory birds during the normal nesting period.

Plants

Several rare plant species known to occur in one area within the Preferred Corridor (*i.e.,* Spragues Falls, ESA # 823) were avoided during selection of the preliminary Preferred 50 m RoW.

Field surveys identified 15 locations within the preliminary Preferred RoW, which contain plant species at risk. All of the species identified occurred both within and outside of the RoW and were not restricted in habitat. At 14 of these sites all rare plant species (including *Eleocharis olivacea*) are aquatic or emergent (*i.e*., they occur in the permanently wet portion of a stream or wetland) and will therefore be protected from significant disturbance by Project activities and recreational ATV traffic (see Section 6.5 Cumulative Effects) within the 30 m buffer zones. One rare plant species, Toothed arrow-wood (*Viburnum dentatum var. recognitum*), occurs in the broad flood plain of Mohannes Stream and will likely be effected by construction of the Project.

At least 30 Toothed arrow-wood plants occur within the preliminary Preferred 50 m RoW. Many times this number occur outside the RoW as the flood plain wetland in which they occur is quite large. The Toothed arrow-wood grows as a tall shrub much resembling the alder and willow species, which dominate the flood plain. The flood plain is a shrub swamp wetland, therefore, standard NB Power practice will be to cut by hand only those trees or shrubs greater than 12 feet in height. This should not have a significant effect on the Toothed arrow-wood as they rarely achieve such heights and are known to be hardy and adaptable to a wide variety of soil and moisture conditions as well as shade or full exposure to sunlight (Uconnecticut, 2002, Uohio, 2002, Uarkansas, 2002) This vegetation control practice will not significantly change the dense shrubby habitat within the preliminary Preferred 50 m RoW as trees or shrubs greater than 12 feet in height are quite scarce.

The power line structures will be located outside the Mohannes Stream wetland, however, during construction a 3 to 5 m trail will be hand cut along the centerline for stringing the conductor. It is likely that some Toothed arrow-wood will be cut to the ground but no grubbing or significant root damage is anticipated. Therefore, it is likely that the plants will regenerate from the remaining roots as this plant is known to sucker profusely from the base where basal shoots have a rapid growth rate. If this does not happen, it is likely that plants from outside this narrow corridor will recolonize the trail. Operational activities within the wetland will only include periodic vegetation control as described above. As during construction, such activities will not effect many Toothed arrow-wood plants or the other tall shrubs that dominate the flood plain. The preliminary Preferred 50 m RoW will be allowed to regenerate up to a height of 12 feet following construction. It is very likely that the tall shrub species that dominate the flood plain will regenerate within the narrow construction trail and that the area will be uninviting to recreational traffic (ATVs in particular).

During botanical field surveys, several rare plants were found to occur at Fowle Lake, including, as mentioned above the first known occurrence (in New Brunswick) of Comb Leaved Mermaid Weed (*Proserpinaca pectinata*). Since we considered it possible (although not likely) that recreational ATV traffic in the cleared preliminary Preferred 50 m RoW could severely affect this rare plant population in the muddy margin of the lake, NB Power moved the preliminary Preferred 50 m RoW south to avoid this location. *Eleocharis olivacea* is also very rare (only one other known location in NB), however, it was observed within and outside the preliminary Preferred 50 m RoW, in open muddy spots along the waters edge. The location of the plant directly adjacent to deep open water is likely to protect it from direct disturbance by ATV traffic. The shrubby bog habitat will be protected within the 30 m buffer zone and IPL construction will not alter the habitat significantly since there is very little vegetation over 12 feet in height, therefore, it was not considered necessary to move the alignment at this location.

The magnitude of adverse effects on plant species at risk will not represent population level effects. The severity of effects are considered low because, although some rare plant species may be temporarily disturbed, a healthy population will remain, which is expected to recolonize habitat within the preliminary Preferred 50 m RoW. In this context, the potential effects from construction and operation are considered reversible.

Mammals

Mammal species at risk identified as potentially occurring within the preliminary Preferred 50 m RoW include:

- Eastern cougar (*Felis concolor couguar*)
- Lynx (*Lynx canadensis*)

- Water shrew (*Sorex palustris*)
- Smokey shrew (*Sorex fumeus*)
- Big brown bat (*Eptesics fuscus*)
- Little brown bat (*Myotis lucifugus (LeConte*)
- Eastern long-eared bat (*Myotis septentrionalis (Merriam*))
- Eastern pipistrelle (*Pipistrellus subflavus*)
- Rock vole (*Microtus chrotorrhinus*)
- Arctic shrew (*Sorex articus*)
- Southern bog lemming (*Synaptomys cooperi*)
- Northern bog lemming (*Synaptomys borealis*)
- Silver haired bat (*Lasionycteris noctivagans*)
- Red bat (*Lasiurus borealis*)
- Hoary bat (*Lasiurus cinerea)*

Eastern cougar and lynx are both wide-ranging and may occupy habitat within the preliminary Preferred 50 m RoW, however, there is no critical or limiting habitat for these species within the RoW. Therefore, no significant adverse effects on eastern cougar or lynx resulting from Project activities are likely.

Water shrew inhabit underground burrows adjacent to small cool streams with thick overhanging vegetation. They may also occur around lakes, ponds, marshes, and bogs. This species may occur within the preliminary Preferred 50 m RoW, however, critical wetland/riparian habitat will be protected within the buffer zones prescribed by the *Watercourse Alteration Regulation*, therefore, no significant adverse effects resulting from Project activities are likely.

Big brown bat has only been observed to over-winter in New Brunswick in urban settings, where they use buildings as hibernacula. Echolocation data suggest that the big brown bat "remains, at best, an insignificant component of forest ecosystems in southern New Brunswick" (McAlpine *et al.*, unpublished), therefore, no significant adverse effects resulting from Project activities are likely.

Little brown bat and eastern long-eared bat hibernates in caves or abandoned mines. Habitat where they may roost or forage include open to heavy forest, usually near water. Such habitat occurs within the preliminary Preferred 50 m RoW, however, this does not represent critical or limiting habitat, therefore, no significant adverse effects resulting from Project activities are likely.

Eastern pipistrelle have only been observed in New Brunswick within or very near their hibernacula (Broders *et al.*, 2001). They prefer solution caves (*i.e.*, limestone or gypsum) or mines. No such habitat occurs within the preliminary Preferred 50 m RoW and no critical or limiting habitat is known to occur within the RoW, therefore, no significant adverse effects resulting from Project activities are likely.

Rock vole, arctic shrew, smokey shrew, and Northern and Southern bog lemmings all inhabit underground tunnel networks in moist boreal forests. They may potentially occur in the Study Area, however, no critical/limiting habitat for these species is known to occur within the preliminary Preferred 50 m RoW, therefore, no significant adverse effects resulting from Project activities are likely.

Silver-haired (*Lasionycteris noctivagans*) bat prefers tree cavities in coniferous forest near water while the red (*Lasiurus borealis*) and hoary (*Lasiurus cinerea*) bats nest in deciduous trees or in ground leaves. These three bat species winter in the southern US and Central or South America, therefore, given the late summer through winter clearing schedule, no significant adverse effects resulting from Project activities are likely.

Birds

The potential effects on bird species at risk that are both migratory and non-migratory are included in the assessment of effects on migratory birds in general. After reviewing the source material, it was found that of the species that had the potential to inhabit this area, 24 species were ranked S1, S2 or S3 by the AC CDC. Further, seven of the 24 species were found to be edge dwellers and had the potential to have increased habitat availability as a result of clearing activities associated with the construction of the proposed Project. Of the remaining 17 species, nine were classified as marsh or wetland species. There will be no net loss of wetland habitat in conformance with the *Clean Water Act.* The eight remaining species are made up of five species that prefer old softwood or softwood habitat of any age. One of the three remaining species relies on old forest regardless of cover type. The two remaining species are found to prefer Old Hardwood habitat. There is ample available habitat of all types found outside the preliminary Preferred 50 m RoW therefore, it is expected that no significant adverse effects from Project activities are likely.

Herpetiles

The four-toed salamander (*Hemidactylium scutatum*), grey treefrog (*Hyla versicolor*), and dusky salamander (*Desmognathus fuscus*) live and breed in wetlands, watercourses or riparian zones. Therefore, their critical/limiting habitat will be protected within the 30 m buffer zone prescribed by the watercourse alteration regulations. Only the grey treefrog may occupy treed areas at some distance from wetlands and watercourses, but these areas do not represent limiting habitat. The four-toed salamander has the least known occurrences in New Brunswick (S1) but it is thought to be more widely distributed in New Brunswick than originally estimated (D. McAlpine, pers. comm., 2001). To date, the four-toed salamander has only been documented at one location in New Brunswick at Marven Lake in Fundy National Park. It is possible that some of these herpetiles occur in wetland and riparian habitat within the preliminary Preferred 50 m RoW. Project activities within wetlands and riparian zones will be limited to hand cutting of trees and tall shrubs over 12 feet in height, except for a narrow (3-5 m) corridor that must be cleared for conductor stringing. Such activities are not expected to significantly disturb herpetile populations, therefore, no significant adverse effects resulting from Project activities are likely.

Wood turtles were observed at Dennis Stream and Black Brook. The Wood turtle is designated as a species of special concern by COSEWIC. If wood turtles are encountered during clearing or construction, they will be safely removed from the work area and placed in a location within the forest, adjacent to the watercourse up or down stream. Wood turtles are known to have excellent homing skills. Wood turtles are fairly tolerant of moderate habitat alterations, utilizing a wide variety of habitats. They prefer wood margins or openings (occasionally agricultural fields) where berries grow, therefore, the presence of a cleared power line corridor in their home range will not displace critical habitat. The main threat to wood turtles is from illegal collection for sale as pets. Because they are colonial during breeding, it is easy to collect many individuals in one area. The location of the breeding areas for the wood turtles observed in the preliminary Preferred 50 m RoW is not known. Access to the Black Brook site will not be significantly increased as the area already has a network of old logging roads within and outside of the preliminary Preferred 50 m RoW. Access at the Dennis Stream site will be carefully controlled through vegetation management due to the protected watershed status. Therefore, it is expected that no significant adverse effects resulting from Project activities are likely to occur.

Invertebrates

It is possible that some butterfly species identified by the AC CDC may occur within the preliminary Preferred 50 m RoW, however, wetland habitat will be protected as per the watercourse alteration regulations and no other critical/limiting habitat for these species is known to occur within the RoW. Therefore, it is expected that no significant adverse effects on butterflies resulting from Project activities are likely to occur.

Mitigation

The recommended mitigation measures include:

- Developing a site-specific environmental protection plan (SSEPP) for each site where species at risk were identified (showing the distribution within the preliminary Preferred 50 m RoW if applicable), in order to ensure that Project personnel are aware of the special concern. The SSEPP will provide instruction on habitat protection measures such as temporary flagging to mark the buffer zones, and erosion/sedimentation control. In addition, the Environmental Inspector will be trained in the identification of these species and relevant construction personnel made aware of the sensitivity of species at risk.
- Submitting SSEPPs to NBDELG NBDNRE , NEB and Environment Canada prior to construction for review.

- Preventing the introduction of invasive plants by implementing the following measures:
    - Prior to entering the preliminary Preferred 50 m RoW, equipment will be inspected for any vegetation and debris that may be lodged in tracks or undercarriage.
    - If any vegetation or debris is found on the equipment, it will be pressure washed using portable or mobile pressure washers.
    - The Environmental Inspector or his/her delegate will inspect the vehicles for cleanliness and record location, time, date and equipment that was cleaned.
- Avoiding construction activities within the riparian zone of the St Croix River from May 15 to June 15.
- Removing any wood turtles identified within the preliminary Preferred 50 m RoW from the construction area, placing them adjacent to the nearest watercourse, photographing and reporting the presence of the wood turtle to the curator of the New Brunswick Museum.
- Obtaining a WAP for all construction activities within 30 m of a watercourse.
- Conducting an additional aerial raptor field survey in rhe spring of 2003. If bald eagle nests are discovered within or near the 50 m RoW, NB Power will contact NBDNRE and Environment Canada to discuss appropriate approaches in addressing the situation. If no acceptable alternatives exist, NB Power would modify the schedule and consider relocating the RoW.

With the implementation of mitigation measures, significant adverse residual effects on species at risk are unlikely to occur (refer to Appendix G for a Summary of Residual Effects Assessment).

6.2.1.4 Potential Effects on Environmentally Significant Areas

ESAs are designated by the NBDELG as having at least one of the following characteristics:

- natural areas that are considered to be ecologically fragile with respect to human activities;
- areas that provide habitat for rare/endangered species;
- areas that have unique, or especially distinctive, natural features of biological, ecological, geological, or aesthetic value; and
- areas that have been enhanced through implementation of specific habitat management strategies aimed at specific species and/or ecosystems.

As identified in Section 4.4.3.1 of the CSR, seven ESAs are located within the Preferred Corridor. One site is Sprague Falls (designated based on rare plants). The other six sites are major watercourses including Dennis Stream, New River, Magaguadavic River, Digdeguash River, Waweig River and St. Croix River Estuary. These watercourses are designated as ESAs (at the watercourse crossing point) based on salmon, trout, and gaspereau populations. The Project can potentially affect the rare plants of the Sprague Falls site through destruction of plants or plant habitat. If Project construction activities take place within any of the six watercourses identified as ESAs, potential effects could include direct fish mortality, destruction of aquatic habitat, or changes in water quality due to sedimentation or accidental spills.

It is recognized that the Project could affect ESAs downstream of the preliminary Preferred 50 m RoW through sedimentation or accidental spill, however, the likelihood of these effects would be very low, given NB Power standard mitigation for construction near watercourses.

Increased access is not expected to be an issue for the ESAs. The Sprague Falls ESA is avoided by the preliminary Preferred 50 m RoW. The remaining six ESAs are watercourses, most of which are presently accessible in areas close to the proposed RoW. Existing access conditions for each of the watercourses is described in the following paragraphs.

Within 500 m of the proposed St. Croix River crossing, three roads lead to the rivers edge. At the crossing point, there is a steep slope to the river, with no floodplain or terrace to allow for easy access to the shore. The terrain is heavily forested to the rivers edge.

The Dennis Stream watershed is a provincially designated surface water supply area for St. Stephen, New Brunswick. A secondary highway to the east and a railroad to the west presently parallel Dennis Stream. The stream comes to within 30 m of each of these easements in the vicinity of the RoW. Due to the protected status of Dennis Stream, RoW access will be carefully controlled through vegetation management.

The Waweig River is within the 1 km corridor, however, the preliminary Preferred 50 m RoW does not cross the mainstem of the Waweig River. Three headwater streams to the Waweig River are crossed (Tributary to Sawyer Brook, Sawyer Brook and Meadow Brook). Route 127 parallels a portion of Meadow Brook at the 50 m RoW crossing, and there is access to Sawyer Brook and Tributary to Sawyer Brook via logging raods.

Route 760 parallels the Digdeguash River on both sides. Approximately 200 m upstream of the preliminary Preferred 50 m RoW a road comes to within 40 m of the rivers edge.

The Magaguadavic River is easily accessible within the vicinity of the RoW crossing. The Lee Settlement Road parallels the east side of the river and then crosses the river approximately 500 m downstream of the RoW. The Beney Road parallels the river on the west and connects to the Lee Settlement Road.

There are two logging roads which come within 500m of New River, downstream of the preliminary Preferred 50 m RoW. The land between the end of the logging road and the river has been clearcut, allowing the river to be easily accessed.

Mitigation

The recommended mitigation measures include:

- Avoiding Sprague Falls, located within the Preferred Corridor near Woodland, Maine. This area is known for the presence of several rare plants along the St. Croix River.
- Conducting construction activities within the buffer zones of the following six watercourses identified as ESAs: Dennis Stream, New River, Magaguadavic River, Digdeguash River, Waweig River, and St. Croix River Estuary, in accordance with the terms and conditions of the WAP.

With the implementation of mitigation measures, significant adverse residual effects on ESAs are unlikely to occur (refer to Appendix G for a Summary of Residual Effects Assessment).

6.2.1.5 Potential Effects on Deer Wintering Areas

The magnitude of these effects are low to moderate for each DWA. The preliminary Preferred 50 m RoW crosses 0.16% of the DWAs within the Study Area. The preliminary Preferred 50 m RoW is situated adjacent to or along the outer boundary of three of the five DWAs, however, the remaining two DWAs will be divided into smaller functioning components. The large DWA situated north east of Digdeguash Lake is crossed twice. However, each crossing is located through a wetland portion of the DWA. These areas are characterized by tall shrub vegetation, which is not indicative of deer wintering habitat (*i.e.,* mean conifer stem diameter >18 cm at breast height, and canopy closure of >30% of trees >10 m tall). The duration of construction activities will be short-term (*i.e.,* ‹1 year). The effects from construction are not reversible, as the preliminary Preferred 50 m RoW will be kept clear during the operational life.

Construction and operation activities may coincide with sensitive yarding periods, and create additional access to the DWAs. Construction activities will be short-term, while operation activities will be long-term (*i.e.,* 25 to 100 years). Increased access to DWAs may make deer susceptible to disturbance from uncontrolled ATV use, especially during sensitive yarding periods. Effects are partially reversible as the preliminary Preferred 50 m RoW will be allowed to partially revegetate, while respecting safety clearances, which will impede easy access to the DWAs.

Mitigation

The recommended mitigation measures include:

- Conducting construction and clearing activities outside the sensitive yarding periods (*i.e.,* when snow depths exceed 50 cm); typically December to March.
- Working with major landowners (*e.g.*, Irving, NBDOT, Crown Lands) to develop a program regarding responsible use of ATVs around DWAs and other ESAs.

With the implementation of mitigation measures, significant adverse residual effects on DWAs are unlikely to occur (refer to Appendix G for a Summary of Residual Effects Assessment).

6.2.1.6 Potential Effects on Mature Coniferous Forest Habitat

The MCFH refers to mature stands of softwood, which are of a size sufficient to provide habitat for populations of old growth forest-dependent species such as pine marten. The NBDNRE maintains MCFH amounts and stand conditions on a provincial basis, such that designated MCFH blocks change from year to year. Forest harvesting and forest road construction are both permitted within MCFH stands. A significant adverse effect on MCFH is defined as an effect resulting in a reduction of the capacity for a Crown License to maintain the regulated value of 12% of MCFH, within the licensed land base. The preliminary Preferred 50 m RoW would not reduce the width of any of the blocks crossed to less than 500 m. The geographical extent of any adverse effects will be restricted to the preliminary Preferred 50 m RoW.

Four areas of MCFH are crossed by the preliminary Preferred 50 m RoW including a total area of 33.2 ha, which represents 0.27% of the total amount of MCFH (12118 ha) in the Study Area. No more than 2.2% of a single MCFH block lies within the preliminary Preferred 50 m RoW. The areas of clearing required for the Project are very small compared to the total areas of MCFH blocks, which are crossed. Also, there are considerable opportunities for the Province to re-allocate MCFH area boundaries in order to maintain block standards. Finally, the presence of a 50 m RoW in a MCFH block is not considered serious fragmentation (S. Gordon, pers. comm., 2001), since there will be significant ground cover that will serve as bridging habitat for most species.

Since only 0.27% of MCFH in the Project Study Area will be affected, and considering that this loss will be made up by re-allocation of MCFH block boundaries over time, the present and future needs of wildlife for MCFH in the Study Area will be met.

Significant adverse residual effects on MCFH are unlikely to occur (refer to Appendix G for a Summary of Residual Effects Assessment).

6.2.1.7 Potential Effects on Permanent Sample Plots

PSPs are ecologically fragile features. These plots have both a high educational and research value. Scientific information is collected from these areas over a long-term period (*i.e.*, 30 years) and used to enhance forest management practices in New Brunswick.

No PSPs will be crossed by the preliminary Preferred 50 m RoW thus, there will be no significant adverse residual effects (refer to Appendix G for a Summary of Residual Effects Assessment).

6.2.1.8 Potential Effects on Protected Areas - Game Management Areas

Game Management Areas (GMAs) were established in the past to protect critical wildlife habitat, however, the environmental conditions have changed significantly and new provincial wildlife management initiatives have rendered the old GMAs largely obsolete. Hunting and trapping are now permitted, as well as timber harvesting on Crown Land.

The preliminary Preferred 50 m RoW crosses 0.1 km^2 of the Lepreau Game Management Area which represent approximately 0.04% of the total area (225.8 km^2).

Significant adverse residual effects to Game Management Areas are unlikely to occur (refer to Appendix G for a Summary of Residual Effects Assessment).

6.2.1.9 Potential effects on Fish Habitat and Fishery Resources

Fish habitat function is defined in terms of its ability to produce fish. Production is defined as the fish biomass, which is produced annually. If the capacity of the habitat to produce fish in the quantity that it did before construction is altered as a result of construction, then harmful alteration, disruption or destruction of fish habitat (HADD) and a loss in function has occurred as a result. The *Fisheries Act* protects both fish and fish habitat, with a policy of no net loss. Watercourses crossed by the preliminary Preferred 50 m RoW that have historically supported Atlantic salmon include New River, Pocologan River, Magaguadavic River, Digdeguash River, the St. Croix River and Dennis Stream. Fish habitat in the Study Area has already been affected by extensive human activity.

Effects of ARD on surface water can occur if the minerals containing sulphide and elemental sulphur are exposed to the weathering effects of oxygen and water. Acidity is generated from the oxidation of sulphur and the precipitation of ferric iron. ARD occurs when the resulting acidity is entrained by water. Although ARD has received most of the attention, the primary sources of toxicity are metals. Elevated metal leaching is associated with acidic drainage due to high metal solubility and sulphide weathering rates under acidic conditions. For many rock types/environmental conditions, metal leaching will only be significant if drainage pH drops below 5.5 or 6.

Human activity can greatly enhance acid generation and metal leaching. Sulphide oxidation resulting in very acidic pH values is common worldwide in marine soils drained for activities such as farming (Pons *et al.*, 1982). ARD also occurs where mineralized bedrock is excavated for use in construction.

Acid rock drainage may cause a variety of effects on aquatic life. Toxicity of ARD is dependent on discharge volume, pH, total acidity, and the concentration of dissolved or bio-available metals. The most critical parameter is pH, as the impact of ARD increases with a decrease in pH. At a lower pH, increased metal concentrations result with a potentially devastating effect on aquatic organisms. Physical effects may include increased turbidity and discoloration of plants, accumulation of particles on fish gills and smothering of stream substrate (Dr. Louis de Wet and Frank van der Kooy, 2000). Fish have been noted to experience various adverse effects such as abnormal behavior and decreased reproductive success when pH becomes much more acidic than about 6.0 (Martin and Platts 1981).

This has been discussed in Section 6.2.1.2 where mitigation measures are defined to protect both surface and groundwater.

Due to the small quantities of bedrock expected to be exposed along the RoW as a result of the Project, and the mitigation outlined in Section 6.2.1.2, significant adverse effects on surface water due to ARD are unlikely.

Some watercourses may be crossed during construction, if alternative points of entry are not available to access portions of the preliminary Preferred 50 m RoW. There is potential for sensitive habitats (*e.g.,* spawning grounds), to be adversely effected through habitat alteration due to release of sediments into streams from construction activities. This could result in habitat loss, sedimentation, or fish mortality. However, a WAP application will be submitted to NBDELG to construct this Project. The WAP Application will include a detailed list of watercourses to be crossed and the planned crossing method. NB Power will adhere to all conditions outlined in the WAP.

The effects of construction activities will be short-term, sporadic (*i.e.,* <1/week), and reversible.

No fording will be conducted during construction. NB Power will use a temporary bridge as the preferred method of crossing a watercourse. Where this is not feasible, a temporary culvert will be used.

Based on NB Power experience with other transmission lines, significant in-stream work is unlikely. However, if it is determined that in-stream work (e.g. limited in-stream work required to facilitate crossing of the streams at a level above the bed to prepare for the installation of a bridge or a culvert) may be required, NB Power will advise DFO and baseline fish and fish habitat assessments will be conducted prior to construction at the appropriate time of year. For waters frequented by fish, the crossing section will be isolated from the rest of the stream using approved techniques. This will allow the work to be conducted in the dry. Any such techniques will be developed in consultation with DFO and NBDNRE

The effects from operation activities will be long-term (*i.e.,* >25 years), rare (*i.e.,* <1/year), and reversible. A minimum buffer zone will be maintained along watercourses as per agreement with NBDELG.

Access related effects should not be an issue with Fisheries Resources as the Province of New Brunswick enforces limits of valued fish species such as Atlantic salmon, brook trout and bass. NB Power will adhere to all conditions in the WAP to construct the IPL in an environmentally acceptable manner, which includes stabilization of any disturbed watercourse banks during construction and the maintenance of riparian buffer strip along the watercourses.

Mitigation

The recommended mitigation measures include:

- Conducting a pre-construction baseline aquatic habitat survey for watercourses requiring in-stream work to comply with WAP requirements and blasting setback distances.
- Limiting removal of riparian zone vegetation.
- Promoting regrowth of vegetation in areas adjacent to watercourses following disturbance.
- Avoiding the use of heavy equipment adjacent to watercourses.
- Adhering to the requirements of the WAP pursuant to the New Brunswick *Clean Water Act* when working within 30 m of a watercourse. No construction activities will be conducted in any watercourse, unless authorized by NBDELG.
- Locating structures a minimum of 30 m from watercourses.
- Conducting in-stream work required for access during the June 1 to September 30 timeframe.
- Inspecting erosion control devices to ensure their effectiveness. Detailed inspection of erosion control measures will be conducted on a regular basis following construction, and after major storm events until vegetation is re-established.
- Responding to spills in accordance with NB Power standard procedure (refer to Section 3.11.11).
- Identifying, during regular maintenance inspections, the need for additional stabilization and erosion control measures.
- Conducting blasting activities in accordance with DFO Blasting Guidelines (Wright, 1998) and the Blasting Code under the *Municipalities Act*.

With the implementation of mitigation measures, significant adverse residual effects to fish habitat or fisheries resources are unlikely to occur (refer to Appendix G for a Summary of Residual Effects Assessment).

6.2.1.10 Potential Effects on Migratory Birds

The geographic extent of any Project-related effects on habitat will be localized and includes birds which reside in or near the preliminary Preferred 50 m RoW. Birds that traverse the RoW during daily feeding and roosting migrations may be affected over a larger area.

Migratory birds are protected under the *Migratory Birds Convention Act*. Under this Act, no person shall deposit or permit to be deposited oil, oil wastes or any other substance harmful to migratory birds in any waters or any area frequented by migratory birds, and no person shall possess, buy, sell, exchange or give a migratory bird or nest or make it the subject of a commercial transaction, without lawful excuse, and no person shall disturb, destroy or take a nest, egg, nest shelter, eider duck shelter, or duck box of a migratory bird without a permit. In New Brunswick, migratory birds typically nest from May 1 to August 1, and begin migration in late September. Migratory routes are dependent on several factors including: origin, species, and time of day that migration occurs. Although the southwest corner of New Brunswick (including Point Lepreau to the Passamaquoddy region) is a recognized migration corridor for birds, the exact geographic locations of these flyways are not known. While no major migration flyways have been identified within the Preferred Corridor, staging areas, and large open water areas, have been identified where birds may congregate during migration.

Habitat fragmentation resulting from increasing intensity of land use in the landscape (Burgess and Sharpe 1981) has been perceived as a major threat to biological diversity (Wilcove *et al.* 1986, Noss 1991, Saunders *et al.* 1991). The effects of habitat fragmentation on species can be mainly assigned to three processes; reduction of total habitat area within a region, loss of area within each single habitat, and increase in isolation between habitats (Andrén 1994). Loss of species may lead to changes in the processes of decomposition, pollination, parasitism and predation (Kareiva 1987, 1990).

The Row consists of 488 ha of potential habitat. As stated in Section 4.4.2 (Migratory Birds), 8 broad habitat types were identified within the Study Area. The RoW is comprised of the following amounts of these habitat types:

- Edge and field habitat – 53.1 ha;
- Hardwood habitat – 31.1 ha;
- Old (>90 years) hardwood habitat – 31.6 ha;
- Old (>90 years) mixedwood habitat – 37.7 ha;
- Old (>90 years) softwood habitat – 35.1 ha;
- Softwood habitat – 131.1 ha; and
- Wetland habitat – 37.2 ha

While there will be a reduction in habitat along the preliminary Preferred 50 m RoW, the habitat that will be affected by the Project is mainly young softwood, which is not considered critical habitat. This accounts for 0.16% (131 ha) of the young softwood habitat in the Study Area

(82,557 ha). The cleared RoW is 50 m and is not likely to isolate migratory bird species, since the RoW will be allowed to revegetate there will be significant ground cover to serve as bridging habitat for most species.

During Project-related clearing activities, there is potential for direct mortality of migratory birds nesting in the RoW, however, as clearing will be conducted outside the nesting season no direct mortality from clearing is anticipated. During construction, the magnitude will be moderate as the disturbance to migratory birds will be short-term and sporadic during the nesting season.

The operation of the Project will have a moderate effect on migratory birds, in particular waterfowl, due to bird mortalities, which could occur as a result of ground wire collisions. Overhead ground wires are the major cause of bird collisions with power lines. Birds seem to recognize the supporting towers because of their mass, but because the overhead ground wires are normally 0.9-1.3 cm in diameter, they sometimes appear invisible because of background or lighting conditions and bird collisions result (APLIC 1994). The probability of bird collisions with power lines is related to the way in which birds use the habitat near power lines. The critical factor is probably not the number of habitats rather, whether or not and how often birds in flight must cross the power lines within their daily use area. The effect that a particular power line will have on a particular species varies with the way that each species uses the adjacent habitat for feeding, roosting, courtship, nesting or brood rearing.

Species that are most likely to collide with power lines are those species that have large, heavy bodies and low maneuverability (APLIC 1994). Flying height is also an important factor in power line collision. During migration, larger birds tend to fly at heights well above power lines as a means of reducing energy expenditure of transport (Tucker 1975). Another factor that may affect power line collision potential is flocking behaviour. The density of large flocks allows little room for avoiding obstacles. Large flocks also impede an individual's ability to see far ahead.

There are a variety of environmental characteristics that can influence bird collisions with power lines. One of the most commonly cited factors affecting collision is inclement weather. This factor is particularly important in cases where birds are flying at night. The combination of reduced visibility from low light conditions as well as inclement weather can increase the likelihood of collision.

During construction there is potential for disturbance of migratory birds due to noise and human presence. The magnitude of effects will be moderate as the duration of construction activities will be short term and localised.

Determining the effects of noise on wildlife is complicated as responses vary between species and between individuals of a single population. These variable responses are due to the characteristics of the species, habitat type, season, activity at the time of exposure, sex and age of the individual, level of previous exposure, and whether other physical stresses such as drought are occurring at the time of the exposure (Busnel, 1978).

The RoW may be used for walking/hiking, ATV use and snowmobiles as well as regular maintenance activities related to the IPL. These activities can be expected to have different effects on wildlife there depending upon the parameters listed above. According to data from *Dirt Wheels* Magazine, and tests from Oregon Dunes National Recreation Area, even with mufflers, noise levels from all-terrain vehicles are found to be in the range of 81-111 decibels (dB) per unit, comparable to that of a city street. In comparison, a forest is measured at 15 dB (Scharf, L. and J. Scharf 1999).

Physiological responses of wildlife to long term exposure to noise can range from mild such as increased heart rate to more serious effects such as effects on metabolism and hormone balance (Fletcher, 1980; 1990).

Behavioural responses to noise vary for different species. Some of the effects are mild such as head-raising and body-shifting. More disturbed mammals will trot short distances; birds may walk around flapping wings. Panic and escape behaviour results from more severe disturbances (National Park Service, 1994).

The long term effects of noise disturbance in animals has yet to be fully studied, however, the fauna that inhabit areas in or near the RoW are not expected to be exposed to long term noise such as that from constant take offs and landings at an airport, rather the noise exposure will be intermittent and of short duration. Recreational use of the RoW is expected to be intermittent and of short duration as vehicles and hikers are expected to be moving through the area. The exposure to noise in the RoW is expected to be intermittent and of short duration in all phases of project activities. Maintenance activities are expected to be intermittent and of short duration as well. Therefore it is unlikely that significant adverse effects will occur from noise.

The horizon has been cited (Brown 1970) as an important visual clue to the orientation of migrating birds. This visual clue can be compromised in the presence of strong artificial lights on tall structures. Birds may be attracted to lighted areas and may become disoriented.

Most species of birds are not affected by transmission lines (*i.e.*, raptors or passerine birds). While a certain level of individual mortality can be anticipated, it is not expected to constitute a population level effect. The primary concern is for populations which use wetland habitat with open water that can be used as nesting or staging areas for migratory birds.

Migratory birds such as osprey are known to nest on transmission structures. The installation of structures presents ideal nesting locations for larger migratory birds. These structures are typically the highest point in an area, are stable, and are easily accessible to birds. In some cases nests require trimming to prevent contact with electrical conductors. As well, NB Power may decide to relocate nests to adjacent platforms which allows the bird to nest at a location on the structure above the conductors, thereby preventing recurring power interruptions.

Mitigation

The recommended mitigation measures include:

- Conducting a migratory bird survey to verify the results of the habitat assessment. The sites and species to be surveyed will be identified in consultation with CWS and NBDNRE representatives. Once sites and key species have been identified, a professional ornithologist will be retained to carry out the surveys and to report survey results. In the event that the survey identifies significant and critical habitat for identified species of migratory birds and it is clear that the functioning of such habitat will be adversely affected by the construction and operation of the proposed transmission line (e.g. habitat within the RoW critical to breeding success and not present outside of the RoW),, NB Power will enter into discussions with representatives of the CWS to identify and implement measures to mitigate these effects.
- Submitting work related to the migratory bird surveys, including survey design, interpretation of results, mitigation and follow-up measures will be provided to the NEB and Environment Canada. As part of this work, NB Power, in consultation with the NEB, Environment Canada and NBDNRE will undertake to develop a comprehensive mitigation strategy and protocol to facilitate compliance with the *Migratory Bird Convention Act* in relation to activities associated with the proposed IPL.
- Prior to clearing activities, preparing a SSEPP for these activities and incorporating the details of the mitigation strategy and protocol. The SSEPPs will be submitted to NBDELG, NBDNRE, NEB and Environment Canada prior to construction for review.
- Scheduling clearing activities to occur outside of the May 1 to August 1 sensitive window.
- Implementing the following measures should clearing and construction activities be required during the sensitive nesting season:
  - Clearing activities will be scheduled in consideration of critical habitat features (*e.g.,* open water wetland areas) identified during the pre-construction field survey.
  - NB Power will instruct the Environmental Inspector and contractors on the *Migratory Birds Convention Act*, the importance of habitat, the significance of the nesting period, and measures to be implemented to minimize any disturbance to birds/nests.
  - A bird survey of the area will be conducted by a professional biologist/ornithologist/ birder prior to clearing activities. The bird species recorded during the survey will be used as an indicator regarding the potential nesting habitat in the area.
  - The typical nesting habitat for these species would be investigated for potential nests.
  - Nest trees will be felled prior to or after the nesting season.

    - The occurrence of all identified nests will be documented.

- Incorporating bird diversion devices into the Project design at Black Brook and Hanson Stream. Black Brook is a Ducks Unlimited site and Hanson Stream is a significant coastal wetland habitat with open water that is used as a nesting and staging area for migratory birds.
- Considering the recommendations provided in a review by an Avian Environmental Specialist whose services were obtained to identify utility trends in relation to bird diversion devices used on high voltage transmission lines. The results and a discussion of the results will be submitted to the NEB and Environment Canada upon completion of the work which is expected by mid-Summer 2002.
- Implementing the mitigation measures for the protection of migratory bird habitat listed in Section 6.2.1.11 during construction and operation activities.

With the implementation of mitigation measures, significant adverse residual effects to migratory birds are unlikely to occur (refer to Appendix G for a Summary of Residual Effects Assessment).

6.2.1.11 Potential Effects on Wetland Resources

Both collectively and as individual units, wetland resources serve a variety of important ecological and socio-economic functions, including the maintenance of surface and groundwater resources and quality, as well as providing habitat for fish, wildlife, and migratory bird species. All species of wildlife in New Brunswick rely on wetland habitat at some point in their life cycle. The value of wetlands to society and their ecological value are derived from their biological productivity and biodiversity. Wetland functions have been defined as the capability of wetland environments to provide goods and services including basic life-support functions (Bond *et al.*, 1992). Wetlands are protected in New Brunswick by the *Watercourse Alteration Regulation* under the *Clean Water Act*. Alteration of a wetland may remove or interrupt the ability of the wetland to continue to support the same level of pre-development functions.

According to *The Federal Policy on Wetland Conservation,* 65% of Atlantic coastal salt marshes have already disappeared. As part of its commitment to wetlands conservation, the Federal Government has adopted *The Federal Policy on Wetland Conservation* with its objective to "promote the conservation of Canada's wetlands to sustain their ecological and socio-economic functions, now and in the future."

The bounded area within which proposed Project activities could potentially interact with wetland function was considered to be wetlands within or overlapping the preliminary preferred 50 m RoW, and wetland habitat potentially affected by the proposed Project located immediately adjacent to the Preferred Corridor. In this context, a significant adverse effect on wetland wildlife habitat/species is defined as any effect resulting in a net loss of wetland function.

Fifty-seven wetlands are crossed by the preliminary Preferred 50 m RoW totalling approximately 0.35 km^2 of wetland habitat, with no more than 1% of any individual wetland area crossed by the RoW. Most of this habitat is located in wetlands of 100 m or less which will be easily spanned by the proposed Project. One Ducks Unlimited site is crossed at Black Brook. The kinds of potential effects on wetland function include:

- alteration/displacement of habitat;
- soil erosion;
- water quality effects;
- noise/physical disturbance of wildlife; and
- introduction of invasive plant species.

Severity of effects in each wetland will vary from low to high as follows:

- Low – some vegetation clearing and power line over hanging span wetlands.
- Moderate – vegetation clearing and temporary road construction (some wetlands).
- High – placement of tower in wetland will cause permanent displacement of habitat (two or three wetlands).

Temporary trails may be constructed in some wetlands consisting of 3 - 5 m wide brush-mats or corduroy. NB Power intends to remove corduroy following construction. The NBDELG has indicated in previous WAPs that any corduroy be removed from any wetlands after construction is complete. NB Power will limit the amount of corduroy used and will rely on fabric base and vegetation mats when crossing wetlands. If corduroy is used it will be layered on top of a fabric base and removed upon completion of the IPL.

Tower structures will be located in a few wetlands each of which will occupy approximately 30 m^2. There will be no structures within 30 m of the following salt marshes crossed by the Project: Dipper Harbour Creek, Tributary to Dipper Harbour Creek and Little Lepreau Basin Inlet. Alteration/displacement of habitat will be unavoidable where structures are located in wetlands, however, the area of displacement relative to the total wetland area will be very small and there will be no interruption of hydrology. Where structures will be located in wetlands the effect will be permanent for the life of the Project (*i.e.,* not reversible). Effects are expected to be short-term and temporary in all other wetlands, where natural revegetation following construction is anticipated.

Ducks Unlimited was contacted about the site at Black Brook. The preliminary Preferred 50 m RoW crosses the northern tip of the Ducks Unlimited controlled area, and will not affect the control structure or water level in the wetland. Ducks Unlimited estimate that the wetland could support 60 duck broods (or about 200 individuals) and that bird strikes on the IPL are not likely to be significant (A. MacInnis, pers. comm. 2001).

It is recognized that the Project could affect wetland habitat downstream of the preliminary Preferred 50 m RoW through sedimentation or accidental spill, however, the likelihood of these events is low, given NB Power standard mitigation for construction near watercourses. Therefore, wetlands which are not within the 30 m buffer zone prescribed by the *Watercourse Alteration Permit Regulation* are not further considered.

Mitigation

The recommended mitigation measures include:

- Keeping vegetation disturbance within wetlands to a minimum, while respecting safety clearances.
- Minimizing the area and duration of construction activities in wetlands.
- Adhering to the requirements of the WAP.
- Minimizing ground and vegetation disturbance by locating staging areas outside wetlands and equipment use in wetlands.
- Identifying areas requiring seeding and/or planting for revegetation purposes. These will include:
    - areas adjacent to watercourses/wetlands where erodible soil (*i.e*., steep banks) has been exposed and where mechanical stabilization (*i.e.,* rip rapped techniques are not judged to be sufficient to guarantee stability or prevent uncontrolled introduction of sediment into watercourses/wetlands);
    - areas within community boundaries or adjacent to existing roads where erodible soil has been exposed;
    - areas which have been identified as providing critical habitat for wildlife species; and
    - any other areas judged to require quick revegetation.
- Allowing wetlands to revegetate naturally unless adjacent to a watercourse/wetland where there are potentially erodible soils. The potential for soil erosion and the attendant effects on wetland habitat and water quality will be controlled through the following construction practices:
    - Identifying water crossing sites at which loose or erodible materials may be exposed by maintenance activities.

- Stabilizing bank sections which contain loose or erodible materials. If banks must be sloped for stabilization no material will be deposited in the watercourse. Sloping will be accomplished by back-blading, and the material removed will be deposited above the watercourse high-water mark.
- Further stabilizing watercourse/wetland beds and banks with clean rip rap when necessary to ensure stability.
- Stabilizing stockpiles of soil or exposed areas prior to anticipated weather conditions.
- Minimizing the risk of import of invasive plants or their seeds, rhizomes or vegetative structures by training Environmental Inspectors to recognize these plants, particularly, purple loostrife, Eurasian watermilfoil, European frog bit, flowering rush, glossy buckthorn and reed canary grass. Construction personnel will also be apprised of the sensitivities surrounding invasive plants.

- Inspecting equipment for any vegetation and debris that may be lodged or tracks or undercarriage prior to entering the preliminary Preferred 50 m RoW. If any vegetation or debris is found on the equipment, it will be pressure washed using mobile pressure washers. The Environmental Inspector and his/her delegate will inspect equipment for cleanliness and record location, time, date and equipment that was cleaned.
- Monitoring wetland and watercourse crossings for evidence of damage caused by ATVs. Where problems exist, they will be reported to NBDNRE. (refer to Section 6.5.3 for additional protection measures)
- Developing a SSEPP for wetlands found to be highly sensitive during the pre-construction wetland survey, and any areas where ground-disturbing activities will be undertaken within 30 m of a wetland. The SSEPP will include mitigative measures such as: minimizing construction period in wetlands; keeping trail to minimum width; using only tracked vehicles; and adhering to conditions outlined in the WAP. The criteria used to decide what type(s) of mitigation would be employed by the Environmental Inspector at a specific site may include the following: types of machinery required for a specific task; details of specific wetland surveys (*e.g.* presence of invasive plants, type of vegetation, etc); water level; and vegetation cover.
- Compensating for any loss in wetland function or areas directly impacted by the towers. The method of compensation will be discussed with NBDNRE if it is determined that areas have been directly impacted by towers or that wetland functions have been lost.

Examples of compensation could include wetlands enhancement, restoration of formerly degraded wetland, or creation of wetland habitat in a new location (ratio to be discussed with NBDNRE).

With the implementation of mitigation measures, significant adverse residual effects to wetlands are unlikely to occur (refer to Appendix G for a Summary of Residual Effects Assessment).

6.2.1.12 Potential Effects on the Local Economy

NB Power anticipates that it will be possible to locally purchase some materials and lease/contract construction equipment. Most of the clearing/construction activities will be sub-contracted to local firms. Types of services that might be subcontracted include: clearing, owner operated trucks, tractor drivers, and clean-up crews. Local employment opportunities also relate to warehousing, transportation and equipment maintenance duties.

It is expected that a small portion of the workforce will be from outside the local area and require temporary lodging and food services.

It is anticipated that Project construction will have a beneficial effect on local economy.

Mitigation

Potential effects on the local economy will be positive as NB Power will follow the standard practice of informing local businesses and labour organizations of opportunities arising from the Project. This information will detail the items that will be purchased, the contracts that will be awarded and the skills required by workers.

Significant adverse residual effects to the local economy are unlikely to occur (refer to Appendix G for a Summary of Residual Effects Assessment).

6.2.1.13 Potential Effects on Agriculture

The preliminary Preferred 50 m RoW crosses three areas of agricultural land which encompasses a total of 0.03% of the land available for agriculture in the Study Area.

Construction and operation activities will not interfere with agricultural operations (*i.e.*, the land can be worked in and around the Project structures). Project related effects will be short-term, rare (<1/year) and reversible, with the exception of structure footprints. The preliminary Preferred 50 m RoW has the potential to alter cold air drainage patterns with possible cooler temperatures resulting in adjacent low lying agricultural areas. Crops growing in the preliminary Preferred 50 RoW are mainly grasses for hay which are considered frost tolerant (ABDAFR, 2001), therefore no significant crop damage is anticipated from cold air pooling.

Though the IPL crosses very little agricultural ground, it will have an effect on the ground it does cross (*e.g.,* soil compaction and loss of crop). Past practice has been that a single travel path is established to minimize disturbance to agricultural fields. Once construction is completed the travel area is plowed and seeded with a cover crop to re-establish and provide nutrients into affected area. During wet conditions work and traffic is limited to only essential vehicles until conditions dry. Erosion is monitored and barriers are established where necessary. The landowner is compensated for loss of crops.

Mitigation

The recommended mitigation measures include:

- Avoiding, where possible, all agricultural lands (*e.g.,* blueberry fields, farmlands and Christmas tree plantations). If these lands cannot be avoided, NB Power will span these sites. Where spanning may not be possible, structures will be required, along with the use of construction equipment. Vehicle traffic will be minimized and confined to one track, and construction activities scheduled outside of the crop growing period.
- Suspending work in the event of wet soil conditions (refer to Section 3.11 for wet soil condition criteria). The Environmental Inspector will have the authority to suspend and resume work in the event of wet weather.
- Compensating landowners for loss of crops and land due to construction activities. Compensation will vary depending on land use.
- NB Power will, prior to clearing and construction activities, meet with the four affected agricultural landowners within the 50 m RoW to discuss proposed construction activities and mitigative measures, including protection measures for wet soil conditions. Easement acquisition will occur prior to any clearing and construction activities. At that time, discussions regarding construction schedule and mitigation strategies will take place with all landowners along the RoW.
- With the implementation of mitigation measures, significant adverse residual effects to agriculture are unlikely to occur (refer to Appendix G for a Summary of Residual Effects Assessment).

6.2.1.14 Potential Effects on Forestry

The geographical extent of any adverse effects will be restricted to the preliminary Preferred 50 m RoW. A significant adverse effect on forest resources is defined as an effect resulting in an uncompensated loss of merchantable timber.

Since less than 0.01% of productive forest in the Study Area will be effected by Project construction, it is expected that this will not constitute a significant decrease in the capability of forest resources to meet the present and future needs in the Study Area.

Mitigation

The recommended mitigation measures include:

- Consulting and providing Project information to timber harvest operations/companies during the finalization of the preliminary Preferred 50 m RoW. This will enable modification of cutting plans with respect to cutting schedule, MCFH, etc., well in advance of Project construction activities.
- Salvaging merchantable timber except where not possible or economically feasible.

With the implementation of mitigation measures, significant adverse residual effects to forest resources are unlikely to occur (refer to Appendix G for a Summary of Residual Effects Assessment).

6.2.1.15 Potential Effects on Recreation

The two campgrounds in the vicinity of the Project are over 6 km from the preliminary Preferred 50 m RoW, and will not be affected by the Project. Recreational trails affected by the Project will be re-established following construction. No trail closures are anticipated during the construction phase. There are two areas that the construction activities could interact with the NB Trail, however, the NB Trail in these areas has only just begun to be developed (http://www.nbtrail.com/En/TrailGuides/index.html) and as such it is unlikely to be widely used during the proposed construction period. However, during stringing of conductors, trails will be monitored by personnel (flagging). Any disruptions will be localized and of brief duration. NB Power does not expect any restrictions on recreational trail use during operations. Effects on recreation will be site-specific and short-term during equipment and supply movement.

With the implementation of mitigation measures, significant adverse residual effects on recreation are unlikely to occur (refer to Appendix G for a Summary of Residual Effects Assessment).

6.2.1.16 Potential Effects on Transportation Infrastructure (Traffic Circulation)

Traffic flow will be interrupted for short periods where the Project crosses roads during conductor stringing activities. Traffic circulation may also be affected during the Project construction period by the equipment and supply trucks servicing construction activities and personnel.

The geographical extent of any adverse effects will be restricted to the transportation infrastructure in the areas immediately adjacent to the preliminary Preferred 50 m RoW. A significant adverse effect on traffic circulation is defined as any increase in peak traffic volumes over and above the designed level of service as defined in “Geometric Design Guide for Canadian Roads” (TAC, 1999).

The preliminary Preferred 50 m RoW crosses 13 primary highways and 57 secondary roads (including 47 seasonal roads, four gravel roads, and six local roads). Severity of potential effects will be low based on temporary slow downs and/or stops in local traffic flow (usually not more than ½ an hour).

Mitigation

The recommended mitigation measures include:

- Consulting with NBDOT in order to coordinate and manage any interruption of flow of traffic.
- Restoring transportation related infrastructure affected by Project activities following completion of construction in consultation with NBDOT.

With the implementation of mitigation measures, significant adverse residual effects on transportation infrastructure are unlikely to occur (refer to Appendix G for a Summary of Residual Effects Assessment).

6.2.1.17 Potential Effects on Other Infrastructure

Other infrastructure includes municipal water and sewer mains and service lines, conduits carrying electrical, telephone, fibre optics and cable services and natural gas lines, as well as RFI sensitive equipment including T.V., radio, and microwave structures.

Construction of the Project has the potential to affect existing infrastructure located within the preliminary Preferred 50 m RoW. The main concern relates to temporary loss of use/interruption of service. A significant adverse effect on infrastructure is defined as an effect of such magnitude that results in reduction of infrastructure function, or an increased difficulty in accessing/repairing infrastructure.

Mitigation

The recommended mitigation measures include:

- Conferring with municipal engineering personnel, outside plant personnel from NB Tel and M&NP to identify specific locations of infrastructure crossed by the preliminary Preferred 50 m RoW (*e.g.* SJLPP), including RFI sensitive equipment (*e.g.* TV, radio, microwave structures).
- Negotiating permit and approval requirements from all applicable municipalities and utilities.

With the implementation of mitigation measures, significant adverse residual effects on other infrastructure are unlikely to occur (refer to Appendix G for a Summary of Residual Effects Assessment).

6.2.1.18 Potential Effects on Community / Emergency Services

A significant adverse effect on emergency services is defined as an effect of such magnitude that results in an increased demand for emergency services within the Study Area and surrounding communities due to construction accidents or third-party damages on a daily basis.

Mitigation

The recommended mitigation measures include:

- Providing appropriate training to employees and contractors, including both safety and environmental awareness training, in order to limit the requirements for emergency assistance.

With the implementation of mitigation, significant adverse residual effects on community and emergency services are unlikely to occur (refer to Appendix G for a Summary of Residual Effects Assessment).

6.2.1.19 Potential Effects on Mineral Aggregate Resources/Mining Areas

Three mining claims are crossed by the Preferred Corridor, which represent areas of potential mineral occurrence. Two aggregate deposits are crossed by the preliminary Preferred 50 m RoW which are being worked periodically. Significant mineral occurrence beneath the preliminary Preferred 50 m RoW is considered unlikely but if such mineral deposits are discovered, the proposed Project will preclude mineral development. A significant adverse effect on mineral aggregate resources/mining areas is defined as an effect of such magnitude that restricts future development potential. The geographical extent of any adverse effects will be restricted to the claim area within the preliminary Preferred 50 m RoW.

If significant mineral resources which warrant further development are discovered in the preliminary Preferred 50 m RoW, the Project will be moved to accommodate economically viable mining activities. Therefore, the severity of effects on mineral aggregate resources/mining areas is considered low since the proposed Project will represent only a minor obstruction to mineral exploration and may be moved to accommodate future mineral development.

Significant adverse residual effects on mineral aggregate resources/mining areas are unlikely to occur (refer to Appendix G for a Summary of Residual Effects Assessment).

6.2.1.20 Potential Effects on Archaeological/Heritage Resources

Archaeological/heritage resources are defined as known archaeological sites designated historic sites and heritage structures. These resources are considered important as they are recognized by the Province of New Brunswick, and form part of a collect body of information used to understand and define the Provincial heritage.

The Archaeological Services Unit (ASU) of the Heritage Branch of Culture and Sport Secretariat regulates archaeological investigations in New Brunswick. The *Historic Sites Protection Act* requires that prior to conducting fieldwork, a license application must be made to the Minister for each project. In the application, the proposed scope of work, the methodology, and other pertinent information is provided to the Province for a determination of whether the level of effort is appropriate. The Province may require modifications, if the proposed level of effort is deemed deficient. NB Power applied for, and received, a licence for its archaeological/heritage investigations.

Designated historic sites and heritage structures are other categories of heritage resources. Discussions with resources managers and review of various databases help to identify associated resources or issues. The Heritage Branch maintains a catalogue of designated historic sites and heritage structures situated around New Brunswick. Designated historic sites have various levels of protection from existing legislation. The heritage structure catalogue has been developed over the years, but does not cover the entire province, and data gaps exist. These structures are recorded based on various criteria, such as the age of the structure, and most do not have any protection under existing legislation. While reviewing files at the Heritage Branch is not a requirement of this project, it was undertaken as a matter for heritage resource assessment. An additional license or permit is not required to assess these categories of heritage resources.

The geographical extent of any adverse effects will be the entire resource and adjacent areas associated with heritage resources that occur within the preliminary Preferred 50 m RoW.

The magnitude of construction effects on unknown heritage resources will be high, as clearing and excavation activities will expose the resource. This effect will be immediate and irreversible. If unknown resources are encountered during either the construction or operation phase, they will be affected, and effects will be site-specific. However, the potential for significant loss of knowledge will be minimized through the initiation of a contingency plan for effected resources as outlined in the Archaeological Procedural Protocol (Figure 6-1).

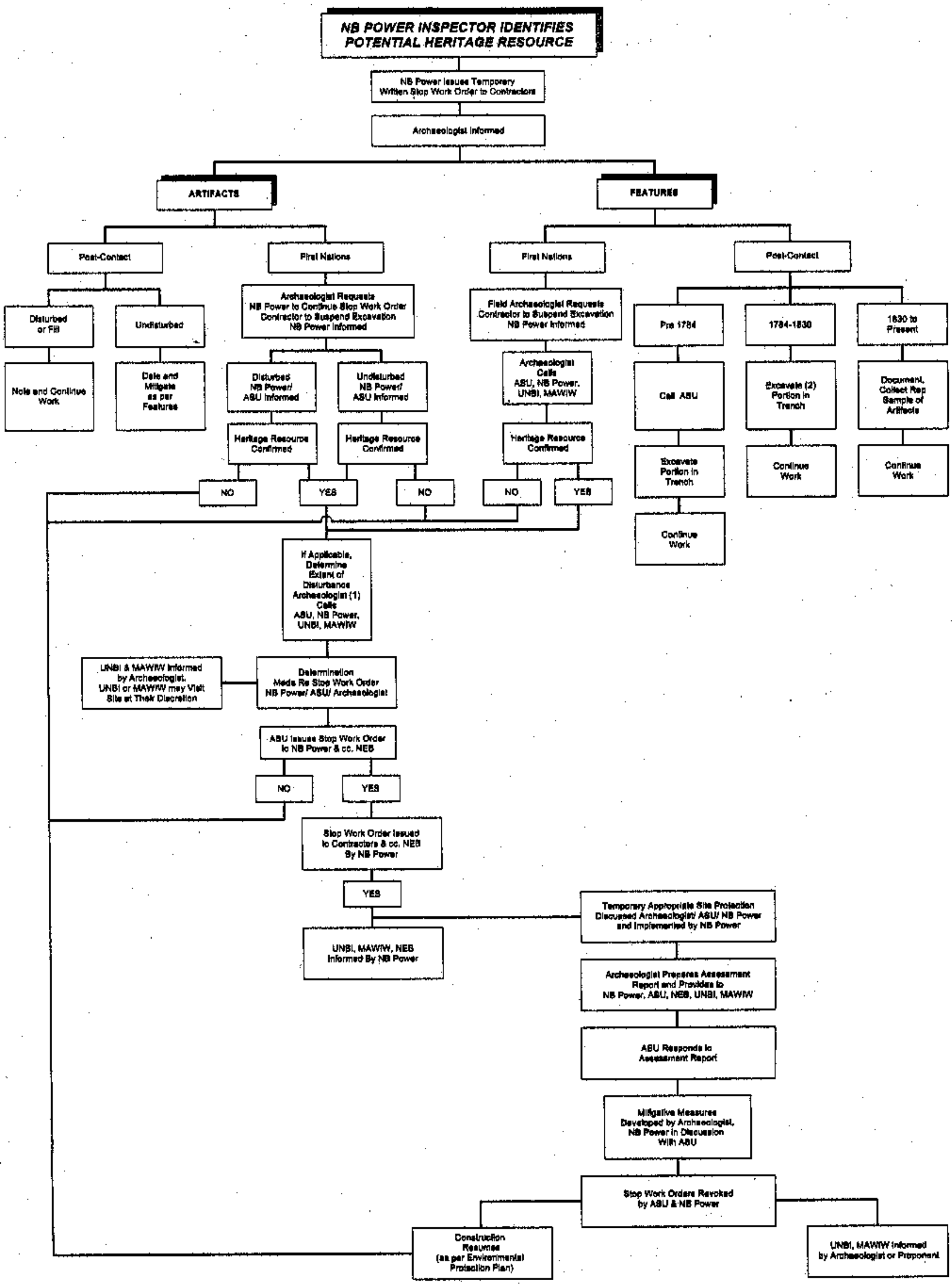
The operation of the Project will not affect archaeological and heritage resources, unless additional unknown resources are discovered. The probability of this occurring is minimal as ground-disturbing activities typically are not required during operation.

Mitigation

The recommended mitigation measures include:

- Conducting fieldwork prior to construction to verify elevated potential within the preliminary Preferred 50 m RoW, where avoidance of the resource is not possible. This could result in additional mitigation, if archaeological/heritage resources are discovered.
- Following the Archaeological Procedural Protocol (Figure 6-1) in the event of an unexpected archaeological discovery during construction. This plan was developed in consultation with New Brunswick Archaeological Services Unit and the Aboriginal Liaison Officers.
- Spanning the Dennis Stream site in EPA 21 by placing no towers between the railway tracks and Dennis Stream. Minimal activities are to occur within the spanned area (e.g., stringing conductors and selective manual cutting of danger trees if necessary) in order to protect the site. No equipment traffic is to occur within the spanned area during construction, operation and decommissioning.
- Testing the nearest tower location to the Dennis Stream site for archaeological resources. Under archaeological license inspect site one and five years after construction. On an on-going basis keep ASU informed of any activities and archaeological discoveries at this site.
- Providing Environmental Inspector(s) with archaeological awareness training to aid in the identification of heritage resources, which could occur outside the areas recommended for monitoring.
- Consulting with ASU to develop an Archaeological Awareness Training.
- Ensuring that all reports and recommendations pertaining to the archaeological component of the Project are reviewed by ASU.
- Monitoring the initial sub-surface disturbance during construction within areas of elevated potential for heritage resources not ruled out during the pre-construction survey. The monitoring will be conducted under the supervision of an archaeological license.

With the implementation of mitigative measures, significant adverse residual effects to archaeological/heritage resources are unlikely to occur (refer to Appendix G for a Summary of Residual Effects Assessment).



ASU - ARCHAEOLOGICAL SERVICES UNIT; A. FERGUSON
NBP - NB POWER ENVIRONMENTAL AFFAIRS; C. ST-PIERRE
LICENSED ARCHAEOLOGIST
UNBI - UNION OF NB INDIANS; R. PERLEY
MAWIW; K. St. JACQUES

(1) The assumption has been made that respective contacts have either voice mail or reception in place.
(1b) It is the responsibility of UNBI & MAWIW to inform appropriate First Nations communities. In the above chart, the term "informed" will usually mean by phone.
(2) Excavate refers to the use of all relevant archaeological techniques; sketches, photos, profiles, etc.

MODIFIED FROM PROTOCOL DEVELOPED BY MARITIMES & NORTHEAST PIPELINE by AMEC WITH INPUT FROM ASU, UNBI & MAWIW

FIGURE 6-1
NB POWER 345kV INTERNATIONAL POWER LINE PROJECT
PROCEDURAL (ARCHAEOLOGICAL) PROTOCOL

amec

TE21002_l/archaeological protocol (02/01/16)

6.2.1.21 Potential Effects on Current Use of Lands and Resources for Traditional Purposes by Aboriginal Persons

A significant adverse effect on current use of lands and resources for traditional purposes by Aboriginal people is defined as an effect of such magnitude that results in the long-term loss of use/access to identified resources. Effects on point locations for traditional use (*e.g.,* ceremonial) or uncommon plant resources may not be reversible. Effects on large traditional use areas (*e.g.,* hunting, fishing) or common plant resources will be reversible.

There were no current use of lands and resources for traditional purposes identified in the Preferred Corridor during Aboriginal consultation (refer to Section 2.2). However, the preliminary Preferred 50 m RoW crosses several areas with common plant and animal species, which could be harvested by Aboriginal people for traditional use. The geographical extent of any adverse effects on point resource use will be the entire traditional use area or plant population within or overlapping the preliminary Preferred 50 m RoW. The geographical extent of any adverse effects on traditional use areas (traditional use specific) or common plant species harvested may extend to associated areas beyond the preliminary Preferred 50 m RoW, including the Study Area. Severity of effects on current use of lands and resources for traditional purposes will be low because abundant plant and animal populations will remain locally in good health following Project construction.

Since the plant and animal populations potentially effected by the Project construction will remain locally, both abundantly and in good condition, it is expected that any present or future needs by Aboriginal people for these local and regional resources will be met.

Significant adverse residual effects to aboriginal resources are unlikely to occur (refer to Appendix G for a Summary of Residual Effects Assessment).

It is anticipated that should some members of the Passamaquoddy Tribe carry out traditional use activities in the Preferred Corridor, they would be similar uses, with similar resources as the Aboriginal people recognized in New Brunswick. Therefore, there would not be significant adverse effects to current use of resources lands and resources for traditional purposes by the Passamaquoddy Tribe.

6.2.2 Additional Assessment Considerations

Socio-economic effects include potential effects on health, aesthetics, air quality, ambient noise, radio and television reception and land values.

Electric Magnetic Field (EMF)

Magnetic field strengths associated with this line are related primarily to current loading and proximity. For the purpose of analysis, a maximum design current loading of 1674 amperes was considered. Assuming a conductor height of 20 m above ground (design at structures) the magnetic field at the edge of the preliminary Preferred 50 m RoW would be in the order of 49 milliGauss (mG). At the planned average conductor height of 12.67 m, the edge of RoW value would be in the order of 66 mG. In both instances the magnetic field levels would be reduced to approximately 5 mG at a distance of 100 m from the centerline, again assuming maximum loading conditions of 1674 amperes.

Electric Fields are related to the voltage of the line and proximity. For EMF analysis, calculations are based on the maximum line voltage. At the edge of the RoW in the vicinity of structures where the conductor height is designed at 20 m, the Electric Field strength would be in the order of 1.2 kV/metre. At the average planned conductor height of 12.67 m, this value would be approximately 1.3 kV/metre. At a point 100 m distant from the centreline, the Electric Field is calculated to be approximately 0.03-0.05 kV/metre.

With respect to the number of households within these areas, roadway crossings have been chosen, to avoid residential development. Only upon finalization of the location of the preliminary Preferred 50 m RoW, will a determination of existing homes within a given distance to the power line be possible.

NB Power, through the Manager of Health and Safety, maintains membership on the Canadian Electricity Association's EMF Task Force. By so doing, the state of the science with respect to EMF is constantly monitored, and current information made available to concerned customers upon request. Two major reviews of the literature have recently been completed:

- In 1999, the United States National Institute of Environmental Health Sciences (NIEHS) filed their report to Congress in response to the 1992 *Energy Policy Act*.
- In 2001, the Report of the Advisory Group on Non-Ionizing Radiation was filed with the National Radiological Protection Board (NRPB) in the United Kingdom.

In general, these extensive reviews have concluded that "Laboratory experiments have provided no good evidence that extremely low frequency electromagnetic fields are capable of producing cancer, nor do human epidemiological studies suggest that they cause cancer in general (NRPB Volume 12 No. 1 2001). However, as summarized by the NIEHS, "…ELF-EMF exposure cannot be recognized as entirely safe because of weak scientific evidence that exposure may pose a leukaemia hazard. In our opinion, this finding is insufficient to warrant aggressive regulatory concern". Both reviews contain recommendations for continuing research.

In the absence of clear scientific information establishing that exposure to such fields, at levels normally encountered in our living environments, causes adverse health effects, neither the Canadian nor New Brunswick governments have legislated exposure standards. However, exposure guidelines have been issued by a number of national and international organizations.

These guidelines are not based upon a consideration of cancer risk or similar health problems, since such adverse health effects have not been established, despite the intense investigations carried out over the past 30+ years. Rather, the guidelines are based on ensuring that electric current densities in the body due to power frequency electric and magnetic fields are below those produced naturally in the body by the brain, nerves and heart.

The exposure guidelines most often quoted for the general public are published by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) which operates under the World Health Organization. For 60 Hz, these guidelines are 840 mG for the magnetic field and 4.2 kV/m for the electric field. These guidelines are based on acute effects, and have not been established with consideration for chronic health effects, as no definitive data are available upon which to make such as decision.

As for "typical exposures", the National Institute of Environmental Health Sciences and the U.S. Department of Energy have published estimates of home exposure based on 5 classifications of power lines nearest to the home (so-called "Wire Code" used by some epidemiological studies of cancer): Underground, Very Low Current Configuration, Ordinary Low Current Configuration, Ordinary High Current Configuration, and Very High Current Configuration. The resulting range of exposures was from about 0.5 mG to 4 mG with the medians ranging from 0.88 mG to 2.01 mG. Workplace exposures are typically higher, but vary greatly with the type of work (welder vs. office worker), and as a result are difficult to represent, other than by specific occupation.

For a person living in a Very Low Current Configuration house, and working in an office environment, daily exposures in one example were measured at a low of near 0 mG to a high of over 20 mG, with a mean exposure of approximately 0.5 mG for the 24 hour period.

With respect to the proposed transmission lines, the levels of magnetic fields to which the public could be exposed will similarly be well below the guidelines.

Air Quality

The maximum ozone concentration near ground produced by the proposed IPL is estimated to be less than 0.1 ppb and will be indistinguishable from the ambient ozone level. Typically this level of concentration is much lower than the levels specified by any regulatory agencies (*i.e.*, 82 ppb as per the Canadian Air Quality Objective) (NBDELG, 1999).

- During fair weather, ozone produced by EHV lines is not detectable above ambient conditions.
- During wet weather conditions, ozone produced by EHV lines is detectable but of an insignificant amount.

In addition to ozone, transmission lines also produce nitrogen oxides (NO_x). The concentration levels of these oxides are even lower and were estimated to be one-sixth to one-tenth of that of ozone (Scherer, 1973). Therefore, the NO_x levels are well under the maximum acceptable level of 213 ppb listed by the Canadian National Air Quality Objective (NBDELG, 1999).

Audible Noise

Corona discharge on high voltage transmission lines also produces audible noise. Noise is particularly evident during wet weather. At present there are no noise control regulations specifically addressing electrical transmission lines. Typical limits that are imposed vary between 45 and 60 dBA. The calculated values for noise during fair weather are much less than 45 dBA (Electric Power Research Institute (EPRI) Transmission Line Reference Book). The location of the line, which minimizes exposure to the general public also limits the potential for effect of audible noise.

Foul weather noise is only present for a small percentage of time during heavy rain, moderate rain, mist or snow. Information on the frequency and duration of adverse weather conditions which can be expected, indicates that foul weather conditions will occur up to a maximum of 5% of the time (*i.e.*, up to approximately 18 days per year (EPRI, 1982).

The estimated level of the expected audible noise level at fair and foul weather at the edge of the RoW (*e.g.*, +/- 25 m from the centreline), is 13 and 38 dB respectively.

The expected level of noise from the 345 kV transmission line falls within the range of the designation assigned for a Library (30-40 dB) and that of an Office (50-60 dB).

The following are examples of typical noise levels (EPRI, 1982):

- Library 30-40 dB
- Living Room 40-50 dB
- Office 50-60 dB
- Conversation 60-70 dB
- Car Horn 110-120 dB

Television and Radio Interference

Overhead electrical transmission lines are only one of many sources of interference on radio and television reception. It is NB Power practice to meet or exceed the standards set out in CSA, Standard C108.3.1. that defines the amount of radio noise that can be generated by a transmission line. Meeting this standard and the rural location of the line, will effectively limit the effect of the proposed line on radio or television reception.

Land Values

The effect of the proposed Project on land values will be addressed pursuant to the *NEB Act.*

Use of Local Labour and Material

NB Power is required by regulation to use a standard form contract for all construction work, including the use of local labour and material.

With respect to the purchase of goods and services, NB Power is governed by provincial legislation which disallows preference in its tendering practices.

To the extent that provincial purchasing legislation allows, NB Power will endeavour to acquire such goods and services (*e.g.*, food, accommodations, fuel, equipment rentals and security services) from local vendors and suppliers.

NB Power will advise local businesses and labour unions well in advance of awarding the contract for the construction of the Project or subsequent maintenance of the Project, by way of personal contact.

In addition, NB Power will emphasize any requirements for the purchase of material and services and the employment of local residents in its tender documents for the construction, and maintenance of the proposed IPL.

6.3 Decommissioning and Abandonment

Decommissioning and abandonment activities would be similar to those described for construction. Decommissioning and abandonment of the IPL will require that an application be made to the NEB for these activities. Detailed plans will be developed after consulting with the NEB and other applicable regulatory authorities. Facilities will be removed for protection of the public and the route surveyed for possible effects of operation.

At the time of decommissioning and abandonment all applicable regulations will be met, and therefore significant residual adverse effects are unlikely to occur.

6.4 Effects of the Environment on the Project

Electrical transmission lines are subject to the environment in which they are located. The Project may be affected by wind, snow, ice, salt spray and marine influences. These and other potential environmental effects have the potential to cause power outages and/or fires.

The preliminary Preferred 50 m RoW is located within the Digdeguash River floodplain at Elmseville (Environment Canada, 1989). Flooding in this area is confined within a fairly narrow portion of the River valley (less than 200 m).

The Project life expectancy is between 50 and 100 years. Over this time frame it is possible that global climate change will have an effect on weather patterns in the Study Area. Studies to date vary widely with respect to climate change models so it is impossible to assess at this time any future changes in design requirements.

Mitigation

The recommended mitigation measures include:

- Designing the Project to withstand anticipated weather conditions (*i.e.*, based on draft CSA Standards (C22.3-No.1-M87) produced after the 1998 ice storms in central and eastern Canada.
- Ensuring the RoW width reduces the potential for outages caused by tree falls.
- Incorporating adequate grounding to reduce lightning strikes.
- Incorporating bird diversion devices into the Project design at Hanson Stream and Black Brook.
- Conducting regular inspections and maintenance on the transmission line.
- Locating structures outside the Digdeguash River flood zone.
- Monitoring latest studies on climate change to make appropriate design modifications if required.

With the implementation of mitigation measures, significant adverse effects on the Project due to effects of the environment are unlikely to occur (refer to Appendix G for a Summary of Residual Effects Assessment).

6.5 Cumulative Effects

The following discussion satisfies the requirement for a Cumulative Effects Assessment (CEA) under section 16(1) of the CEAA. This process involves a consideration of the potential for adverse effects from the Project to act in an additive manner with effects from other Projects and activities on the VECs identified. The basis for considering cumulative environmental effects is provided in the Responsible Authority's Guide (CEAA, 1994), and supplemented by the Cumulative Effects Practitioners Guide (CEAA, 1999), and the Operational Policy Statement (Addressing Cumulative Environmental Effects under the *Canadian Environmental Assessment Act*) (CEAA, 1999).

Cumulative effects requires that a certain level of information for each VEC and Project be known in order to properly conduct a meaningful assessment. This level of information is not always available, or the level of information between projects may not be known to the same extent, and as result the comparison is rendered invalid.

The central question is: What contribution would the proposed Project make to the overall stresses on selected VECs, caused by all stressors due to human activities? CEAs are conducted when a project will have a likely, measurable, effect on a VEC.

6.5.1 Valued Environmental Components Suitable for Cumulative Effects Assessment

For the purpose of identifying and assessing cumulative effects, the bounded areas established for the VECs remain the same as for the Project effects (refer to Section 5). The temporal boundaries, however, are extended to include activities in the past, those that are under way in the area, and known planned projects in the future.

Initially, all VECs identified in the scoping exercise were considered for their suitability as candidates for the CEA. Several of the VECs were eliminated early in the process as no measurable effects were identified as a result of the Project. For example, the Project has not been demonstrated to have a potential measurable effect on regional or local air quality as well as archaeological/heritage resources, therefore these VECs are not considered further in the assessment. No adverse effects were identified for groundwater resources, PSPs, mineral resources, local economy, agriculture, forestry, recreation, transportation infrastructure and other infrastructure, or resources currently used by Aboriginal people, therefore these VECs are not considered further in the assessment. Six ESAs identified within the preliminary Preferred 50 m RoW, are watercourses, which are considered significant due to their Atlantic salmon populations. These ESAs were assessed with the fish habitat VEC. The remaining VECs (where a potential measurable effect from the Project has been identified) were selected for CEA, including: plant species at risk, wetlands, migratory birds, deer wintering habitat, MCFH and fish habitat.

Plant Species at Risk

Assessing potential cumulative effects on plant species at risk in New Brunswick is problematic for many reasons. The rarity of various plants in New Brunswick is caused by many different factors. Several species are globally common but reach the northern or southern limit of their range in New Brunswick (Hinds, 2000). Some plants are rare throughout their range. Most rare plants are restricted to ecosites with very specific habitat characteristics (*e.g.* calcareous soils, wetlands/riparian zones, warm or cool microclimates) (Hinds, 1993) while others may occupy a wider range of habitat types. Some species are made rare through human activities (*e.g.* harvesting, habitat displacement/ degradation) or natural events (*e.g.* long term climate change, invasive species) but many species are simply niche dwellers, which take advantage of uncommon (often harsh) habitat types.

The true distribution of most plant species at risk is not well established in New Brunswick. Many areas of the province are under explored, while many rare plants are easily overlooked or confused for more common species (Hinds, 1993), thus leaving relatively large gaps in our knowledge. Most major projects in New Brunswick include a rare plant survey component for this reason. Also, many plant species are not consistently observed in what is presumed to be their preferred habitat, possibly because their physiology is not well understood, therefore, it is extremely difficult to estimate their true occurrence based on habitat. These factors make it impossible to conduct a meaningful assessment of potential cumulative effects on plant species at risk.

There have been several anecdotal observations of adverse effects on some of the identified plant species at risk by ATVs and snowmobiles in New Brunswick (M.Toner, pers.comm., 2002). The main concern related to effects of uncontrolled ATV traffic is direct mortality, destruction of habitat, and introduction of alien invasive plant species. While it is possible that ATV traffic may occur in the preliminary Preferred 50 m RoW, NB Powers' standard vegetation management practice of leaving a buffer zone around all wetlands and watercourses, which will remain vegetated up to 12 feet in height, is expected to discourage ATV traffic in wetland/riparian areas. Therefore, no potential cumulative effects from uncontrolled ATV traffic on the identified plant species at risk are likely. No mitigation required.

6.5.2 Other Project/Activities Considered in Cumulative Effects Assessment

Three classes of projects were considered: (1) NB Power Projects, (2) Maritimes & Northeast Pipeline Projects (which is comprised of the Mainline and the Saint John Lateral) and (3) Forestry practices on Crown Land. NB Power Projects include both existing and proposed projects.

These projects were selected because of their potential to act cumulatively with the proposed project in the following manner: direct loss or change in vegetation, direct habitat loss, habitat fragmentation, indirect increased access. The projects together with their characteristics are described below. These are the only known projects for the Study Area with the potential to act in a cumulative fashion with the proposed IPL.

NB Power Projects

A 138 kV transmission line (line 1223) from Pennfield to Oak Bay Terminal was constructed during 2001-2002. The Project was registered with NBDELG under the *Environmental Impact Assessment Regulation* of the *Clean Environment Act.* A letter of determination was issued by NBDELG stating that the Project did not require a full EIA. Watercourse Alternation Permits were also issued by NBDELG for clearing and construction activities in the vicinity of watercourses. The transmission line is approximately 45 km in length, 26 km of which paralleled an existing line (line 0016) and required an additional 25 m of RoW. The remaining 19 km required a new 30 m RoW. The conductors were strung on H-frame wood pole structures. The poles are approximately 16 m in height. The line includes two galvanized 3/8" steel ground wires.

NB Power is currently proposing to construct a 138 kV transmission line (line 1229) on an old 69 kV transmission line RoW from Point Lepreau to Highway #1 (west of the existing 345 kV transmission line) in order to provide back-up supply to the Point Lepreau Generating Station. The first 3 to 4 km of the RoW will not require additional clearing while the remaining 6 to 7 km will require about 42 m of clearing to accommodate the IPL and the proposed new line.

Maintenance on the existing 138 kV transmission line (line 1121) in the Study Area will be conducted on a regular basis. Maintenance involves vegetation management along the 30 m

RoW. The maintenance is conducted on 5 to 7 year cycles using mechanical and manual methods. Vegetation management activities are carried out in accordance with WAP issued by NBDELG.

Maritimes & Northeast Pipeline (M&NP) Project

This project within the Study Area involved construction and operation of approximately 600 km of 30" O.D. natural gas pipeline (*i.e.*, mainline) with a RoW requirement of 25 m and 110 km of 16" O.D. natural gas pipeline (*i.e.*, Saint John Lateral). An EIA Panel reviewed the mainline project and a CSR was prepared for the Saint John Lateral. The NEB approved the construction and operation of both lines. The work involved clearing of the RoW width and included in-stream construction for stream crossings. The SSEPPs and detailed fish habitat maps were prepared for each stream crossing. All steam crossings were returned to their natural state as per the requirements of the permits. Monitoring of this work is continuing.

Both pipelines involved construction activities within wetlands. The pipeline RoWs were routed to limit the number of wetlands crossed and any crossed were rehabilitated following construction. This rehabilitation work is also the subject of an extensive monitoring program to determine its success. The RoW was selected to avoid agricultural land, including blueberries and therefore, does not involve any of this type of land. Vegetation is controlled on pipeline RoWs through the use of mechanical clearing methods.

Botanical field surveys were conducted for each project prior to construction, which revealed several plant species at risk in close proximity to both pipeline routes. One rare plant (Toothed arrow-wood (*Viburnum dentatum var. recognitum*)) was common to the mainline and the IPL, while a different rare plant (Bladderwort species (*Utricularia geminiscapa*) was common to the Saint John Lateral and the IPL. None of the rare plants identified near the M&NP pipeline routes occurred within the pipeline RoWs and no measurable adverse effects from those projects on either of these plant species at risk were identified.

Forest Practices on Crown Land

Approximately 216,000 ha of the Study Area is forested of which an estimated 50% is located on Crown Land. The area of Crown Land harvested annually is approximately 1% or 1,000 ha. The current practice for harvesting is clearcutting. The Crown Land in the area is managed under the New Brunswick *Crown Lands and Forests Act*. The Minister of NBDNRE is responsible for the development, utilization, protection and integrated management of the resources on this land. The practice in New Brunswick is for Crown Timber Licensees to develop management and operating plans to achieve goals, objectives and standards which are set by government. Management plans forecast timber and habitat supplies for 80 years and map harvest blocks and specific habitat areas for 25 years (NBDNRE, 2000). These plans are approved by NBDNRE and monitored on a 5-year basis before the license is renewed.

Hardwood and softwood clearcut harvest blocks may not exceed 100 ha in size. Harvest must be timed so that a 10 year period elapses between harvest of adjacent blocks with a combined area of 100 ha.

The policy goal for wildlife habitat is to provide habitat necessary to support populations of native wildlife species at desired levels across their natural ranges. The actions include development of quantitative habitat objectives for selected species or groups, ensuring that forest management activities provide a sufficient amount of properly distributed quality habitat to meet population objectives for all native vertebrate species and, protection of the habitat of endangered species.

The water policy goal is to protect water quality and maintain aquatic habitat for fish and wildlife species. This is achieved by maintenance of buffer zones around lakes and along watercourses, ensuring conformance with standards for road, bridge and culvert design and construction and ensuring conformance with the requirements of the *Clean Water Act*.

Watercourse buffer zones are maintained along all watercourses with a channel width 0.5 m or greater. Timber harvesting is permitted within buffer zones as long as the function of the buffer remains. Guidelines for watercourse protection are presented in “Watercourse Buffer Zone Guidelines for Crown Land Forestry Activities” (NBDNRE, 1996).

License 6 which includes the Study Area, contains approximately 45 km^2 of MCFH (Old Spruce Fir Habitat). The spatial criteria for MCFH is – a minimum of 375 ha must meet stand level criteria within each block, a minimum of 75% must meet stand level criteria within each block and block widths must normally exceed 1000 m and always exceed 500 m.

There are approximately 39,940 ha of DWAs in license 6. The goal of the management plan is to ensure that harvesting does not reduce habitat levels by more than 15% in a single 5 year period. The spatial criteria for Moderate Deer Wintering Habitat is greater than 5 ha, greater than 75% must meet structural criteria and greater than 150 m minimum patch width.

Forestry operations on private woodlots are not legislated, and do not require that a management plan be submitted to NBDNRE. Therefore, private woodlot operations do not have to adhere to habitat requirements set out by NBDNRE. As the future plans for the private woodlots are not readily available, it is not possible to conduct a meaningful assessment of potential cumulative effects from private woodlots.

6.5.3 Analysis of Cumulative Effects

The areas of each VEC affected by the respective projects are shown in Table 6-1.

TABLE 6-1
Comparative Data for VECs Used in CEA

VEC	NB Power IPL	M&NP Line	Other NB Power	Forestry Crown Land	Study Area
Wetlands (km^2)	0.35	0.07	0.108	0	271
Deer Wintering Habitat (km^2)	0.13	0.47	0.05	2.45[2]	82
MCFH (km^2)	0.3	0.23	0	---[4]	121
Fish Habitat[1] (no. of crossings)	49	66	51	NA	NA
Total Area of Projects Listed	5	9	2.5	10[3]	2400

[1] Number of watercourse crossings. (1:50 000 scale NTS mapping of the Study Area)
[2] Based on allowance of 15% per 5 year period (3% per year).
[3] Based on annual harvest allowance. Timber harvest is limited to sustainable yield by volume (not area) over 80 years for each License. This yield is practically limited to a proportion of approximately 1% per License per year but not more than 2% in any License in any year. The use of area to represent percent of harvest per year is probably conservative since much of the forested area along the IPL is not high volume timber (*i.e.*, not optimal species or nurtured through silvicultural activities) (Dan Beaudette, pers. comm., 2002). The area 10 km^2 is approximately 1% of Crown Land (50% of total Study Area (216 000 km^2), which is allowed by the Province to be cut per year.
[4] There is the potential for Crown Land Forestry operations to occur in MCFH when a Crown License has more than the required 12% MCFH on its land base.
NA – Not available

The first step of the analysis of cumulative effects was to determine if the identified effect was adverse. An adverse effect was defined as one that has the potential to directly reduce the population of a VEC or to limit the function of the VEC below an acceptable level.

The significance of a potential effect was determined using duration, frequency, geographical extent, magnitude and reversibility of the effect. Three categories for each criterion were established which are presented below:

a. Duration
   i. Short-term (less than 1 year)
   ii. Moderate term (between 1and 25 years)
   iii. Long-term (greater than 25 years)
b. Frequency
   i. Rarely (less than once per year)
   ii. Sporadically (less than once per week)
   iii. Frequently (less than once per day)
c. Geographical Extent
   i. Single point
   ii. Localized
   iii. Regional or greater
d. Magnitude
   i. No measurable disturbance
   ii. Measurable disturbance with no loss of function
   iii. Measurable disturbance with loss of function
e. Reversibility

i. Less than a year
ii. Between 1 and 25 years
iii. Over 25 years

Finally, the analysis considered the likelihood of the effect acting in a cumulative manner with other effects.

Wetlands

The magnitude of effect associated with each of the included projects is moderate due to the crossing techniques and in the case of M&NP the rehabilitation practices. This means that there may be measurable disturbance to a small area of wetland, however there will be no net loss of wetland function (refer to Appendix G, Summary of Residual Effects Assessment). With the exception of tower footprints in wetlands, any effects are reversible within one year. The total area affected by the identified projects is 0.1% of the wetland area available. This is a truly localised geographic effect. Any effects are short-term, with the exception of several tower locations in wetlands for the transmission line project for which compensation will be provided. The effects are one time. Since forestry activity on Crown Land is managed by the Minister of NBDNRE according to the *Crown Lands and Forests Act* and in accordance with the *Watercourse Alteration Regulation* under the *Clean Water Act*, forestry activities will not be allowed to occur within wetlands on Crown Land, therefore, no direct loss of wetland function will result from such activities. Generally, it is not economically viable for forestry operations to occur in wetlands as minimal amounts of merchantable timber are available.

All projects will, however, result in a potential increase in access to wetland areas which has the potential, if uncontrolled, to have a cumulative effect on wetland resources in the area. Due to the relatively small amount of wetland habitat opened to access this is not likely to be significant, however mitigation is recommended for the proposed transmission line in the conclusion below.

Migratory Birds

Several residual adverse effects on migratory bird species have been identified, which have potential to act cumulatively with effects from other projects or activities, including:

- Reduced/altered habitat, due to RoW clearing;
- Direct mortality due to bird strikes on conductor wires; and
- Disturbance due to noise and human presence.

There is potential for significant cumulative effects to occur due to reduced/altered habitat as the other projects identified in the Study Area contribute to regional fragmentation and silvicultural activities have altered much forest habitat in preference of softwood. There is insufficient existing data on the actual distribution of migratory bird species within the available habitat of the region to meaningfully assess the cumulative significance of reduced/altered habitat.

Therefore, a migratory bird field survey will be conducted (see Section 6.2.1.10) to verify the results of the Project habitat assessment. In the event that the survey identifies significant and critical habitat for identified species of migratory birds and it is clear that the functioning of such habitat will be adversely affected by the construction and operation of the proposed transmission line, NB Power will enter into discussions with representatives of the Canadian Wildlife Service to identify and implement measures to mitigate these effects.

There is potential for cumulative effects to occur due to direct mortality from bird strikes on transmission lines, however, NB Power is conducting a study to determine the types of devices available for use on high voltage transmission lines. Bird diversion apparatus will be installed as necessary to protect migratory birds, therefore, no significant cumulative effects from direct mortality are expected.

There is potential for significant cumulative effects to occur due to disturbance from noise and human presence resulting from recreational ATV traffic in all of the linear corridor projects (present and future) in the Study Area. However, due to the lack of sufficient data on present distribution of bird species within available habitat in the region and the lack of data regarding ATV activities in the other linear corridor projects in the Study Area, it is impossible to conduct a meaningful assessment of the significance of potential cumulative effects. NB Power will monitor effects of recreational ATV traffic in the preliminary Preferred 50 m RoW during operation and any measurable adverse effects on migratory birds (or their habitat) will be reported to NBDNRE, NBDELG and CWS.

Although it is recognized that there is a potential for measurable effects on migratory birds, it is impossible to do a meaningful CEA due to the fact that the same level of baseline information is unavailable from other projects in the Study Area.

Deer Wintering Habitat

The magnitude of direct effect associated with deer wintering habitat from the projects is moderate because while there may be a measurable effect on a portion of identified deer wintering areas, there will be no loss of function (refer to Appendix G for a Summary of Residual Effects Assessment). DWAs were selected as an appropriate VEC as the potential disturbance could be measured. They are defined as managed on Crown Lands by NBDNRE. A DWA aerial survey was conducted along the preliminary Preferred 50 m RoW for private lands on March 1, 2002. No DWAs were identified within the 50 m RoW during the survey. The duration of effect will be long-term and for the life of the Project. The direct frequency of disturbance is one time. The geographical extent is localized, being 3.1 km^2 out of 82 km^2 available (note that 70% of this area is associated with forest harvesting which in turn represents 30% of what is permitted on an annual basis on Crown Land in the Study Area). The effect is reversible in the mid term due to revegetation. The direct effect of the proposed Project together with other projects considered is not likely to have a significant adverse effect.

All projects will result in a potential increase in access to deer wintering habitat that has the potential, if uncontrolled to have a cumulative effect on the functioning of deer wintering habitat. Due to the limited extent of deer wintering habitat affected by the projects, however, the effect is not likely to be significant. Even so we recommend mitigation.

MCFH

The effects would be long-term, for the life of the projects (refer to Appendix G for a Summary of Residual Effects Assessment). The frequency is rare for all projects. The geographical extent is limited as 0.53 km^2 out of 121 km^2 will be affected. The magnitude is moderate as there will be a measurable disturbance with no loss of function. The effects of forest practices are reversible while those of the transmission lines and pipelines are not. According to the *Crown Lands and Forest Act*, each Crown Land licensee must maintain 12% of the license as MCFH. The forest practices would make the majority of the contribution to the effects on mature coniferous forest and any contribution from the proposed transmission line would not be significant.

Fish Habitat

All of the projects considered for CEA require stream crossings. Some watersheds are crossed by several of the projects, although none in close proximity. The duration of effect on fish habitat is short-term and infrequent (refer to Appendix G for a Summary of Residual Effects Assessment). The crossings are single points and the geographical extent is localized. There will be no measurable disturbance associated with the projects in streams provided appropriate mitigation is in place. Any effects are reversible in the short-term. All projects, including forestry operations on Crown Land, are regulated and must obtain and adhere to WAPs.

The contribution to any cumulative adverse effects from the proposed transmission line is not significant.

All projects will increase access to watercourses. Uncontrolled access has the potential to result in adverse effects. The likelihood of such effects will be reduced by taking a proactive approach to access management.

Conclusion

The likelihood of significant adverse cumulative effects due to the Project, when considered with other projects in the Study Area, is low.

Increased uncontrolled access has been identified as having potential for adverse effects on identified VECs. At present there are an estimated 1200 km of highways and roads in the Study Area. This does not include the number of forestry roads that are constructed annually to harvest forest resources on Crown and private land. The Study Area also includes 110 km of pipeline corridor and some 115 km of existing 138 kV transmission lines. The total amount of linear corridor in the Study Area is estimated at 1400 km. The proposed Project will add approximately 95 km to this length, a portion of which is existing RoW. This represents an increase of approximately 7% to the total amount of linear corridor.

Several sections of the EA identified approaches that are planned by NB Power to reduce the potential for uncontrolled access along the preliminary Preferred 50 m RoW. The RoW will be allowed to regenerate up to a height of 12 feet following construction. It is very likely that the tall shrub species that will regenerate within the narrow construction corridor will discourage recreational traffic (ATVs in particular). These approaches will have some effect on limiting access to the preliminary Preferred 50 m RoW, however adjacent land uses, such as forestry practices, can effectively negate the effectiveness of any access controls put in place along the RoW. In view of this potential, NB Power will undertake to communicate with other major landowners and resource managers to consider uncontrolled access. NB Power does not have “Fee simple” ownership of the RoW, and any mitigation measures must be acceptable to the landowner. Therefore, NB Power will work in cooperation with any landowner(s) who wish to control access to the preliminary Preferred 50 m RoW, that may result in the use of gates, barriers and signage. Maintenance of any initiatives would be the responsibility of the individual landowner. In addition, NB Power is committed to the following: monitoring wetlands for evidence of damage caused by ATVs, contacting and meeting with the ATV Associations in Charlotte County to discuss environmental and safety issues associated with ATV use along the transmission line RoW, contacting and working with landowners when damage has been observed along the RoW and continuing with the advertisement in the local media regarding ATV and Snowmobile trespass. The issue of controlling ATV access to the RoW will be discussed with landowners during the pre-construction program which will be implemented prior to clearing to obtain easements, as well as to review any constraints that may be located on the property and to discuss environmental commitments made by NB Power in relation to these constraints. NB Power does not have a time frame for consultation with major landowners and resource managers to consider uncontrolled access by ATV vehicles. NB Power has participated in discussions about this issue and will continue to do so. NB Power believes that the Province’s Task Force on ATVs under the Department of Public Safety should initiate and conduct such discussions.

6.6 Renewable Resources

Several of the VECs identified, may be considered to be renewable resources (*i.e.,* resource will return to a natural state over time) as follows:

- Air quality
- Groundwater
- DWAs
- MCFH
- Fishery resources

- Migratory birds
- Wetland habitat
- Agricultural areas
- Forestry areas
- Aboriginal resources

It is a requirement of *CEAA* to consider the capacity of renewable resources to meet present and future needs. Presently, all of the VECs identified above are managed by the Provincial and Federal agencies, which allow sustainable harvesting/usage of VECs such as hunting, fishing, and forestry. Based on the assessment of Project and cumulative effects (Section 6.1 – 6.5), no significant adverse residual effects are likely to occur on any of the VECs, with application of the identified mitigation. Within the local and regional context, a significant effect was considered to diminish the quality of the renewable resource, critically reduce the availability of the renewable resource, or compromise the ability of other species or future generations to meet their needs. Since no significant adverse effects are anticipated, the capacity of the renewable resources identified above to meet present and future needs is considered to be unaffected by the Project. Therefore, no additional mitigation is necessary to protect renewable resources.

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7.0 ENVIRONMENTAL MONITORING AND FOLLOW-UP PROGRAMS

It is not likely that the Project will cause significant adverse environmental effects, provided that recommendations, including implementation of mitigative measures identified in Sections 3.0 and 6.0 are incorporated. Recommended further studies and monitoring initiatives are summarized in Table 7-1, and described in the following sections. In addition, Table 7-1 provides the status of each commitment. Monitoring is recommended in the context of ensuring that habitat function is maintained at a level equal to or better than pre-construction conditions.

7.1 Environmental Monitoring Plans

A comprehensive environmental monitoring program will be developed for the proposed IPL Project. Environmental monitoring will be used to:

- assure protection of the environment;
- assure that personnel exercise due diligence in carrying out activities; and
- evaluate the effectiveness of the measures used to prevent or minimize environmental effects.

NB Power will establish the following environmental monitoring programs:

- Compliance Monitoring
- Baseline Monitoring
- Environmental Effects Monitoring

7.1.1 Compliance Monitoring

An Environmental Compliance Monitoring (ECM) program is undertaken for a project to ensure that appropriate regulations and Company specifications are implemented during Project development. Activities relevant to all phases of the Project (*i.e.*, construction, operation, and decommissioning and abandonment) are subject to the provisions of relevant regulations and guidelines (Table 1-1). Activities conducted are also subject to standard NB Power specifications.

An ECM program will ensure that pre-construction commitments made to landowners, regulatory agencies, and other groups are implemented. Commitments may include the need to follow specific watercourse crossing techniques or other conditions imposed by regulatory agencies (*e.g.*, WAP). As well, a landowner, stakeholder or other interested party may request specific attention be made in particular areas. Compliance monitoring will ensure that preventative and protective environmental measures are in place throughout construction.

TABLE 7-1
Summary of Pre- and Post-Construction Studies and Monitoring Initiatives

Valued Environmental Component (VEC)	Pre- and Post-Construction Studies and Monitoring Initiatives	Status
• Air Quality	Pre-Construction Investigations/Programs:	
	• None identified at this time	Not applicable
	Monitoring:	
	Construction:	
	• None identified at this time.	Not applicable
	Post-Construction:	
	• None identified at this time.	Not applicable
• Groundwater Resources	Pre-Construction Investigations/Programs:	
	• A groundwater resource survey will be conducted on all private landowners along the preliminary Preferred 50 m RoW to identify any groundwater wells or springs developed as a water supply within 200 m of the centerline of the RoW.	Complete (Section 4.3.5)
	• All wells and springs developed as water supplies, within 50 m of the centerline of the preliminary Preferred 50 m RoW where excavation and dewatering will occur will be ground-truthed. Baseline water quality analysis will be conducted, including total coliform bacteria, and general water chemistry parameters (e.g., pH, alkalinity, turbidity, acidity, conductivity, metals, sulfate, etc). Yield static water levels and well depth and casing length will be recorded.	To be conducted
	Monitoring:	
	Construction	
	• Seismic monitoring will be carried out on the closest well within 200 to 500 m of all blasting locations.	To be conducted

TABLE 7-1
Summary of Pre- and Post-Construction Studies and Monitoring Initiatives

Valued Environmental Component (VEC)	Pre- and Post-Construction Studies and Monitoring Initiatives	Status
• Groundwater Resources (Cont'd)	• All wells within 200 m of any blasting locations will be pre-tested for baseline water quality, including total coliform bacteria, and general water chemistry parameters (e.g., pH, alkalinity, turbidity, acidity, conductivity, metals, sulfate, etc). Yield, static water levels and well depth and casing length will be recorded for these wells.	To be conducted
	Post-Construction	
	• After normal excavation, post-construction monitoring will be conducted, as indicated by the pre-construction survey.	To be conducted
• Terrestrial Resources	<u>Pre-Construction Investigations/Programs</u>:	
	• Field investigation of areas suspected of having a high potential to support plant species at risk (i.e., at wetlands and watercourses have been conducted.	Complete (Section 4.4.1.1)
	• An aerial raptor survey has been conducted along the centerline of the preliminary Preferred 50 m RoW to determine the presence and location of active raptor nests within the 50 m RoW.	Complete (Section 4.4.1.5)
	• A DWA aerial survey has been conducted along the centerline of the preliminary Preferred 50 m RoW to determine the location of DWAs on private land within the 50 m RoW.	Complete (Section 4.4.3.2)
	• An aerial raptor field survey will be conducted in the spring of 2003	To be conducted
	<u>Monitoring</u>:	
	Construction	
	• None identified at this time.	Not applicable

TABLE 7-1
Summary of Pre- and Post-Construction Studies and Monitoring Initiatives

Valued Environmental Component (VEC)	Pre- and Post-Construction Studies and Monitoring Initiatives	Status
• Terrestrial Resources (Cont'd)	Post-Construction • Monitoring recovery of plant species at risk associated with the Mohannes Stream damaged by construction clearing; • Monitoring of species at risk (including species of migratory birds), as required in SSEPPs; and • Monitoring of erosion control measures at watercourse crossings during routine maintenance inspections and following major storms until the RoW is revegetated.	 To be conducted To be conducted To be conducted
• Aquatic Environment	Pre-Construction Investigations/Programs: • Finalize tower placement greater than 30 m from any watercourses. • If access across a watercourse (or blasting is required adjacent to a watercourse), then a pre-construction baseline aquatic habitat survey will be conducted to satisfy Watercourse Alteration Permitting requirements and DFO blasting setback distances. Monitoring: Construction • Monitoring of stipulations included in any WAPs, including erosion and sedimentation control measures to ensure effectiveness. Post-Construction • Inspection to identify areas where further stabilization and erosion control measures are required.	 On-going To be conducted To be conducted
• Wetland Habitat	Pre-Construction Investigations/Programs: • Biophysical habitat surveys have been conducted for all wetlands crossed by the preliminary Preferred 50 m RoW.	 Complete (Section 4.6.1)

TABLE 7-1
Summary of Pre- and Post-Construction Studies and Monitoring Initiatives

Valued Environmental Component (VEC)	Pre- and Post-Construction Studies and Monitoring Initiatives	Status
• Wetland Habitat (Cont'd)	<u>Monitoring</u>: Construction	
	• Ensure undesirable invasive plants species are not transferred from, or to, a wetland.	To be conducted
	Post-Construction	
	• Monitoring wetland recovery where a structure will be located in, or within 30 m of the wetland;	To be conducted
	• Monitoring for damage caused by ATV's at watercourses and wetlands (including effects on migratory birds);	To be conducted
	• Monitoring recovery of plant species at risk associated with the Mohannes Stream damaged by construction clearing	To be conducted
	• Monitoring species at risk (including species of migratory birds), as required in the SSEPPs	To be conducted
	• Monitoring erosion control measures at watercourse crossings during routine maintenance inspections and following major storms until the RoW is revegetated	To be conducted
• Migratory Birds	<u>Pre-Construction Investigations/Programs</u>:	
	• Conduct a migratory bird survey in June 2002 to verify the results of the habitat assessment. The sites and key species that will be surveyed will be identified in consultation with CWS and NBDNRE representatives. Once the sites and key species have been identified, a professional ornithologist will be retained to carry out the survey and to report survey results.	Complete (Section 4.4.2)
	<u>Monitoring</u>: Construction	
	• None identified at this time.	Not applicable

TABLE 7-1
Summary of Pre- and Post-Construction Studies and Monitoring Initiatives

Valued Environmental Component (VEC)	Pre- and Post-Construction Studies and Monitoring Initiatives	Status
• Migratory Birds (Cont'd)	Post-Construction • None identified at this time.	Not applicable
• Other Infrastructure	<u>Pre-Construction</u> • Definition of specific locations of other infrastructure crossed by the preliminary Preferred 50 m RoW (e.g., SJLPP), including EMF sensitive equipment (e.g., TV, radio, microwave towers).	On-going
• Community/Emergency Services	<u>Pre-Construction</u> • Basic fire prevention and safety awareness training.	To be conducted
• Archaeological/Heritage Resources	<u>Pre-Construction Investigations/Programs</u>: • A contingency plan for the protection of resources during both construction and operation will be developed in consultation with regulatory agencies. • Archaeological field surveys have been conducted for 21 high potential areas along the preliminary Preferred 50 m RoW. <u>Monitoring</u>: Construction • Site-specific construction monitoring will be conducted during initial ground disturbing activities and excavation, at high potential areas identified during field surveys (may include separate study at Dennis Stream site).	Complete (Section 6.2.1.20) Complete (Section 4.7.3) To be conducted

TABLE 7-1
Summary of Pre- and Post-Construction Studies and Monitoring Initiatives

Valued Environmental Component (VEC)	Pre- and Post-Construction Studies and Monitoring Initiatives	Status
• Current Use of Lands and Resources for Traditional Purposes by Aboriginal persons	<u>Pre-Construction Investigations/Programs:</u> • Continue communication with Aboriginal groups. • The preliminary Preferred 50 m RoW has been surveyed for medicinal plants used traditionally by Aboriginal peoples.	 On-going Complete (Section 4.8)
• General Compliance, Baseline, and Environmental Effects Monitoring	• Following finalization of the preliminary Preferred 50 m RoW, monitoring initiatives will be developed for significant sensitive features not avoided.	To be conducted (Section 7.1.3)

The ECM will be performed by NB Power personnel. NB Power personnel will be familiar with the applicable regulations and will ensure that activities be planned and conducted with the knowledge and understanding of standard specifications. In the event of non compliance, NB Power personnel overseeing ECM will immediately report the activity to the appropriate personnel within NB Power, and implement measures to achieve compliance.

Project personnel will be fully qualified and will have applicable work experience. The Environmental Inspector will advise construction personnel on environmental matters, and oversee all environmental matters pertaining to construction. The Environmental Inspector will also report any activity which may cause adverse environmental effects, or any activities which do not meet environmental protection commitments.

The ECM during operations will be conducted during aerial and ground patrols. General environmental conditions on and near facilities will be monitored for conditions such as soil erosion or water ponding. New developments or activities near facilities will also be monitored to assess any encroachment onto or near the 50 m RoW.

7.1.2 Pre-Construction Monitoring

Pre-construction (*i.e.*, baseline) monitoring is conducted to characterize a variety of parameters associated with VECs, and facilitate finalization of the preliminary Preferred 50 m RoW. Pre-construction monitoring provides a basis by which changes in parameters associated with VECs can be determined by comparing with the results obtained from the compliance and Environmental Effects Monitoring (EEM) programs. Pre-construction monitoring programs have been described in Table 7-1.

7.1.3 Environmental Effects Monitoring (EEM)

The EEM is used to assess the accuracy of any predictions made in the EIA concerning potential effects. Following restoration of the 50 m RoW, the potential environmental effects of construction are monitored. A photographic and written record is made of conditions on and adjacent to the 50 m RoW at various times after construction. A visual examination of the environmental features along the RoW help identify potential problem areas. This will help assess recovery trends and sites that require additional restoration activities. Aerial observations and on-the-ground field surveys will be used. Where necessary, air, land, and water sampling programs will be developed to monitor site conditions. If problems are noted, site-specific rehabilitation programs will be established. These programs will be based on the results of the baseline sampling programs. The EEM will be site-specific and will include documentation of the following, as appropriate:

- groundwater quality in the vicinity of areas that may be potentially effected;
- the effect of vibrations associated with blasting activities on the aquatic environment (if fish are determined to be present) and surrounding areas;

- the quality of selected surface waters draining potentially disturbed areas;
- species at risk. Species at risk monitoring will be undertaken coincident with routine maintenance inspections and will be conducted where a SSEPP has identified this requirement. The SSEPPs will be submitted to NEB, Environment Canada, NBDNRE and NBDELG for review prior to construction. The inspector will be trained to recognize the identified species and habitat and will be familiar with the requirements of the SSEPP. Where damage (*i.e.,* an anthropogenic disturbance resulting in the inability of the species to regenerate naturally) has been observed, the necessity for remedial action will depend on the species affected, the type and extent of damage, and the likelihood that those damaging effects will recur. Therefore, if any damage to species at risk is observed which has resulted from the Project the potential effect on the species population at that site will be assessed the appropriate regulatory authorities will be notified and protective measures will be taken including a follow-up program to test the effectiveness of these measures. The most practical approach to protection/restoration of species is the protection of their habitat. Species restoration/recovery can be expected to occur naturally, provided suitable habitat is present.
- wetlands (including alien invasive plant species); and
- aquatic habitat. The EEM program would consist of a survey with the same design employed as for baseline surveys. Baseline surveys would consist of a baseline aquatic habitat survey using the standard NBDNRE/DFO habitat assessment, methodologies and an electrofishing survey. The results from the post-construction survey would then be compared to the pre-construction baseline surveys focussing on habitat characteristics.

The proposed EEM program will be submitted to DFO, Environment Canada, NBDELG, NBDNRE and NEB for review and comment.

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8.0 CONCLUSION

This CSR has addressed the environmental effects associated with construction, operation and maintenance of the proposed IPL Project. The location of the preliminary Preferred 50 m RoW (detailed routing) will be further refined and finalized in consideration of the results of the follow-up/field programs recommended in this Report.

NB Power is committed to implementing all recommended mitigation measures described in this Report. Therefore, this assessment concludes that the Project is unlikely to cause significant adverse residual environmental effects.

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APPENDIX A

Issues and Concerns Raised During Public Consultation

Appendix A
Issues and Concerns Raised During Public Consultation

Name	Association	Date Received	How Received	Issue/Request/Concern/ Comment/Question	Date of Response	Mode of Response	Response	Status
Allen Kenneth Appleby	Landowner within the preliminary Preferred 50 m RoW	June 25, 2001	Attended Information Session	Issue: Concerned re land and timber value. Owner has a managed woodlot and wants this taken into consideration during negotiations for compensation.	July 31, 2001	Meeting	Right of Way agent visited Mr. Appleby to discuss the details of the compensation offer. Mr. Appleby was advised that the timber cruise of the property would not be completed until fall of 2001 or possibly early 2002. Agent advised that the issue of whether the compensation would be increased as a result of the fact that it is a managed woodlot would depend on the findings of our forester.	Landowner is satisfied and will await results of timber cruise for further discussion. Cruises expected to be completed in Early 2002. Agent to contact.
Carol and Russell Arbeau	Landowner within the preliminary Preferred 50 m RoW	Oct.25, 2001	Attended Information Session	Question: why did Irving Oil Limited appear on the mailing label along with their names for their property?	Nov 21, 2001	Letter/ Meeting	Right of Way Agent visited the Arbeaus to hand deliver a letter explaining why Irving Oil appeared on the mailing label of the information package sent to their home regarding their property. The Arbeaus were advised that the Provincial database lists Irving Oil as an owner along with themselves. As NB Power was not verifying the title information on each property until later in the project, NB Power was relying on the information contained therein. The Arbeaus understood the reasoning and had no further issues.	Complete. Landowner is satisfied with response.
Gordon Baird	Local Service District Representative	Oct 25, 2001	Attended Information Session	Request: for maps of the General Study area and the Preferred Corridor	Oct 31, 2001	Letter	Letter with the requested maps and information forwarded to Mr. Baird with an invitation to contact NB Power if he had any further requests or questions.	Complete. No further requests to date.
Myrwyn Berry	Landowner within the preliminary Preferred 50 m RoW	July 16, 2001	Phone Call	Complaint: Only received one letter advising of the Information Session. Unable to attend this session but wondered why they were not invited to another session.	July 20, Sept 25, & Nov 27, 2001	Meetings	Right of Way Agents met with the Berrys regarding the routing of the proposed IPL on their property. Apology was given regarding the misunderstanding that they would be invited to the second meeting. The Berrys have since signed the Permission for Access Agreement, road Access agreement and a Section 87 Notice has been served regarding their property.	Apology was accepted and they have no further issues at this time. Option for Easement Agreement signed on January 31, 2002.

Name	Association	Date Received	How Received	Issue/Request/Concern/ Comment/Question	Date of Response	Mode of Response	Response	Status
Shannon Brewer	Landowner located within the 1 km Preferred Corridor	July 24, 2001	Phone Call	Question: Where is the location of the proposed IPL?	July 25, 2001	Phone Call	A Right of Way Agent called the Brewers to discuss the location of the proposed IPL in relation to their property. The Brewers were advised that the preliminary preferred 50m RoW would not cross their property. A map showing the route was offered but declined. Agent undertook to contact them in the event that the proposed route location changed affecting their property. Preliminary preferred 50m RoW has not changed in this area.	Complete. Landowner is satisfied with response.
Rose Cawley	Landowner located within the 1 km Preferred Corridor	Oct 25, 2001	Attended Information Session	Requesting some additional information related to the proposed location of the line in relation to her property (map etc) and interested in all project information during the life of the project. Also requested information re EMF	Nov 5, 2001	Letter sent with map	Cover letter sent to landowner with mapping information illustrating that her property was located approximately 400 meters or 440 yards away from the boundary of the preliminary preferred 50m RoW for transmission line 3016. All information sent to landowners will also be sent to Ms. Cawley in future.	Complete No further information sent to affected landowners as of this date.
					Nov 5, 2001	Phone Call	NB Power's Manager of Health and Safety called Ms. Cawley to discuss the issue of EMF. They spoke at length regarding this issue. Invitation to Ms. Cawley to contact NB Power anytime with further questions/issues.	Landowner continues to have concerns regarding EMF but she was very appreciative of the conversation. No further contact to date.
Mrs. Cogswell	Landowner located within the 1 km Preferred Corridor	October 31, 2001	Phone Call	Concern: She is unable to interpret the map which was sent to her in the information package. She would like to know if her property will be affected.	Nov 8, 2001	Letter	Cover letter to Mrs. Cogswell sent stating that her property is not affected by the preliminary Preferred 50 m RoW. An additional map was enclosed showing the location of her property in relation to the preliminary preferred 50 m RoW.	Complete.

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Mrs. Cogswell (Continued)					Nov 14, 2001	Phone Call	NB Power's Right of Way Agent called landowner to follow up and ensure that information was received and that the information was clear.	Landowner was satisfied with the information and had no further issues.
Charles Connick	Landowner located within the preliminary Preferred 50 m RoW	June 26, 2001	Attended Information Session	Question: who completes the clearing and can he keep the wood that is cleared and where will it be left?	July 26, 2001	Meeting	Right of Way agent met with landowner to discuss the issues. He advised the landowner that NB Power contractors would clear the land but that the landowner had the choice of whether to be paid for the wood or keep the wood. Landowner satisfied and advised that he would make his choice once he saw the compensation offered. Landowner signed Access Permit.	Complete. Option for Easement Agreement has been signed.
David Coon	Community Resident	July 12, 2001	Attended Information Session	Request: a copy of the study comparing the 2nd tie line routing of Keswick vs. Point Lepreau route	July 24, 2001	Letter	Letter with information memo included setting out the comparisons of the two proposed routes. Invitation included contacting the Project Manager if anything further required.	Complete. No further requests related to this issue to date.
Louise Corning and Frances MacKellar	Landowner located within the preliminary Preferred 50 m RoW	July 12, 2001	Phone Call	Request: for mapping showing line in relation to property boundary	July 26, 2001	Letter	Information package forwarded to Mrs. Corning	Complete. Access Permit has been signed. No issues
		July 25, 2001	Phone Call	Request for information as she will not be able to attend information session	Aug 3, 2001	Phone Call	Right of Way Agent called Mrs. MacKellar to discuss the project and the Access Permit and called Mrs. Corning to set up a meeting for review of same. Access Permit received signed by the MacKellars. No issues	
					Aug 9, 2001	Received Access		
					Aug 31, 2001	Permit Meeting	Agent met with Mrs. Louise Corning to review the package of information which was forwarded. No issues.	

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Ronald Curran	Landowner located within the preliminary Preferred 50 m RoW.	July 9, 2001	Phone Call	Question: will the line be going across his property?	July 23, 2001	Meeting	Right of Way Agent met with Ron and Elizabeth Curran and their son Tony Curran to review the proposed project and the location of the line on their property. Access Permit was signed at this time.	Complete. Option for Easement Agreement has been signed.
Gordon Dalzell	Environmental representative	October 25, 2001	Attended Information Session	Request: Provide copy of the presentation given at the session and a contact at Bangor Hydro. Question: Approximately how many trees will be cut for the proposed easement?	Nov 1, 2001	Letter	Letter sent to stakeholder with the presentation attached and the contact information for a person at Bangor Hydro. Commitment to provide information related to wood as soon as received.	Follow up required regarding approximation of amount of wood to be cleared. Information to be provided once NB Power is in receipt of same.
Dan Debow	Landowner owns property within the immediate area	Sept 27, 2001	Phone	Concern: He has a camp property just purchased in the area and would like to know where it is in relation to the proposed line.	Oct 3, 2001	Letter and phone call	Information forwarded to Mr. Debow showing the location of the line in location to his camp. Camp is located a few kms from the proposed route. Location discussed with Mr. Debow. Mr. Debow advised that he would review the information forwarded once received and call back if further issues. No further contact or request for information.	Complete. Landowner is satisfied with response.
Patrick Desmond	Local Businessman	Oct 25, 2001	Attended Information Session	Question: Is his Company Ready John listed in the database we use to contract for services?	Nov 13, 2001	Phone Call	Mr. Desmond advised that his company is included in NB Power's database for services and he would be kept in mind in the event that his services were required.	Complete.
Judy Dewar	Landowner located within the preliminary Preferred 50 m RoW	June 25, 2001	Attended Information Session	Question: How is the land cleared and who gets the wood on the land once cleared?	July 31, 2001	Meeting	Right of Way Agent met with landowner and discussed the fact that NB Power's contractor will do the clearing. He advised her that the landowner had the choice of whether to keep the wood after clearing or be paid for same. She advised that her brother in law may want the wood but would choose at the time of the compensation offer. Permission for Access has been signed.	Complete. Option for Easement Agreement has been signed.

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Name	Association	Date Received	How Received	Issue/Request/Concern/ Comment/Question	Date of Response	Mode of Response	Response	Status
William Dickerson Estate, c/o William Dickerson Jr.	Landowner located originally within the preliminary Preferred 50 m RoW; now located within the 1 km Preferred Corridor	June 25, 2001	Attended Information Session	Concern re the property boundary as shown on the sketch he received.	July 25, 2001	Meeting	Right of Way Agent met with Mr. Dickerson to discuss property boundary information. Mr. Dickerson did not believe the proposed easement was on his property, as he believed the property boundary information to be incorrect. Surveyors have since confirmed this information and the proposed alignment is now off of Mr. Dickerson's property and falls completely within Ralph Dow's property.	Complete. Mr. Dickerson has no issues and is satisfied with the response. Mr. Dow has been advised of the boundary change and agrees with the boundary as now shown.
Robert and Terry Dickerson	Tenants on property owned by Ken and Jean Johnston located within the preliminary Preferred 50 m RoW.	July 12, 2001	Attended Information Session	Concern: They have a camp on the affected property and they are concerned about the location of the proposed alignment being less than 500 feet from the camp.	July 20, 2001 Oct 31, 2001	Meeting Meeting	Right of Way Agent met with tenants to discuss proposed alignment in proximity to their camp. Agent met with tenants to serve them a Section 87 Notice. Advised them that now that the centerline survey has been completed we know that the camp is located approximately 1000 feet from the boundary of the preliminary preferred 50m RoW. Although they are still not 100% happy with the location of the proposed IPL they are happier that it is further away than originally thought.	Follow up meeting required to serve Section 87 Notice and to advise re actual location of preliminary Preferred 50 m RoW once centerline survey cut. Nothing further at this time. Access Permit and Option for Easement Agreement has been signed by the landowner.
Jimmy Dow	Landowner located within the preliminary Preferred 50 m RoW.	June 25, 2001	Attended Information Session	Issues: Tax implications of compensation; wants to preserve the pine on the properties and concerned regarding loss of future income	July 25, 2001	Meeting	Right of Way Agent met with landowner to discuss the issues. Mr. Dow decided to cut and mill the pine on the property so this is no longer an issue.	Permission for Access signed and Section 87 Notice has been served.

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Jimmy Dow (Continued)							Agent advised him that he would need to see his own accountant to discuss tax implications however explained to Mr. Dow his option to choose a periodic payment of the compensation to help address this. Discussions were held regarding the issue of future loss this issue will be further discussed at the time of the compensation offer.	Once timber cruises are complete on the properties agent will meet with landowner again to discuss compensation issues outstanding.
Russell Dow	Community Resident	June 25, 2001	Attended Information Session	Request: copy of constraint map, information related to methods of construction around watershed (Dennis Stream watershed) ; provide EIA report; Question: How will NB Power stop ATV's from using easement?	July 24, 2001	Letter	Maps of the study area including constraint mapping were sent as requested. Letter explained the methods of construction in watershed areas and gave a brief description based on NB Power's Environmental Protection Plan. A copy of the ads which have been published in local newspapers regarding ATV use on the easement were also included. Invitation to contact NB Power again if anything further required	Complete. No further request for information received to date.
Dorothy Fairweather – Estate of Philip McKay	Landowner located within the preliminary Preferred 50 m RoW.	July 12, 2001	Attended Information Session	Issues: Property value and compensation	July 25, 2001	Meeting	Right of Way Agent met with landowner to discuss compensation issues. Agent advised that property is only slightly affected by the current proposed routing and may in fact not be affected at all. Her only concern is that if affected the compensation offer is fair. Access Permit has been signed.	Complete. Further meeting required to offer the total compensation.
Chester Getchell	Landowner located within the 1km Preferred Corridor	July 24, 2001	Phone Call	Question/Comment: Where is proposed route in relation to his property and information package addressed to Curtis Getchell who is deceased.	July 25, 2001	Meeting	Right of Way Agent met with Mr. Getchell to review the location of the proposed route in relation to his property. It was determined that his property is not affected by the preliminary Preferred 50 m RoW.	Complete. Landowner is satisfied with response.
		Sept 12, 2001	Information Session		Sept 12, 2001	Meeting	At the session Mr. Getchell requested confirmation that the preliminary preferred route location had not changed. Confirmation was provided at that time.	

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Jason Golding, Forester for JD Irving Limited	Landowner within the preliminary Preferred 50 m RoW.	July 12, 2001	Attended Information Session	Question: Concerned re loss of investments of JDI and would like to discuss project generally and the impact on JDI. Specific concerns include silviculture compensation and accessibility to their product (wood)	Aug 9, 2001 Sept 8, 2001	Phone Call Meeting	Called to set up meeting. Representatives from NB Power met with Jason Golding at JDI offices. Information was provided at this time relating to the location of the proposed line on JDI properties. Compensation was discussed and rates were agreed to. Mr. Golding was advised that wood would be left at accessible roads. No further issues at this time.	Complete. Final title searches being completed on the 9 JDI properties and once complete meeting will be set up for service of section 87 and negotiation for compensation.
George Gunter	Conservation Council of New Brunswick	Aug 15, 2001	Phone Call	Question: was the route from Keswick considered for this line and if so why was it rejected and heard on news that the US side of things was having trouble with the approvals; any comment?	Aug 27, 2001	Phone Call	Mr. Gunter had conducted additional research on the Website and had obtained some of the information he was looking for. He had a number of general comments about the economics of the project; however, seemed satisfied when we talked about details of the project. With respect to his question regarding US approvals: Mr. Gunter was provided with a contact at Bangor Hydro.	Complete: No further issues to date.
Gary Hasty	Landowner located within the 1km Preferred Corridor	Aug 2, 2001	Phone Call	Concern: Noticed survey ribbons near his camp and no one has called for permission.	January 31, 2002	Phone Call	Agent called to advise that NB Power surveyors should not have been flagging on his property and information was that they were not. Agent called to determine if Mr. Hasty had any further activity on his property and he advised that he discovered that the flagging was completed by students working for NBDNRE and not NB Power.	Complete. Landowner satisfied with response and appreciated follow up call.
David Hatt	Landowner within the immediate area	July 10, 2001	Phone Call	Request: Would like a map of the proposed 1km Preferred Corridor and the preliminary Preferred 50 m RoW.	Aug 8, 2001	Letter and Phone Call	Information sent to Landowner including the map requested. Right of Way Agent called to discuss the location and advise him of the information forwarded. Nothing more required.	Complete. Landowner is satisfied with response.

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Name	Association	Date Received	How Received	Issue/Request/Concern/ Comment/Question	Date of Response	Mode of Response	Response	Status
Ken Healey	Landowner located within the 1km Preferred Corridor	October 19, 2001	Phone Call	Question: Has property close to Maguadavic River and would like to know where route is in relation to his property	Nov 13, 2001	Letter	Right of Way Agent sent a letter stating that his property is not affected by the preliminary preferred 50m route enclosing a map showing the location of the route in relation to his property.	Complete. Landowner is satisfied with response.
Sheldon Lee	MLA	Oct. 16, 2001	Phone call	Looking for information on cutting process. Have contracts for cutting and removal already been awarded? What is the process? Who can the contractors contact to bid on the job.	Nov 14, 2001	Phone	Left a message on Nov. 1 and finally had an opportunity to speak with Mr. Lee on November 14, 2001. Provided information on the contract process and indicated that a contract has not been sent out for tender. Informed him that anyone can bid on the contract as long as they have the necessary insurance and the 10% bid deposit. Once the project goes to tender it will be advertised in the paper.	Mr. Lee appreciated the details and had no further questions or issues.
Ms. Levison	Community Resident	Sep 10 2001	Phone Call	Requested maps of the Preferred Corridor and a copy of the CSR. Concerned that her property might be affected.	Sept 14, 2002	Letter	Sent her an information package that included the maps and the CSR. Followed up with a call to confirm receipt of the information. Ms. Levison was in the process of reviewing the information. Explained the process of selecting the Preferred Corridor and pointed out to her that a 50 m RoW would be located within the Corridor. A few days later another called was made to confirm that her concerns had been satisfactorily addressed.	Complete. No further issues or concerns.
Janet MacElwain	Landowner located within the preliminary Preferred 50 m RoW	June 25, 2001	Attended Information Session	Question: Who is liable for trespassers on the proposed RoW?	August 27, 2001	Letter	Letter sent to landowner explaining NB Power's position regarding liability.	Complete. Option for Easement Agreement provided for review.

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Janet MacElwain (Continued)					Sept 6, 2001 Nov. 14, 2001	Meeting Meeting	Right of Way Agent met with the landowner regarding the issue of access and to follow up regarding the letter sent. The letter was discussed and she accepted NB Power's position and signed the Permit for access. Section 87 Notice served and no further issues at this time.	
Jim Maxwell	Landowner located within the preliminary Preferred 50 m RoW.	Nov 14, 2001	Phone Call	Question: General questions related to the proposed location of the easement and the width of same.	Nov 15, 2001	Meeting	Landowner met with the surveyors on site to discuss the work of the survey and centerline cut. Right of Way Agent served the Section 87 Notice and Access Permit had been previously signed. No further questions at this time	Complete. Landowner is satisfied with the response.
Sidney/ Ronald Mitchell	Landowner has property located within the immediate area	July 12, 2001	Phone Call	Question: Location of proposed route in relation to his property	August 9, 2001	Phone Call	Landowner is an NB Power employee and therefore reviewed the mapping information available at work. Right of Way Agent called landowner to review the map and to confirm that his property was located approximately 5 km from the edge of the preliminary Preferred 50 m RoW.	Complete. Landowner is satisfied with response.
Peter Moffat	Landowner is located within the 1km Preferred Corridor	June 25, 2001	Attended Information Session	Question: Where is proposed route in relation to his property? Please provide a map	July 24, 2001 July 26, 2001	Phone Call Letter	Right of Way Agent called landowner to advise that his property was not affected by the preliminary preferred 50m RoW. Asked if he wished to meet to discuss and he advised that this was not necessary. Map showing the location of the preliminary preferred route in relation to his property sent to landowner.	Complete. Landowner is satisfied with response.
Eric and Bette Nesbitt	Landowner located within the preliminary Preferred 50 m RoW	June 25, 2001	Attended Information Session	Request: PID verification and location on mapping	July 25, 2001	Meeting	Right of Way Agent met with landowners and explained that the property was affected by the preliminary preferred 50m RoW and reviewed the location of this preliminary route on the mapping. Access Permit was signed by owners on this date.	Complete. Landowner is satisfied with response.

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Name	Association	Date Received	How Received	Issue/Request/Concern/ Comment/Question	Date of Response	Mode of Response	Response	Status
Danny Orr	Landowner is located within the immediate area	June 25, 2001	Attended Information Session	Question: Who is liable for trespassers?	Sept 4, 2001	Letter	Letter sent to landowner stating NB Power's position related to liability. Mr. Orr was invited to contact NB Power if he had any further issues or questions.	Complete. No further requests to date.
Richard Orr	He intends to purchase property currently owned by the Reids. Property is located within the preliminary Preferred 50 m RoW	July 12, 2001	Attended Information Session	Request for information: Landowner would like to discuss with NB Power officials where the structures will be located on this property and how negotiations will be handled. Comment: He is purchasing the property from the current owners, the Reids.	July 24, 2001 July 26, 2001 July 31, 2001	Meeting Phone Call Phone Call	Right of Way Agent met with Mr. Orr on this date to discuss the project. Mr. Orr was advised that NB Power would continue to deal with the landowner but would be happy to meet with Mr. Orr in 2002 to discuss the issue of the location of the structures at this time. In addition Mr. Orr was advised that as NB Power was aware of his possible future interest he would be continually advised of developments concerning the property. Agent met with Mrs. Reid and had her sign Access Permit. Mr. Orr was called to advise him of same. Mrs. Reid advised that Richard Orr is to be involved in all decisions related to this property and the proposed IPL. Sale is projected to be completed before the end of 2002.	Complete Complete/No issues
James Pierson	Landowner located within the 1km Preferred Corridor	July 12, 2001	Attended Information Session	Question: Where is the line located? Concern: Safety, land values and aesthetics	July 27, 2001	Meeting	Right of Way Agent met with the Piersons to discuss the issues raised. He is concerned about the current alignment of the proposed IPL on the Tucker property. He has a small child and is also concerned about EMF. These issues were discussed and Information was offered along with a follow up visit. Mr. Pierson declined both.	

Name	Association	Date Received	How Received	Issue/Request/Concern/ Comment/Question	Date of Response	Mode of Response	Response	Status
James Pierson Continued		Sept 12, 2001	Attended Information Session	Concerns: EMF, aesthetics and location of proposed route Request: Would like the precise location of the proposed new route with the route rational and discussion re aesthetics/ eye sore; clearly identify the constraints causing the new proposed route outside of the original proposed corridor.	Sept 12, 2001	Meeting	Landowner was advised at the Session of the possible realignment. He would like the IPL out of Elmsville altogether but stated that the new alignment is better than the original alignment. NB Power representatives, discussed the EMF issue again at this time. Right of Way Agent advised that it did not appear that the preliminary Preferred 50 m RoW was located near Mr. Pierson's property. Agent to follow up with Mr. Pierson to confirm. Discussions occurred regarding the route rational and he was advised that the proposed route is routed based on existing constraints. A map showing these constraints in the area will be forwarded. Discussions were also held to address aesthetics. Representatives explained that the line is located in areas to minimize this issue.	The preliminary Preferred 50 m RoW was realigned in this area to avoid Mr. Tucker's property and locate the proposed alignment completely on an adjoining owner's property. The adjoining owner, Mr. Chris Stewart has been advised of the change and has no issue with the proposed new alignment.
					Oct 5, 2001	Phone Call	Right of Way Agent called Mr. Pierson to advise him that the preliminary Preferred 50 m RoW was staked and that his property was located approximately one km away from same.	Forward constraint map.
					Oct 18, 2001	Letter and Map sent	NB Power's Environmental Specialist sent a cover letter with a constraint map attached as requested. If further questions Mr. Pierson was asked to please call.	Complete. No further issues have been raised at this time.

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Ron and Bette Scott	Landowner originally located within the preliminary Preferred 50 m RoW. Now landowner is located within the 1 km Preferred Corridor	June 26, 2001	Attended Information Session	Concern re the proximity to the camp and opening up the property as currently it is very private and there is no access road into camp.	July 31, 2001 Aug 7, 2001	Meeting Phone Call	Right of Way Agent met with landowners and they requested a move of the line to the adjoining property owned by NBDNRE to keep ground access private. Survey/Design was contacted to review the proposed route location in this area. Agent called landowner to advise that the line would be realigned to avoid this property.	Landowner satisfied. NBDNRE provided with alignment on their properties with the proposed routing. To date, no issues.
Kenneth Hall Estate c/o Audrey Scovil	Landowner located with the preliminary Preferred 50 m RoW	June 25, 2001	Attended Information Session	Request confirmation that the proposed IPL is affecting their property	July 23, 2001	Meeting	Right of Way Agent met with landowners to advise that the proposed route was crossing their property and reviewed the route location with them. Access Permit signed by landowner on this date.	Complete. Landowner is satisfied with response.
Lois Simpson	Landowner located within the preliminary Preferred 50 m RoW	June 25, 2001	Attended Information Session	Comment: Landowner listed on Mailing label is deceased; Questions: How much of the land will be affected by the proposed RoW and if land is rendered useless by it will NB Power purchase the property and what is the compensation for loss of the timber?	Aug 3, 2001	Meeting	Right of Way Agent met with the landowner to discuss the issues. Landowner was advised of the total acreage affected. In addition she was advised that it is not NB Power's practice to purchase the land in fee simple but that NB Power simply required an easement interest in the land with the landowner retaining ownership rights to the property. At the meeting the issue related to ATV traffic and any related liability was raised. A letter was sent to her on Aug 27 stating NB Power's position on liability. Survey and Design requested to review proposed alignment on her property.	Complete. Access Permit has been executed.

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Lois Simpson Continued		July 12, 2001	Attended Information Session	Question: Is it possible to move the line so that it does not dissect the property *i.e.* move closer to the boundary line? Also would like to discuss the severed piece of land with the current alignment.	Sept 14, 2001	Meeting	Met to sign an Access Road Agreement. Landowner signed agreement. Agent inquired as to whether she was satisfied with our response related to liability and she replied that she was.	Complete.
					Jan 22, 2002	Meeting	Agent met to review line location with the landowners and advised landowner that the current preliminary preferred alignment has been reviewed by NB Power personnel and it has been determined that the current proposed route will not be realigned at this time due to existing constraints.	Severance of parcel to be addressed during negotiations for compensation for the land rights acquired. Section 87 Notice Served and the Option for Easement Agreement signed.
Florina Stewart	Landowner located within 1 km Preferred Corridor	Sept 26, 2001	Phone call	Request: would like Information related to the proposed location of the IPL and where it crosses the river	Oct 1, 2001	Phone Call	Right of Way Agent called landowner to discuss the proposed location of the line. She was advised that her property was not affected by proposed transmission line 3016 and she was satisfied with this response and required nothing further.	Complete. Landowner is satisfied with response.
Terry Stewart	Landowner within the local area	July 12, 2001	Attended Information Session	Concern: Safety and land values	July 31, 2001	Phone Call	Right of Way Agent spoke to landowner regarding his issues. He had concerns about the proposed alignment across the Tucker property. He was concerned about EMF and the devaluation of the Tucker property. Advised him that we are looking at realigning off of the Tucker property and any issues related to devaluation of property would be discussed with Mr. Tucker and at the time of compensation offers. Information and further meetings offered regarding the EMF issue and both were declined.	No further issues have been raised to date. Phone call made January 31, 2002 to follow up with landowner as to any further issues. Landowner advised that he has all the Information he requires and is satisfied with same.

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Tim Stewart	Landowner located within the preliminary Preferred 50 m RoW	June 26, 2001	Attended Information Session	Request: start dates for construction, amount of property damage expected; general Information	July 25, 2001	Meeting	Right of Way Agent met with Tim and Colleen Stewart to discuss the proposed Project. They were advised of the current schedule and discussed generally the issues of damages and the compensation process for same. Landowners signed an Access Permit on this date.	Complete. Landowner is satisfied with response.
Bertha Taylor	Landowner located within the 1 km Preferred Corridor	October 25, 2001	Attended Information Session	Question and Request: Where is the location of the route in relation to my properties and please provide a map.	Nov 7, 2001	Letter	Cover letter was sent to landowner enclosing the map showing the proposed route in relation to her properties. Her properties are not affected by the preliminary Preferred 50 m RoW.	Complete. Landowner is satisfied with response.
David Thompson	Community Resident	October 25, 2001	Attended Information Session	Question and request. Would like more Information on the regulatory process and would like to receive a copy of the CSR when filed.	Nov 1, 2001	Letter	NEB Information Bulletins sent to stakeholder in a letter and a note to indicate the CSR will follow once filed.	To provide a copy of the CSR once filed.
Ken and Jean Tinker	Landowner located within preliminary Preferred 50 m RoW	June 25, 2001	Attended Information Session	Request: would like Information re location of proposed line in relation to their property	July 24, 2001	Meeting	Right of Way Agent met with landowners to review location of the proposed line on their property. Access Permit signed and landowners satisfied	Complete. Option for Easement Agreement signed.
David Tucker	Landowner	June 27, 2001	Phone call from Mr. Tucker	Why hadn't he been invited to the landowner meetings on June 25 or 26? Concerned about proposed location, EMF	June 27 July 5 July 10	Call Meeting Meeting	Project Manager called to advise that his name had inadvertently been crossed of the list of landowners to be invited. Arranged to meet on July 5. Project Manager and Manager – Health and Safety met Mr. Tucker. Mr. Tucker expressed his strong opposition to the planned location. NB Power agreed to review the proposed routing.	Mr. Tucker has been contacted on a number of occasions and has received all the information he has requested. NB Power has attempted to address his issues by moving the location of the route.

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David Tucker continued					July 19, 2001 Sept. 20, 2001	Call Letter	Project Manager and Sr. Transmission Engineer delivered landowner information package to Mr. Tucker	NB Power will continue to address any issues Mr. Tucker may have as they relate to the IPL Project.
		July 12, 2001	Attended information session	Concerned about location of the line.	Oct. 25, 2001	Letter	Right of Way Agent telephoned Mr. Tucker to set up an appointment to meet and explained to him that the route was under review	
		Sept. 12, 2001	Attended information session	Request for information on reason for selection vs. Keswick to Orrington.			Project Manager sent letter to Mr. Tucker attaching a copy of an internal memo regarding the Reasons for Choosing Point Lepreau – Orrington Route over the Keswick-Orrington Route.	
		Oct. 4, 2001	Letter	Concerns: EMR, property depreciation, increased number of lightening strikes, line falling, audible noise, increased access to property.			In a letter to Mr. Tucker each concern was addressed and a detailed response provided. The letter also confirms that Mr. Tucker's property is not affected by the preliminary Preferred 50 m right-of-way.	
Fred Tuddenham	Landowner located within preliminary Preferred 50 m RoW	June 26, 2001	Attended Information Session	Request/Issue: He would like the proposed line to miss his property altogether. However if not he would like it realigned to parallel the southern boundary of his property. He noted he was in the waste removal service and previously was not asked to provide the service on other NB Power lines.	July 24, 2001	Meeting	Right of Way Agent met landowner to request Access Permit be signed and to review location of proposed line on his property. NB Power design and survey have reviewed the location of the preliminary Preferred 50 m RoW on his property and it has been determined that a relocation of the proposed line is not justified at this time.	Access Permit signed.

Name	Association	Date Received	How Received	Issue/Request/Concern/ Comment/Question	Date of Response	Mode of Response	Response	Status
Fred Tuddenham					Jan 29, 2001	Meeting	Waste removal work. Agent advised that waste removal service for land clearing is not required. Agent met with Landowner to discuss issue of realignment request. Advised him that a realignment would not be done at this time however advised landowner of his rights pursuant to Section 34 of the NEBA re objection to detailed routing.	Options for resolution provided by landowner to NB Power for review. Agent to follow up when compensation package available.
Gordon Way	Landowner located within the 1 km Preferred Corridor	July 12, 2001	Attended Information Session	Question: Where is proposed route located in relation to his property	August 22, 2001	Phone Call	Right of Way Agent spoke to landowner regarding route location. His property is located about 300m from the preliminary preferred 50m RoW. He advised that he is currently trying to sell his property and is not receiving many offers. He thinks it may be because there is a proposal to build the IPL in the area. He wants to be subsidized if he receives an offer below what he is asking. Agent advised she would get back to him.	Mr. Way will be contacted to discuss details of his claim for compensation once the appraisal report is received by NB Power.
					August 23, 2001	Phone Call and Letter	Agent called to advised the landowner that NB Power would compensate any owner who suffered a loss as a result of the operations of the company. If this was the case with Mr. Way he should provide NB Power with the details of the loss for the company to review.	
		October 17, 2001	Phone Call	Question: Will NB Power be paying me compensation on my property?	October 17, 2001	Phone Call	NB Power's Manager of Real Estate discussed the issue with Mr. Way and again reiterated NB Power's position that the company does require the details of the claim for review and she advised that NB Power would retain	

Appendix A
Issues and Concerns Raised During Public Consultation

Name	Association	Date Received	How Received	Issue/Request/Concern/ Comment/Question	Date of Response	Mode of Response	Response	Status
Gordon Way Continued					 Jan 21, 2002	 Phone Call	DeStecher Appraisals to complete an appraisal on the lands in the area of the proposed IPL to determine what effect if any it has on land values. Agent contacted landowner to advise that the company has not yet received the appraisal report and she will contact him once the appraisal was complete.	
Wayne Westhaver	Landowner located within the 1 km Preferred Corridor	Sept 12, 2001	Attended Information Session	Question: Location of proposed route in relation to property and what is the orange flagging he has seen in the area?	Sept 12, 2001 Sept 18, 2001 Sept 18, 2001	Meeting Phone Call Letter	Right of Way Agent reviewed the preliminary Preferred 50 m RoW with the landowner and determined where his property was in relation to same. Agent advised landowner that the orange flagging indicated points of reference for the survey crew used to identify the limits of the proposed easement. Map sent showing the preliminary Preferred 50 m RoW in relation to his property.	Complete. Agent to follow up re the orange flagging in the area. Landowner satisfied with response. Complete Complete
Russell Wilcox	Landowner located within the preliminary Preferred 50 m RoW	July 12, 2001	Attended Information Session	Concerned that the Proposed route was affecting all 3 of his properties and would like to discuss the proposed alignment	July 19, 2001	Meeting	Right of Way Agent met with landowner and reviewed the proposed alignment. After review it was determined that only 2 of the properties were affected. Landowner signed Permission for Access.	Complete. Option for Easement Agreement has been signed by Landowner.
Michael Young	Landowner located with the 1 km Preferred Corridor	July 12, 2001	Attended Information Session	Request: Would like a map of the proposed route showing his property in relation to the proposed route.	Aug 2, 2001	Phone Call and letter	Right of Way Agent called landowner to advise him that his property was not affected by the preliminary preferred 50m RoW and that a map was being forwarded to him illustrating the location. Landowner commented that he is pleased to see that this project has begun as he feels that it will be a stride toward economic growth for New Brunswick.	Complete. Landowner is satisfied with response.

Appendix A
Issues and Concerns Raised During Public Consultation

Name	Association	Date Received	How Received	Issue/Request/Concern/ Comment/Question	Date of Response	Mode of Response	Response	Status
Maude Doughty	Community Resident	Sept 25, 2001	Phone Call	Safety of Point Lepreau Generating Station; wants it shut down.	Sept 28, 2001	Phone call	The Manager of Public Relations spoke with Mrs. Doughty to attempt to address her concerns. She was very adamant that the nuclear generating station was going to destroy us all. She wants it disassembled.	The conversation was an opportunity for Mrs. Doughty to express her dissatisfaction. She appreciated the call and knew there was very little that could be done to shut down the nuclear generating station.
Merle Hobin	NB Power Customer	Oct 25, 2001	Attended Information session	Question: Why cant his power be supplied from the Musquash Generating station	Nov 2, 2001 Nov 16, 2001	Phone Call Meeting	NB Power customer service contacted Mr. Hobin by telephone then followed up with a meeting on November 16' 2001. Two Engineers from NB Power's Regional office met with Mr. Hobin at his house and discussed his concerns. Mr. Hobin was pleased with the Information provide to him and understood the reasons why his house could not be connected to the Musquash Plant.	Complete. Customer is satisfied with response.
Nelson Lavigne	Community Resident	Sept 18, 2001	Attended Information session	Customer lives beside substation in Pennfield and is concerned about EMF and audible noise.	Oct. 2, 2001	Phone call and letter	Manager of Health and Safety spoke with Mr. Lavigne over the phone and followed up with a letter and pamphlet on EMF. His concerns with respect to audible noise were as a result of construction activities that occur on a temporary basis.	Complete. Community Resident satisfied with response.
Edgar McGibbon	Community Resident	July 12, 2001	Attended Information session	Request for more Information on the Coleson Cove conversion project.	Juy 25, 2001	Letter	Letter and Information package sent to Mr. McGibbon on the Coleson Cove conversion project.	Complete. Community Resident is satisfied with response.

Appendix A
Issues and Concerns Raised During Public Consultation

Name	Association	Date Received	How Received	Issue/Request/Concern/ Comment/Question	Date of Response	Mode of Response	Response	Status
Francis Riley	Community Resident	Oct. 25, 2001	Attended Information session	Interested in knowing the site locations for radiation monitoring and levels at these sites.	Ongoing	Phone call	The matter has been referred to the Point Lepreau Generating Station Health Physics group who has attempted to reach Mr. Riley on several occasions without success. They will continue to try and reach Mr. Riley.	Ongoing – not yet complete.

APPENDIX B

Aboriginal Consultation

Note: Table dates are not reflected in chronological order

#	Organization/ Community/ Individual	Type of Contact	Date	Summary of Consultation	Response
1	Archaeological Services Unit (ASU)	Meeting	February 5, 2001	A meeting was arranged with ASU to search the provincial database for archaeological resources within the General Study Area.	The results of the search were added to the constraint mapping for the Alternative Corridor selection.
2	ASU	Telephone call	Feb 9, 2001	ASU was contacted for an Aboriginal contact list for the upcoming Information Sessions associated with the proposed IPL Project. A list was provided by ASU.	Not applicable
3	ASU	Letter	May 10, 2001	An Archaeological Field Research License Application was submitted to ASU. The Application included a project description, objectives of research and methodology.	No issues or concerns were raised by ASU. An Archaeological Field Research License was issued on May 23, 2001.
4	ASU	Meeting	August 1, 2001	A meeting was held with ASU to discuss how to proceed with additional archaeological field investigations on the Magaguadavic River site. It was mentioned to ASU that the Liaison Officer for MAWIW had requested a field visit. ASU requested digital photos of the site.	Digital photos were sent on August 14, 2001.
5	ASU and MAWIW Tribal Council	Telephone	August 7, 2001	ASU and the MAWIW Tribal Council requested a field visit to the Aboriginal archaeological sites discovered during the field assessment. A telephone call was made to ASU and MAWIW to discuss logistics of the archaeological field visit.	The visit took place on August 9, 2001. No issues or concerns were raised by ASU or MAWIW.
6	ASU	Fax and email	August 14, 2001	Information of the two Aboriginal archaeological sites and one historic period site was sent to ASU. In addition, digital photos of the three archaeological sites were sent by e-mail and fax on the same day.	A meeting was scheduled on August 14, 2001 to discuss information collected at these sites. During the meeting, a summary of the location and what was recovered at these sites was provided to ASU. Attendees discussed a number of issues such as mitigation measures, ownership of property and size of unit to excavate during fieldwork to determine the extent of these sites. Additional fieldwork at these sites was approved by ASU.
7	ASU	Fax	September 12, 2001	At ASU's request, a copy of the Archaeological Protocol (Rev. 3) was faxed to ASU for review.	Not applicable. ASU was satisfied with the Protocol.
8	ASU	Telephone call	October 15, 2001	ASU was contacted to discuss the potential mitigation options to consider in the Dennis Stream Watershed. The potential options offered by ASU were as follows: a) avoid the site by rerouting, b) test and excavate the site, or c) span the site (*e.g.,* no structures).	NB Power reviewed the options and determined that the preferred mitigation was to span the site (*e.g.,* no structures). In addition, a commitment was made to keep clearing activities to a minimum to provide a natural barrier to ATV access. A email was sent to ASU on October 26, 2001 requesting a meeting to discuss the Dennis Stream option. Digital photos of the site and artifacts discovered were also sent to ASU. A meeting was scheduled on October 29, 2001.

#	Organization/ Community/ Individual	Type of Contact	Date	Summary of Consultation	Response
9	ASU	Meeting	October 29, 2001	A meeting was held to discuss NB Power's mitigative options for the Dennis Stream archaeological site. A number of options were discussed with ASU and preferred options identified. ASU was satisfied with the options discussed during the meeting. A copy of the letter to the Town of St. Stephen was requested by ASU.	A copy of the letter to the Town of St. Stephen was sent to ASU on December 12, 2001. ASU was invited to contact NB Power with any further requests or questions.
10	ASU	Letter	January 10, 2002	As per the conditions of the Archaeological Field Research License, a copy of the preliminary field report outlining the archaeological/heritage resource survey was submitted to ASU.	ASU was invited to contact AMEC with any questions or concerns regarding the preliminary report. No questions or concerns to date. The Final Technical Report will be filed with ASU by March 31, 2002.
11	Heritage Branch	Meeting	February 15, 2001	A meeting was arranged with Heritage Branch to search the provincial database for Heritage resources within Study Area.	The results of the search were added to the constraint mapping for the Alternative Corridor selection.
12	NBAPC	Meeting	May 2, 2001	A meeting was held to discuss the proposed IPL Project, and the consultation process to collect information on current use of lands and resources for traditional purposes by Aboriginal persons within the Preferred Corridor. APC members requested a copy of the checklist and maps for their review.	A copy of the checklist and maps were sent to APC on May 23, 2001 per their request to review same. NB Power asked that they complete the checklist in order to identify current use of lands and resources for traditional purposes.
13	NBAPC	Interview	June 6, 2001	An interview was held to identify current use of lands and resources for traditional purposes by Aboriginal persons. The St. Croix River (*e.g.,* Canoose to mouth of river) was identified as an area of elevated potential. It was noted that members of NBAPC use the Study Area for hunting and fishing. No specific resource location was identified within the 1 km wide Preferred Corridor.	NB Power asked if another meeting with APC would be required to discuss any other topics. APC advised that no further meeting would be required.
14	NBAPC	Telephone call	October 10, 2001	NBAPC was informed that NB Power was going to use information collected during the June 6 meeting as part of the environmental documents to be filed with the NEB. NBAPC was comfortable with the approach and had no concerns regarding the use of the information.	Not applicable
15	Union of New Brunswick Indians (UNBI)	Fax	February 20, 2001	NB Power faxed an invitation to UNBI regarding the upcoming Information Sessions for the proposed IPL Project.	Not applicable
16	UNBI	Letter	February 26, 2001	UNBI Executives sent a letter to NB Power advising that they could not attend the Information Sessions. Concerns raised included the use of pesticides along transmission lines, wildlife habitat, and hunting and fishing areas.	On March 26, 2001 a letter was sent to UNBI informing them that the corridor selection and environmental assessment process was underway and that NB Power would welcome information on habitat of concern, medicinal plants, and gathering and harvesting sites used by Aboriginal persons.

#	Organization/ Community/ Individual	Type of Contact	Date	Summary of Consultation	Response
16	UNBI Continued				In addition, NB Power advised that pesticides are not used on transmission lines. UNBI was invited to contact NB Power to discuss information.
17	UNBI Executives and Chiefs	Meeting	April 23, 2001	During a meeting regarding a different project, AMEC briefly informed attendees of NB Power's upcoming proposed IPL Project, and advised that NB Power would be in contact with UNBI in the near future.	Not applicable
18	UNBI Executives	Meeting	May 11, 2001	A meeting was held to introduce NB Power's proposed IPL Project and Aboriginal consultation program. A number of questions were asked about transmission line clearing, construction and maintenance. NB Power representatives answered all questions raised at the meeting.. UNBI stated the Chiefs, Elders and Resource Users should be involved in the consultation process. NB Power agreed to consult with interested members of the Aboriginal communities. UNBI stated that they would take the information provided to their Chiefs and get back to NB Power. Copies of the EPP and EIA Study Report were requested by UNBI.	A letter was sent to UNBI on May 22, 2001 enclosing copies of the EPP and EIA Study Report.
19	UNBI and Chiefs	Meeting	May 29, 2001	Meeting cancelled by UNBI.	Not applicable
20	UNBI Executives	Meeting	June 19, 2001	A meeting was held to discuss how information on current use of lands and resources for traditional purposes by Aboriginal persons within the Preferred Corridor would be collected during interviews with interested members. Assistance was requested by UNBI. It was suggested by UNBI that NB Power talk to the Chiefs.	UNBI will notify NB Power of the next Chief meeting. A brief presentation will be given by NB Power to explain the consultation process and to identify communities or members interested in participating. A separate meeting will be held to discuss assistance for UNBI in relation to the proposed IPL Project.
21	UNBI Executives	Meeting	June 22, 2001	A meeting was held with UNBI Executives and NB Power representatives to gain an understanding of the role and objectives of UNBI's organization and the issues facing the communities they represent.	Discussions are ongoing with UNBI regarding relationship development in relation to proposed IPL Project
22	UNBI Executives	Meeting	June 26, 2001	A meeting was held with UNBI Executives to discuss relationship development.	Discussions are ongoing with UNBI regarding relationship development in relation to the proposed IPL Project. See #27 for further details.
23	UNBI Executive	Letter	July 3, 2001	UNBI commented on the checklist used to record "current use of lands and resources for traditional purposes by Aboriginal persons". It was noted the term "Used by" appeared to imply something that is contrary to Aboriginal traditions in that the lands and resources were used on a communal basis rather than an individual basis. It was suggested that the column be changed to "Communal Use".	The checklist was revised to incorporate UNBI's comment. A letter was sent to UNBI on July 26, 2001 with a copy of the revised checklist.

#	Organization/ Community/ Individual	Type of Contact	Date	Summary of Consultation	Response
24	UNBI Executives	Telephone call	July 19, 2001	A copy of the Draft Scope of the Environmental Assessment for the proposed IPL Project was requested by UNBI.	A fax was sent to UNBI on July 19, 2001 enclosing a copy of the Draft Scope of the Environmental Assessment.
25	UNBI Executives	Telephone call	July 26, 2001	UNBI was informed that AMEC had located an arrowhead while surveying the preliminary preferred 50 m RoW. UNBI were appreciative of the telephone call.	Not applicable
26	UNBI Executives	Telephone call	August 7, 2001	UNBI was provided with information regarding the archaeological site at Dennis Stream. No issues or concerns were raised.	Not applicable
27	UNBI Executives	Letter	August 9, 2001	Agreement reached between UNBI and NB Power. The agreement offers assistance for a liaison position, as well as assistance for documentation review. The agreement also includes a commitment to put in place an archaeological protocol which will identify First Nations involvement should a significant heritage resource be located during construction activities.	Not applicable
28	UNBI Liaison Officer	Telephone call	August 29	AMEC provided the Liaison Officer with an overview of the items that would be covered during the meeting held on September 7, 2001 with the Chiefs.	Not applicable
29	UNBI, ASU and Chiefs	Meeting	September 7, 2001	NB Power provided an overview of the project, the archaeological fieldwork conducted to date and the consultation process to collect information of current use of lands and resources for traditional purposes by Aboriginal persons. A number of issues were raised such as funding for each community, Land Claims, Crown Land issues, compensation, past NB Power projects and Treaty Rights. NB Power explained that assistance was provided to UNBI for the IPL Project and that the scope of the consultation focused on the proposed IPL Project. Attendees requested a copy of the Archaeological Protocol.	A letter dated September 13, 2001 was sent to UNBI thanking them for the opportunity to meet with some of their Chiefs and to provide an overview as to how NB Power proposes to meet with members of their communities to gather information on current use of lands and resources for traditional purposes. A copy of the Archaeological protocol was also provided. UNBI was invited to advise NB Power of communities interested in the consultation process.
30	UNBI Liaison Officer	Telephone call	October 1, 2001	The Liaison Officer advised that Madawaska Maliseet First Nations were interested in having a community meeting and would advise of a date in the coming weeks.	The Liaison Officer to contact NB Power to advice of a meeting date.
31	UNBI Liaison Officer	Telephone call	September 27, 2001	The Liaison Officer informed NB Power that 2 field personnel were hired by UNBI to conduct a walkthrough of the centerline of the preliminary Preferred 50 m RoW. The purpose of the walkthrough was to conduct an independent medicinal plant survey. The results of the walkthrough were similar to the medicinal plant survey conducted by AMEC. NB Power provided UNBI with a NB Power field contact name. UNBI requested maps of the preliminary preferred RoW.	On October 2, 2001, NB Power contacted UNBI to inform them that copies of draft Plan and Profile maps were available for the 2 field personnel. A NB Power representative dropped off the maps at UNBI's office. UNBI were pleased with the maps and would use them to conduct their walkthrough of the centerline of the preliminary preferred RoW. No further issues.

#	Organization/ Community/ Individual	Type of Contact	Date	Summary of Consultation	Response
32	UNBI Liaison Officer	Telephone call	October 9, 2001	The Liaison Officer confirmed that a community meeting was requested by Madawaska Maliseet First Nation. A date and time would be confirmed as soon as possible.	Not applicable
33	UNBI Liaison Officer	Telephone call	October 22, 2001	The Liaison Officer confirmed a meeting date of November 1, 2001 with Madawaska Maliseet First Nation Community. The proposed agenda was provided to UNBI. The agenda included: an overview of the Project, and a description of the Aboriginal consultation.	Not applicable
34	UNBI Liaison Officer	Telephone call	October 31, 2001	The Liaison Officer contacted AMEC to inform them that the Madawaska Chief and about 4 community members would be at the meeting. About 15 minutes would be available for a presentation followed by any questions. AMEC provided UNBI with a review of the presentation. UNBI felt it was appropriate.	Not applicable. See next row for details on the Madawaska Maliseet First Nation Community.
35	UNBI Executives and Chiefs	Meeting	November 20, 2001	NB Power provided an overview of the Project and the consultation process. It was suggested that NB Power consult with the Maliseet Advisory Committee. The Chief from the Oromocto First Nation invited NB Power to give a presentation to his community. In addition, it was requested that wood from Crown Land be given to Aboriginal Communities.	NB Power will work with the Liaison Officer to schedule a meeting with the Oromocto First Nation and the Maliseet Advisory Committee. See #37 and #54 for details.
36	Madawaska Maliseet First Nation Community	Community meeting	November 1, 2001	An overview of the proposed IPL Project was provided and the purpose of the consultation explained to all attendees (approximately 20). It was noted that Black Ash should be protected and distributed to Aboriginal Basket Makers. No specific resource location was identified within the Preferred Corridor.	No further issues or concerns were noted. Madawaska Maliseet First Nation Chief was invited to contact NB Power or the UNBI Liaison Officer with any additional questions or concerns.
37	Oromocto First Nation Community	Letter	February 7, 2002	As a result of the meeting on November 20, 2001 with UNBI Executives and Chiefs, the Oromocto Chief expressed an interest to have NB Power consult with his community.	On a number of occasions NB Power tried unsuccessfully to contact the Oromocto Chief by phone. A letter dated February 7, 2002 was sent to the Oromocto First Nation with an attachment outlining the nature of information requested by community members. They were invited to contact NB Power with any further questions or concerns. No further requests to date.
38	MAWIW Tribal Council (MAWIW)	Fax	February 20, 2001	NB Power faxed an invitation to MAWIW regarding the upcoming Information Sessions for the proposed IPL Project.	Not applicable

#	Organization/ Community/ Individual	Type of Contact	Date	Summary of Consultation	Response
39	MAWIW	Letter	February 28, 2001	MAWIW sent a letter to NB Power requesting the establishment of a formal process of dialogue between NB Power and MAWIW.	On March 22, 2001 a letter was sent to MAWIW informing them that the corridor selection and environmental assessment process was underway and that NB Power would welcome input that would assist in avoiding constraints. MAWIW was invited to contact NB Power.
40	MAWIW	Meeting	April 24, 2001	During a meeting regarding a different project, AMEC briefly informed attendee of NB Power's upcoming proposed IPL Project and advised that NB Power would be in contact with MAWIW in the near future.	Not applicable
41	MAWIW	Meeting	May 24, 2001	A meeting was held to introduce NB Power's proposed IPL Project and Aboriginal consultation program. Maps were viewed of the preliminary Preferred 50 m RoW and questions answered by NB Power representatives. It was suggested that assistance be provided to MAWIW.	NB Power to schedule a meeting with senior management to discuss assistance. See #43 for details.
42	MAWIW	Meeting	June 05, 2001	A meeting was held to discuss the Archaeological work conducted as part of the Field Assessment and to review the Archaeological Protocol.	MAWIW was satisfied with the information provided during the meeting. No further issues or concerns.
43	MAWIW	Meeting	July 5, 2001	A meeting was held with NB Power representatives to gain an understanding of the role and objectives of the MAWIW Tribal Council.	Ongoing discussions with MAWIW regarding relationship development in relation to proposed IPL Project. See #46 for details
44	MAWIW Liaison Officer	Telephone call	July 26, 2001	MAWIW was informed that AMEC had located an arrowhead while surveying the preliminary Preferred 50 m RoW.	MAWIW were appreciative of the call.
45	MAWIW Liaison Officer	Telephone	July 30, 2001	MAWIW was provided with detailed information on the location of the site where artifacts were found. A request was made to visit the site. A site visit was arranged for MAWIW on August 9, 2001. See #5 for details.	Following the site visit, no significant issues or concerns were raised, however, it was mentioned by MAWIW that proper measures should be implemented to protect this site. NB Power agreed and committed to implementing proper measures.
46	MAWIW Liaison Officer	Letter	August 8, 2001	Agreement reached between MAWIW and NB Power. The agreement offers assistance for a liaison position, as well as assistance for documentation review. The agreement also includes a commitment to put in place an archaeological protocol which will identify First Nation involvement should a significant heritage resource be located during construction activities.	Not applicable
47	MAWIW	Meeting	August 28, 2001	A meeting was held to discuss the approach to be taken in initiating community consultation. A MAWIW Tribal Council Executive member also requested a visit to the archaeological site.	Executive members were welcomed to visit the archaeological site. Executive members were invited to contact NB Power if they had additional questions.

#	Organization/ Community/ Individual	Type of Contact	Date	Summary of Consultation	Response
48	MAWIW Liaison Officer	Telephone call	October 1, 2001	The MAWIW Liaison Officer advised that the community consultation would take place following the MAWIW Council Election on October 11, 2001. The Liaison Officer noted that he would contact NB Power following the Election to resume discussions.	Not applicable
49	MAWIW	Meeting	Nov. 27, 2001	A meeting was held to discuss the logistics of the Tobique First Nations community meeting. Posters were place in key locations on the reserve and radio ads were aired on the Tobique First Nation radio station inviting community members to attend the meeting.	Not applicable
50	Tobique First Nation Community	Community meeting	November 28, 2001	Attendees were invited to view the map of the Preferred Corridor. The consultation process was explained to interested persons. No specific resources or locations were identified. A number of questions were asked and answered by an NB Power representative and the consultants.	NB Power will continue to work with the MAWIW Liaison Officer to address any issues or concerns and inform communities of the proposed IPL Project.
51	MAWIW	Call	January 17, 2002	MAWIW confirmed meeting date with Big Cove and Burnt Church communities.	Not applicable
52	Big Cove First Nation Community	Community meeting	January 24, 2002	Attendees were invited to view a map of the Preferred Corridor. The consultation process was explained to interested persons. The Lake Utopia Region through to Mount Pleasant was identified as a gathering site. NB Power representative, the Liaison Officer and the consultants answered a number of questions about the Project (*e.g.,* jobs, plant survey, archaeological resources).	No further issues or concerns were raised.
53	Burnt Church First Nation Community	Community meeting	January 25, 2002	Attendees were invited to view a map of the Preferred Corridor and were explained the consultation process associated with the proposed IPL Project. Confusion surrounding the objective of the meeting occurred when approximately 20 members thought that job recruitment would be addressed at this meeting. Attendees were advised of the objective of the meeting and that it did not pertain to job recruitment/hiring. Approximately half those in attendance left the meeting. No specific resources or locations were identified within the Preferred Corridor. A number of questions were asked about the Project and answered by NB Power and the consultants.	No further issues or concerns were raised.
54	Maliseet Advisory Committee on Archaeology (MACA)	Meeting	December 4, 2001	A brief overview of the Project and the consultation process were provided to all attendees. Ash trees were identified has a resource used by Aboriginal persons. No specific location was identified within the Preferred Corridor.	A letter dated March 26, 2002 was sent to the Maliseet Advisory Committee on Archaeology to respond to the questions that could not be addressed during the meeting. A summary of the response provided to MACA was as follows: “NB Power has met on various occasions with

#	Organization/ Community/ Individual	Type of Contact	Date	Summary of Consultation	Response
54	Maliseet Advisory Committee on Archaeology (MACA) Continued			A number of issues were raised regarding the Aboriginal plant checklist and the expert selected to conduct the medicinal plant survey. The Committee was informed that the Aboriginal person selected to conduct the plant survey was an individual who was qualified, physically capable, well recognized for traditional Aboriginal plant knowledge and available to undertake the work in the given timeframe. MACA requested a letter from NB Power why Passamaquoddy Tribe were not consulted.	Aboriginal groups recognized by Aboriginal Affairs Secretariat." During discussions with Aboriginal Affairs Secretariat, it was confirmed that UNBI, MAWIW and APC are recognized Aboriginal groups in New Brunswick. These groups have been consulted in relation to the proposed IPL Project. The Passamaquoddy Tribe was not consulted, as it is not recognized in New Brunswick. The Maliseet Advisory Committee were invited to contact NB Power with any further issues or concerns. No request to date.
55	Wulastuk Grand Council	Meeting	January 29, 2002	A brief overview of the consultation process was provided to all attendees. It was mentioned that the highest points of elevation are of significance to Aboriginals (*i.e.*, Red Rock Mountain) because they are often associated with burial sites. In addition, Black Ash, Cedar Stands, fiddleheads and salmon were noted as resources used by Aboriginal persons. However, no specific locations were provided. A number of questions were asked and responded to. Questions that could not be addressed during the meeting were responded to in a letter dated March 6, 2002.	A letter dated March 26, 2002 was sent to the Wulastuk Grand Council addressing all questions and issues raised during the meeting. They were invited to contact NB Power with any further questions or concerns. No further requests to date.
56	Phil Atwin (Wulastuk Grand Council)	Interview	January 18, 2002	An interview was held to identify current use of lands and resources for traditional purposes by Aboriginal persons. The following resources were identified: ash trees, hunting and fishing in area, Sweetgrass collected in the Point Lepreau area, Sea Urchin currently being harvested by Kingsclear First Nation members off of Point Lepreau area. No specific resource location was identified within the Preferred Corridor.	A letter was sent to Mr. Atwin to respond to his issues and concerns. See above row.
57	Karen Perley, Co-chair of Maliseet Advisory Committee and employee of Archaeological Services	Interview	January 22, 2002	An interview was held to identify current use of lands and resources for traditional purposes by Aboriginal persons. The following resources were noted during the interview: ash trees, birch bark from mature trees, Indian Pipe and Goldenthreat on the Magaguadavic River. In addition, the following plants were identified as not being on the plant "checklist" used for this project: Birch trees (bark and fungus used), Wood Burles (cramp knots), Goldenthread, Sweetfern, Indian Pipe, Angelica, Ground Hemlock,	A letter dated March 26, 2002 was sent to Ms. Perley to address the questions that could not be answered during the interview. Ms. Perley was invited to contact NB Power with any further request. No request to date.

#	Organization/ Community/ Individual	Type of Contact	Date	Summary of Consultation	Response
57	Karen Perley, Co-chair of Maliseet Advisory Committee and employee of Archaeological Services Continued			Fiddleheads, Wild Potatos, Ginger Root, Spiknard, Wintergreen, Wild onions, Wild Rice, Kinick Kinick, and Chamomile. A number of other issues such as land claims, ash trees and species at risk. A letter was sent to respond to unanswered questions.	
58	Barbara Nicholas, resident of the Tobique First Nations Reserve	Interview	January 22, 2002	An interview was held to identify current use of lands and resources for traditional purposes by Aboriginal persons. The following resources were identified: Ash trees, Birch bark from mature trees, Sweet fern, Canadian Lynx and Goldenthread. No specific resource location was identified within the Preferred Corridor. Other issues were noted during the interview. These included chemical use during vegetation management, traditional plants used by Aboriginal groups, pipestone quarries and tree fungus used during Maliseet ceremonies.	A letter dated March 26, 2002 was sent to Ms. Nicholas to response to her questions and concerns
59	Edmund Francis, resident of the Big Cove First Nation Reserve	Interview during meeting at Big Cove First Nation Education Center	January 24, 2002	Mr. Francis identified the Lake Utopia Region (streams and rivers leading to Lake Utopia) through to Mount Pleasant as being a gathering area. The information was recorded on the checklist. No further issues or concerns were raised.	Not applicable
60	Marjorie Polchies	Telephone call	January 17, 2002	A telephone call was made to Ms. Polchies to request a meeting. A meeting was declined based on MACA meeting held on December 4, 2001.	Not applicable

APPENDIX C

One-on-One Meetings With Stakeholders

Association	Means of Consultation	Date/Location (2001)	Subject	Means of Addressing Issues/Requests/Concerns
Atlantic Coastal Action Plan (ACAP)	Meeting	September 21 Saint John	NB Power presented information on the environmental assessment process for the proposed IPL Project and reviewed the constraint maps of the Preferred Corridor. A number of questions were asked about the project and construction/maintenance practices. NB Power answered each question accordingly to ACAP satisfaction. A copy of the EPP was requested by ACAP.	A letter dated December 3, 2001 enclosing 2 copies of NB Power's EPP was sent to ACAP. They were invited to contact NB Power with any further questions or concerns. No further requests to date.
Atlantic Salmon Federation (ASF)	Meeting	September 13 Shamcook	NB Power presented information on the proposed IPL Project and reviewed the constraint maps of the Preferred Corridor. ASF identified salmon habitat and watercourse crossing methods as items of interest to them. NB Power explained the practices outlined in the EPP that are used when working within 30 m of a watercourse. In addition, they were advised that NB Power will comply with all conditions outlined in the Watercourse Alteration Permit issued by the Department of Environment and the compliance will be monitored by a trained Environmental Inspector. ASF appeared satisfied with the information provided and had no further questions. A copy of NB Power's EPP and watercourse crossing coordinates were requested by ASF.	A letter dated September 28, 2001 was sent to ASF thanking them for the opportunity to discuss the proposed IPL Project and informed them that a copy of the EPP and the watercourse crossing coordinates would be provided as soon as the information becomes available. Construction practices were added to Section 3.11 of the CSR dated March, 2002.
	Letter to NB Power (cc NEB)	September 26	ASF raised concerns about status of salmon populations in rivers along the Preferred Corridor and habitat destruction along a power line in the Digdeguash area	A letter dated November 19, 2001 was sent to ASF explaining the incident that occurred along the Digdeguash crossing and outlined the commitments that NB Power will take during the construction of the IPL to protect fish habitat. Commitments were added to Section 6.2.1.9 of the CSR dated March 2002. ASF was invited to contact NB Power with any further questions or concerns. No further requests to date.
	Letter	November 30	EPP and watercourse crossing coordinates	A letter enclosing the EPP and the watercourse crossing coordinates was provided to ASF as requested at the meeting of September 13. ASF was invited to contact NB Power with any further questions or concerns. No further requests to date.

Association	Means of Consultation	Date/Location (2001)	Subject	Means of Addressing Issues/Requests/Concerns
Conservation Council of New Brunswick (CCNB)	Meeting	September 6 Fredericton	The following topics were discussed: description of project and transmission system, NB Power's organizational structure and description of final draft CSR. CCNB questioned how mature forest habitat would be protected.	It was explained that mature coniferous forest was avoided as much as possible. Where mature coniferous forest could not be avoided, mitigative measures would be implemented as identified in the final draft CSR.
	Letter from CCNB to NEB (cc NB Power)	September 17	Letter opposing the IPL Project due to fragmentation of forest habitat and no approval from NB Power's own Board of Directors	Letter dated October 5, 2001 was sent to CCNB explaining the measures that would be implemented to minimize the impact on protected areas and other critical habitat features. In addition, it was explained to CCNB that NB Power's Board of Directors agreed to proceed with the IPL Application by approving $2 million for initiating the planning process. However, final NB Power Board approval will not be given until NB Power receives a Certificate of Public Convenience & Necessity. In addition the results of the Open Season which is currently set for May 2002 must be known prior to the Board approving the project. Measures to protect protected areas and other critical habitat features were added to Section 6.2.1.6 of the CSR dated March 2002.
Canadian Wildlife Service (CWS)	Telephone call to CWS	July 24, 2001	NB Power contacted CWS to discuss migratory birds issues related to the proposed IPL Project. It was suggested that NB Power and CWS get together to discuss the Project.	CWS to schedule a meeting with NB Power representatives.
	E-mail from CWS	Aug. 3, 2001	CWS advised NB Power that a meeting would probably be held in September.	CWS to schedule a meeting with NB Power representatives in September.
	E-mail to CWS	Aug. 30, 2001	An e-mail was forwarded to CWS to follow-up on meeting date. Due to holidays, CWS will get back to NB Power within the next few weeks.	CWS to schedule a meeting with NB Power representative in September.
	E-mail from CWS	September 18, 2001	CWS advised of a meeting date to discuss the proposed IPL Project.	NB Power confirmed meeting date.
	Telephone call from CWS	Date not available	CWS advised NB Power that the meeting was cancelled due to unforeseen circumstances.	CSW will advise of a meeting date.

Association	Means of Consultation	Date/Location (2001)	Subject	Means of Addressing Issues/Requests/Concerns
Canadian Wildlife Service (CWS) Continued	Telephone call to CWS		NB Power contacted CWS to reschedule meeting.	CWS to schedule a meeting with NB Power representatives.
	Email from CWS	Nov. 7, 2001	CWS informed NB Power that the meeting will be rescheduled as soon as possible. CWS will advise shortly of a date.	CWS to schedule a meeting with NB Power representatives.
	Email from CWS	Nov. 13, 2001	CWS informed NB Power that a meeting would be held on Nov. 19, 2001 to discuss the proposed IPL Project.	NB Power confirmed meeting date.
	Meeting request by NB Power	Nov 19, 2001, Sackville	NB Power provided an overview of the project, discussed the fieldwork results on Migratory Birds; and reviewed the draft Migratory Bird Protection Plan. The following comments were made by CWS personnel regarding the Migratory Bird fieldwork observations and the aerial raptor survey: "The observation table on migratory birds (attached) is very superficial and does not contain enough details (*e.g.,* more common bird species should have been identified). Some of the common birds observed during the survey were not identified to the species level. The migratory bird survey does not include certain winter breeding birds." The following comments were made regarding the draft Migratory Bird Protection Plan: "Proceeding with clearing activities to avoid the nesting season (May 1st to August 1st) is preferred and acceptable." Concerns about the loss of habitat / fragmentation was raised as an issue. A number of bird populations are declining due to the loss of habitat. Maintenance on transmission lines has an impact on birds.	NB Power will obtain forest cover information from the Department of Natural Resources and Energy (DNRE). This information will be used to identify habitat types such as hardwood stands that are critical habitats for certain birds. As soon as this information is available, a meeting will be scheduled with CWS to discuss results.
	Meeting	March 15, 2002	A meeting was held to discuss migratory bird habitat assessment and fieldwork surveys conducted for the proposed IPL Project. CWS requested a migratory bird survey be conducted to validate the results of the habitat assessment.	NB Power has committed to conducting a migratory bird survey in June 2002. The sites and key species will be identified in consultation with CWS and NBDNRE representatives. Once sites and species have been identified, a professional ornithologist will be retained to carry out the survey and report the results.

Association	Means of Consultation	Date/Location (2001)	Subject	Means of Addressing Issues/Requests/Concerns
New Brunswick Department of Culture and Sport Secretariat (DCSS)	Meeting Letter	September 6 Fredericton Sept 14, 2001	DCSS expressed concerns about potential archaeological and heritage resources along the Preferred Corridor. In addition, it was suggested that DCSS provide training to NB Power's Environmental Inspector for the project regarding archaeological site identification. A copy of NB Power's Archaeological Protocol was requested by DCSS. A copy of NB Power's Archaeological Protocol was sent to DCSS.	NB Power explained the steps it has undertaken to identify potential archaeological and heritage resources along the Preferred Corridor. They were advised that Consultants were conducting fieldwork as per the License Application issued by Archaeological Services Unit. In addition, Aboriginal consultation was ongoing with MAWIW, UNBI and Aboriginal Peoples Council to identify the current use of lands and resources for traditional purposes by Aboriginals. Any significant heritage or aboriginal resource area identified during the fieldwork and consultation would be evaluated accordingly. Information on archaeological and heritage resource process and the Aboriginal consultation was added to Section 6.2.1.21. A letter enclosing the Archaeological protocol was sent to DCSS. DCSS was satisfied with the protocol. DCSS was advised at the meeting that once NB Power hires an Environmental Inspector for the project DCSS will be contacted to ensure proper training is provided to the Inspector. DCSS was satisfied with this approach/commitment.
New Brunswick Department of Environment & Local Government (NBDELG)	Letter to NB Power	June 26	The Technical Review Committee (*e.g.,* members of Natural Resources and Energy, Fisheries and Oceans, NBDELG, Culture and Sport Secretariat, Public Health Services and Environment Canada) provided comments and questions on the EIA Study Report dated April 25, 2001. Comments included, but are not limited to, the following: wetlands, clearing and construction practices, ATVs and species at risk.	A letter was sent to NBDELG on August 14, 2001 providing responses to each comment and question. Following a conversation with the Project Manager at NBDELG, a few issues remained outstanding (*e.g.,* ATV, wetlands, fish habitat, etc.). These issues were reviewed by the Project Team and additional information included in the Final Draft CSR dated September 7, 2001. Information was added to Section 6.2 of the CSR dated Nov. 27, 2001.

Association	Means of Consultation	Date/Location (2001)	Subject	Means of Addressing Issues/Requests/Concerns
New Brunswick Department of Environment & Local Government (NBDELG) Continued	Letter to NB Power	September 11	The Technical Review Committee provided comments and questions on the EPP rev. 5.0 contained in Appendix D of the EIA Study Report dated April 25, 2001. Comments included, but is not limited to, the following: fording, corduroy, ATV access, wetlands, etc.	NB Power's EPP was revised to address comments from the Technical Review Committee and submitted to NBDELG on November 29, 2001. A letter was received on January 30, 2002 from NBDELGs Technical Review Committee containing comments on the revised CSR dated November 27, 2001 and the revised EPP dated December 2001. A number of comments were grammatical or typographical in nature and will be addressed in the next revision of the CSR and EPP. A number of items remain outstanding such as fording, wetlands, and aquatic resources. NB Power will discuss these items with NBDELG.
New Brunswick Department of Environment and Local Government and Rural District Planning Commission	Meeting	September 12 St. Stephen	NB Power presented information on the proposed IPL including: project description, environmental assessment process and a description of final draft CSR dated Sept. 7. Several questions were asked about the project schedule and construction practices. Each question was answered and the representatives were satisfied with the information and had no concerns.	Not applicable
Digdeguash Lake (Chalet Owner)	Telephone call	May 2	Owner called NB Power and requested a map of the Preferred Corridor and project information	A letter dated May 2, 2001 enclosing a copy of a map, project description and Environmental Report was sent to Chalet Owner. See next row for meeting information.
Digdeguash Lake Association	Meeting initiated by NB Power	September 13 Digdeguash	Chalet owner was concerned about proximity of transmission line to chalets. NB Power reviewed maps of the preferred Corridor with the owner to locate chalets in relation to the Preferred Corridor. Owner was satisfied with the location of proposed IPL (approximately 1 km away from chalets) and required no further information.	Not applicable
Eastern Charlotte Waterways Inc. (ECW)	Telephone call to NB Power	April 10	ECW requested information on the proposed Project	A letter dated April 11, 2001 enclosing a map, project description and Environmental Report was sent to ECW.
	Meeting	November 6 St. George	NB Power staff reviewed the environmental assessment process with ECW. A number of questions and concerns about NB Power's construction and maintenance practices, ESAs, ATV access, buffer zones and Dennis Stream Watershed were raised by ECW.	A letter dated December 3, 2001 enclosing a copy of the EPP was sent to ECW.

Association	Means of Consultation	Date/Location (2001)	Subject	Means of Addressing Issues/Requests/Concerns
Eastern Charlotte Waterways Inc. (ECW) Continued			NB Power explained the mitigation measures listed in the final draft CSR that would be implemented during construction and maintenance activities to mitigate impacts on identified features along the preliminary right-of-way. NB Power also discussed the measures outlined in the EPP to ECWs satisfaction. A copy of the EPP and the Fieldwork Report was requested by ECW.	The Fieldwork Report will be sent as soon as it becomes available. This is expected to be available in March 2002.
Nature Trust of NB (NTNB)	E-mail to NB Power	August 10	NTNB was concerned about Clark's Point Preserve, 14 km north of St. Stephen, that may be affected by the proposed IPL Project. To verify the location of this preserve in relation to the Preferred Corridor, NTNB requested a copy of the EIA Study Report, draft scope of the environmental assessment and maps	A letter dated August 14, 2001 enclosing a copy of the EIA Study Report, the draft scope of the environmental assessment and maps were provided to NTNB
	Telephone call to NTNB	August 20	Clark's Point Preserve	NB Power contacted NTNB to confirm receipt of documents sent on August 14, 2001. NTNB stated that they had not received the documents but would look in the office for a NB Power package and would call to confirm.
	Telephone call to NTNB	August 21	Contacted NTNB to follow-up on information regarding Clark's Point Preserve	NTNB confirmed that they had received and had responded to NB Power by letter.
	Letter to NB Power	August 21	NTNB provided NB Power with information on two (2) nature preserve of concerns (*e.g.,* Clark's Point Preserve and Caughey-Taylor Preserve)	NB Power evaluated the information provided by NTNB. It was determined that the Preferred Corridor did not affect the 2 preserves. NB Power informed NTNB of the results of the review during a meeting held on September 6, 2001 (see next row)

Association	Means of Consultation	Date/Location (2001)	Subject	Means of Addressing Issues/Requests/Concerns
Nature Trust of NB (NTNB) Continued	Meeting	September 6 Fredericton	The Environmental Significant Areas (ESAs) were raised as a concern. It was explained to NTNB that the ESAs were identified and avoided during the selection of the Preferred Corridor. Specifically, NBNT was advised at this meeting that the two preserves of concern namely, the Clark's Point Preserve and the Caughey-Taylor Preserve were not affected by the 1km Preferred Corridor. Nature Trust indicated that new ESAs were added to their database since the filing of the EIA Study Report. NB Power committed to review the latest ESAs and would revise the environmental assessment information if these ESAs were located within the Preferred Corridor.	A letter dated October 16, 2001 was sent to NTNB informing them that the latest information on ESAs was reviewed by NB Power staff and it was determined that 6 additional ESAs occurred within the Preferred Corridor. As a result, this information was added to Section 4.3.2 of the Final Draft CSR (dated September 7, 2001) and proper mitigative measures for these additional ESAs were identified in Section 6.2.14 of the CSR. A copy of the CSR dated September 7 was sent to NTNB.
	Letter to NB Power	October 29	NTNB provided NB Power with comments on the forest fragmentation, ESAs, spread of invasive plants, new access points for ATVs, hunting, fishing and poaching in relation to the proposed IPL Project.	A letter was sent on January 23, 2002 advising NTNB that NB Power is currently revising the CSR to address these items and a copy of the final CSR would be sent as soon as it was complete. It appears that the comments can be addressed in the next revised CSR by including additional mitigative measures. Information was added to Section 6.2.1.4 in the CSR dated March 2002.
Pocologan Local Service District Representative (LSDR)	Meeting	September 11 Pocologan	NB Power presented information on the proposed IPL including project description, construction practices and environmental assessment process. Several questions were asked about the design and construction of the proposed IPL. Each question was answered to the satisfaction of the LSDR.	Not applicable
Public Health Services (PHS)	Meeting	September 21 Saint John	NB Power presented information on the proposed IPL Project and reviewed the constraint maps of the Preferred Corridor. PHS raised concerns about increased activities in the Dennis Stream Watershed and questioned construction and maintenance activities. NB Power explained the mitigative measures that would be implemented during all phases of the Project to minimize any impacts within the Watershed area. In addition, NB Power staff answered all questions related to construction and maintenance practices to the satisfaction of the representatives of PHS. A copy of the EPP was requested by PHS.	A letter dated November 30, 2001 enclosing a copy of the EPP was sent to PHS. They were invited to contact NB Power with any further questions or concerns. No further requests to date. Information was added to Section 6.2.1.2 and 6.2.1.3 of the CSR dated Nov. 27, 2001.

Association	Means of Consultation	Date/Location (2001)	Subject	Means of Addressing Issues/Requests/Concerns
St. Croix Estuary Project Inc.	Meeting	September 13 St. Stephen	NB Power presented information on the proposed IPL including: project description and construction practices. Several questions were asked about project schedule and construction practices. Questions were answered to the satisfaction of the representative.	Not applicable
Saint John Citizens Coalition for Clean Air (SJCCCA)	Meeting held in response to letter dated August 9 from SJCCCA to NEB (cc NB Power)	September 7 Saint John	SJCCCA provided comments on the Scope of the Environmental Assessment in a letter dated August 9, 2001 addressed to the NEB. Comments included: spraying pesticides, Climate Change, greenhouse gas emissions, spills, green power, burning, fish habitat, etc.	NB Power staff discussed content of letter dated August 9, 2001 and addressed each issue and question accordingly. Additional questions were asked about the Project and answered to the satisfaction of SJCCCA. Following the meeting a letter dated September 11, 2001 enclosing a copy of the Final Draft CSR was sent to SJCCCA.
	Letter to NB Power	September 14	Letter from SJCCCA to NB Power regarding comments on Final Draft CSR. Their comments included: air quality (*e.g.,* burning, fuel for equipment), Liaison Committee, fish habitat/resources, handling of waste and debris, decommissioning and ATVs.	A letter dated October 11, 2001 was sent to SJCCCA to address each comment and concern raised by SJCCCA. In addition, NB Power committed to implement a Liaison Committee as was suggested by SJCCCA. Information was added to Sections 2.3, 6.2.1.1, and 6.2.1.9 of the CSR dated Nov. 27, 2001. SJCCCA was invited to contact NB Power with any further questions or concerns. No further requests to date.
Town of St. Stephen	Meeting	September 12 St. Stephen	NB Power presented information on the proposed IPL including: project description, environmental assessment process and construction practices. The Town of St. Stephen had concerns about increased access to the Dennis Stream Watershed, construction activities along watercourses and use of pesticides. NB Power stated that no pesticides are used on transmission lines and explained the construction practices followed by contractors. The Town requested that NB Power evaluate the possibilities of relocating the preliminary right-of-way outside the watershed area.	NB Power staff reviewed possibilities of relocating right-of-way outside watershed, reviewed applicable regulations and contacted Department of Environment & Local Government to discuss issue. It was determined that the existing location was the best possible route. A meeting was scheduled October 11, 2001 to discuss the results of NB Power's review (see next row)

Association	Means of Consultation	Date/Location (2001)	Subject	Means of Addressing Issues/Requests/Concerns
Town of St. Stephen Continued	Meeting	October 11 St. Stephen	NB Power staff advised Town representatives of the review results for the proposed routing in the area. They explained the rationale for not relocating the right-of-way outside the watershed and listed the unique measures (*e.g.,* selective cutting, felled trees) that would be implemented to minimize increased access in the area. At this time, NB Power offered to advise Town representatives when survey crews would be working in the watershed area. Town representatives agreed.	A letter dated October 17, 2001 was sent to the Town of St. Stephen reaffirming NB Power's commitments during all phases of the Project to minimize any impacts in the Dennis Stream Watershed. Commitments were added to Section 6.3, 6.2.1.2, 6.2.1.4, 6.2.1.9, and 6.2.1.11 of the CSR dated Nov. 27, 2001. Fax sent October 16, 2001 to advise Town representatives that NB Power survey crews would be working in the watershed area for a few days.

APPENDIX D

Contact List (Updated)

Appendix D
Contact List and Stakeholder Consultation

Contact Name	Organization	Contact Number	Date Contacted	Reasons for Contact
Beaudette, Dan	NB Department of Natural Resources and Energy	(506) 453-2440	2001 11 14	Forest Management Practices on Crown Land
Betts, Matthew	Greater Fundy Ecosystem Research Group	(506) 447-3435	March 2002	Migratory Birds
Boyne, Andrew	Canadian Wildlife Service	(506) 364-2660		
Carson, Steve	Enterprise Saint John	(506) 658-2877	2001 01 15	Major Employers
Cole, Darlene	NB Department of Natural Resources and Energy	(506) 453-2437	2001 03 16	Crown leases, sugar bush
Craig, Nelda	NB Department of Natural Resources and Energy	(506) 457-4846	2001 01 18	Outstanding lakes and rivers, Environmentally Significant Areas
Donovan, Melinda	Canadian Coast Guard	(902) 426-7853	2001 08 28	Navigational concerns/Navigable Waters Protection Act
Ferguson, Albert	Archaeological Services Unit, Heritage Branch, Culture & Sport Secretariat	(506) 453-2756	February 2001	Archaeological resources within Study Area
Gerrietts, Stefen	Atlantic Canada Conservation Data Centre	(506) 364-2657	2001 01 19	Species of Concern
Gordon, Steve	NB Department of Natural Resources and Energy	(506) 453-2440	2001 11 14	Old Coniferous Forest Habitat
Harvey, Joe	Ducks Unlimited Canada	(506) 458-8848	2001 01 12	Ducks Unlimited impoundments within the Study Area
Hughes, Rob	NB Department of Environment and Local Government	(506) 453-2265	2001 01 30	Air Quality
Keppie, Dan	UNB	(506) 453-4928	2002 03 14	Migratory Birds
Lemonie, Janet	The Canadian Real Estate Association	(613) 237-7111	2001 01 15	House Pricing
Libby, Cade	NB Department of Natural Resources and Energy, Fish & Wildlife Branch	(506) 453-2440	2001 02 16	Reported sightings and occurrences of lynx in Study Area
MacInnis, Andrew	Ducks Unlimited Canada	(506) 458-9921	2001 01 12	Ducks Unlimited impoundment locations
MacLeod, Malcolm	New Brunswick Department of Natural Resources and Energy	(506) 432-2233	July 2002	Acid Rock Drainage and Geology Mapping
Makepeace, Scott	NB Department of Natural Resources and Energy	(506) 453-2440	February 2002	Migratory Birds
Marshall, Martin	NB Department of Natural Resources and Energy	(506) 453-3601	2001 01 15	Ecological Reserves
McAffee, Rodney	Jacques Whitford Associates	(506) 457-3200	2001 11 25	Acid Generating Bedrock
McAlphine, Don	NB Museum	(506) 643-2345	2001 01 18	Rare mammals
McCabe, Darren	NB Department of Environment and Local Government	(506) 466-7373	2001 02 08	Local Service Districts
McCauley, John	Canadian Environmental Assessment Agency	(819) 994-3159	2001 08 15	Comprehensive Study Report Requirements
Melanson, Marc	Statistics Canada	(902) 426-6278	2001 01 15	Population and labour statistics
Miller, Ian	Natural Resources Canada	(902) 893-0099	2001	Forest Edge Effects

Appendix D
Contact List and Stakeholder Consultation

Contact Name	Organization	Contact Number	Date Contacted	Reasons for Contact
Morin, Gerard	Atlantic Climate Centre	(506) 451-6006	2001 01 18	Climatology Information
Moore, Gary	NB Department of Natural Resources and Energy	(506) 444-4888	August, 2001	Deer Wintering Areas (Updated Mapping)
Phillips, Richard	Heritage Branch, Culture & Sport Secretariat	(506) 453-2324	February 2001	Heritage resources within Study Area
Richard, Sara	NB Department of Natural Resources and Energy	Fx453-6699	2001 02 23	Eastern habitat joint Venture Areas
Sabine, Dwayne	NB Department of Natural Resources and Energy	(506) 453-2440	2002 03 14	Migratory Birds
Sharma, Mana	Nature Trust of NB Inc.	(506) 457-2398	2001 08 13	Nature Preserves
Shaw, Ron	NB Department of Natural Resources and Energy	(506) 453-2206	2001 02 26	Mining leases
Sochasky, Lee	St. Croix Waterway Commission	(506) 466-7550		Georgia Pacific Land along St. Croix River
St. Peter, Clint	NB Department of Natural Resources and Energy	(506) 453-2206	2001 02 26	Areas of subsidence
Stocek, Rudy	Maritime Forest Ranger School	(506) 458-0657	2001 01 16	Raptors species of concern
Vanderlaan, Paul	NB Department of Environment and Local Government	(506) 457-4846	2001 01 12	Designated watershed in Study Area
Woods, Don	NB Department of Environment and Local Government	(506) 444-4599	2001 03 08	Landfill sites
Zelazny, Vince	NB Department of Natural Resources and Energy	Fx453-6630	2001 02 27	Ecological Reserves

APPENDIX E

Constraint Map

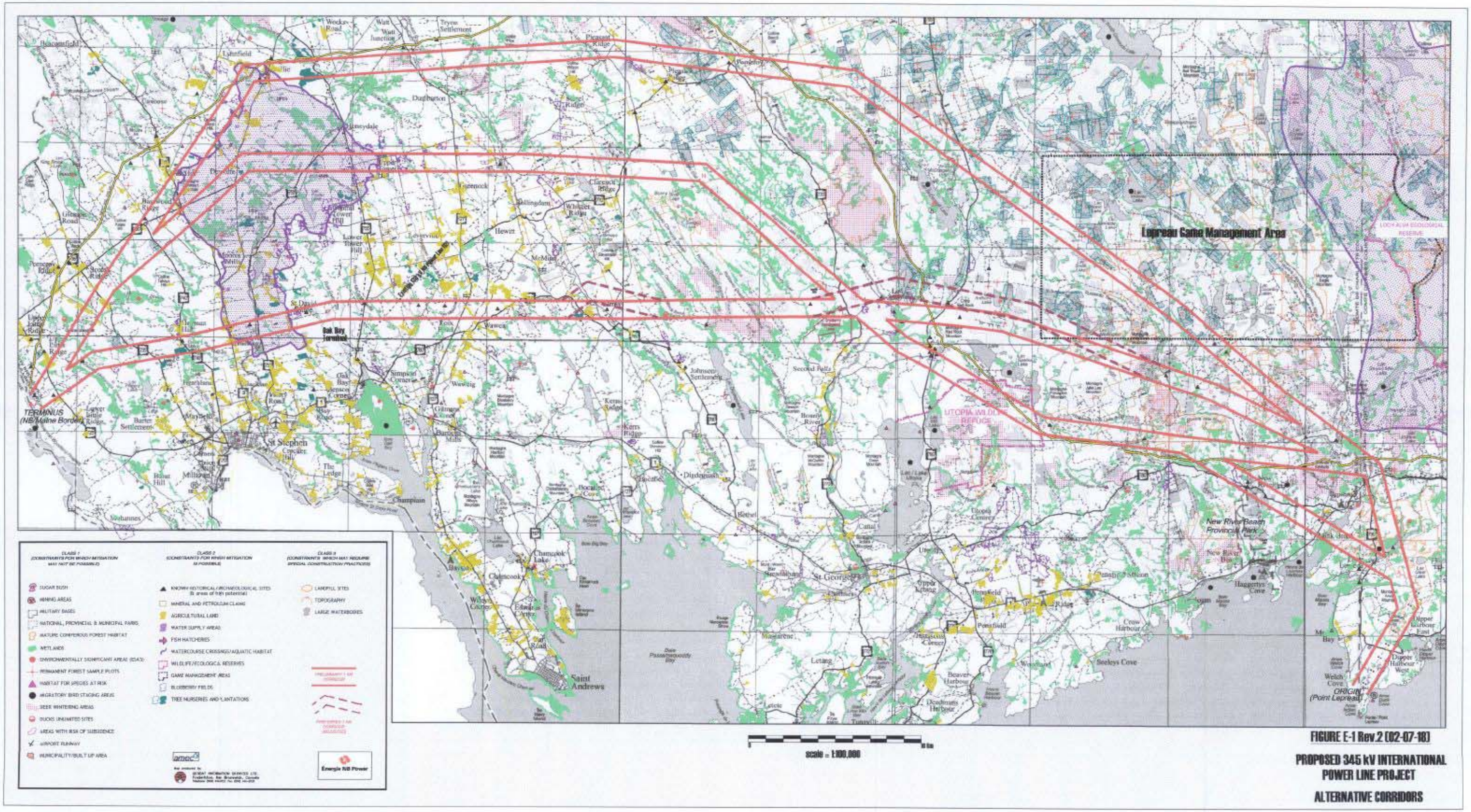
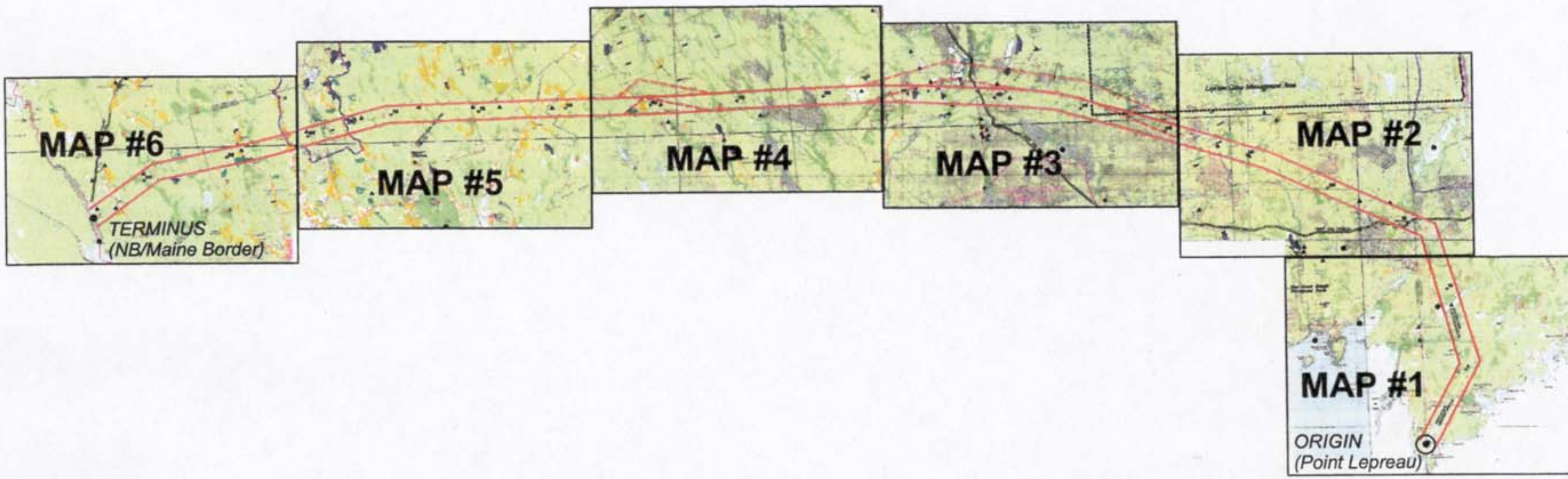


FIGURE E-1 Rev.2 (02-07-18)

PROPOSED 345 kV INTERNATIONAL POWER LINE PROJECT

ALTERNATIVE CORRIDORS



PROPOSED 345 kV INTERNATIONAL POWER LINE PROJECT
KEY MAP
Rev.2 (02-07-12)

TE21002.3/index (2002/07/12)

amec

CLASS 1
(CONSTRAINTS FOR WHICH MITIGATION MAY NOT BE POSSIBLE)

- SUGAR BUSH
- MINING AREAS
- MILITARY BASES
- NATIONAL, PROVINCIAL & MUNICIPAL PARKS
- MATURE CONIFEROUS FOREST HABITAT
- WETLANDS
- ENVIRONMENTALLY SIGNIFICANT AREAS (ESA'S)
- PERMANENT FOREST SAMPLE PLOTS
- HABITAT FOR SPECIES AT RISK
- MIGRATORY BIRD STAGING AREAS
- DEER WINTERING AREAS
- DUCKS UNLIMITED SITES
- AREAS WITH RISK OF SUBSIDENCE
- AIRPORT RUNWAY
- MUNICIPALITY/BUILT UP AREA

CLASS 2
(CONSTRAINTS FOR WHICH MITIGATION IS POSSIBLE)

- KNOWN HISTORICAL/ARCHAEOLOGICAL SITES (& areas of high potential)
- MINERAL AND PETROLEUM CLAIMS
- AGRICULTURAL LAND
- WATER SUPPLY AREAS
- FISH HATCHERIES
- WATERCOURSE CROSSINGS/AQUATIC HABITAT
- WILDLIFE/ECOLOGICAL RESERVES
- GAME MANAGEMENT AREAS
- BLUEBERRY FIELDS
- TREE NURSERIES AND PLANTATIONS

CLASS 3
(CONSTRAINTS WHICH MAY REQUIRE SPECIAL CONSTRUCTION PRACTICES)

- LANDFILL SITES
- TOPOGRAPHY
- LARGE WATERBODIES

PREFERRED 1 KM CORRIDOR

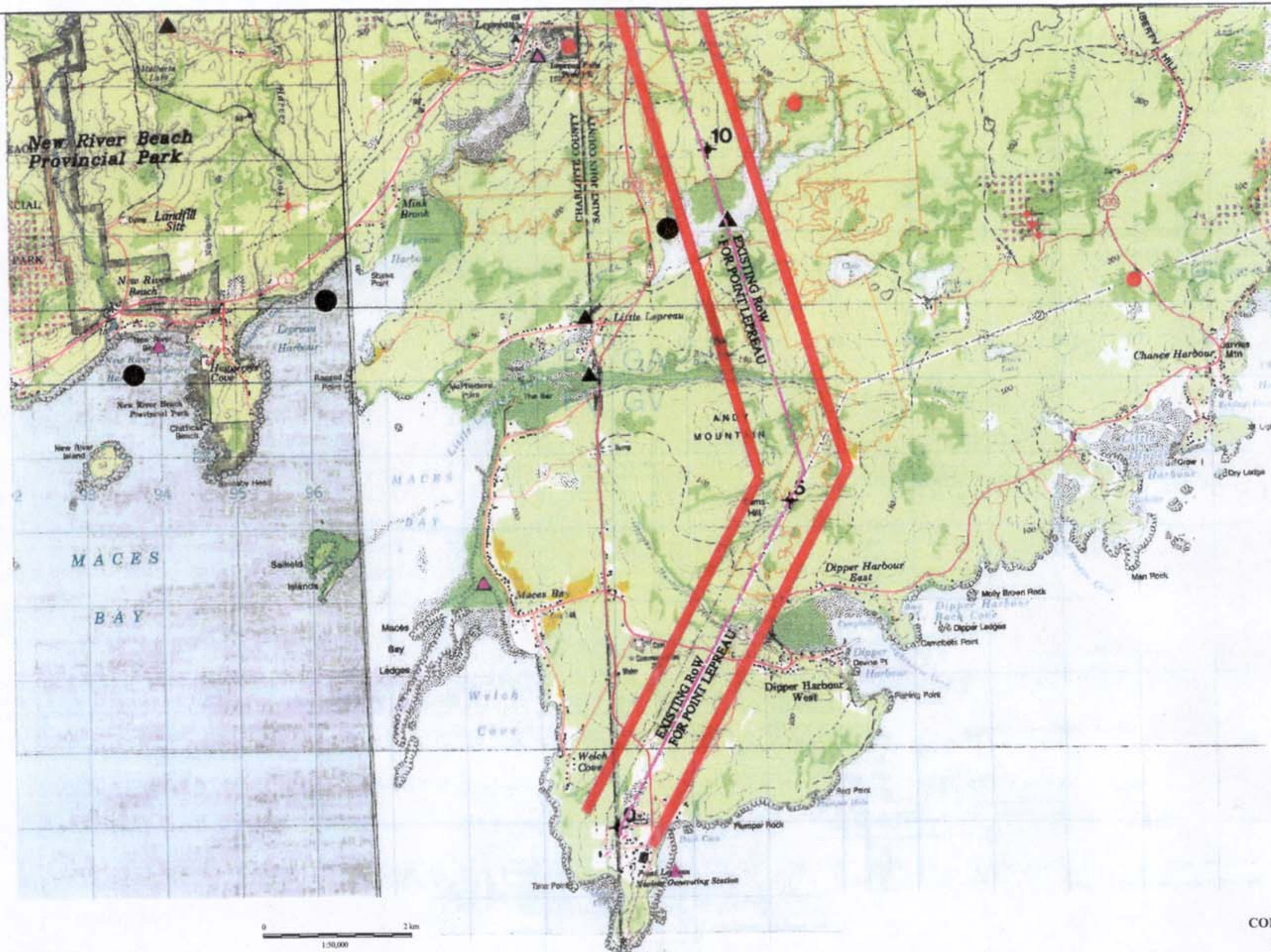
PREFERRED 1 KM CORRIDOR (ADJUSTED)

50 m RoW

5 KILOMETRE POST

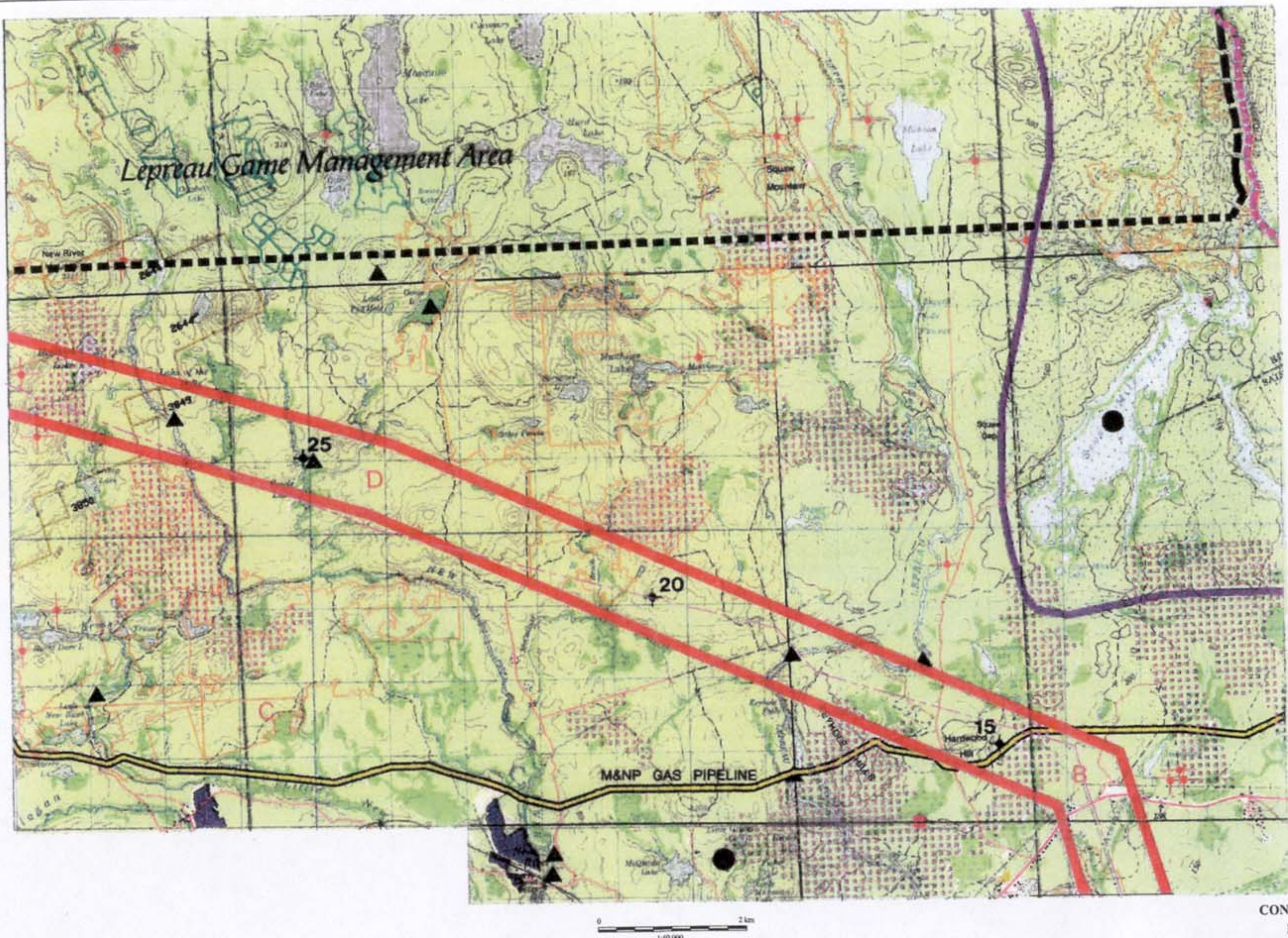
PROPOSED 345 kV INTERNATIONAL POWER LINE PROJECT
LEGEND
Rev.2 (02-07-12)

TE21002.3/cnstrnt legend (2002/07/12)

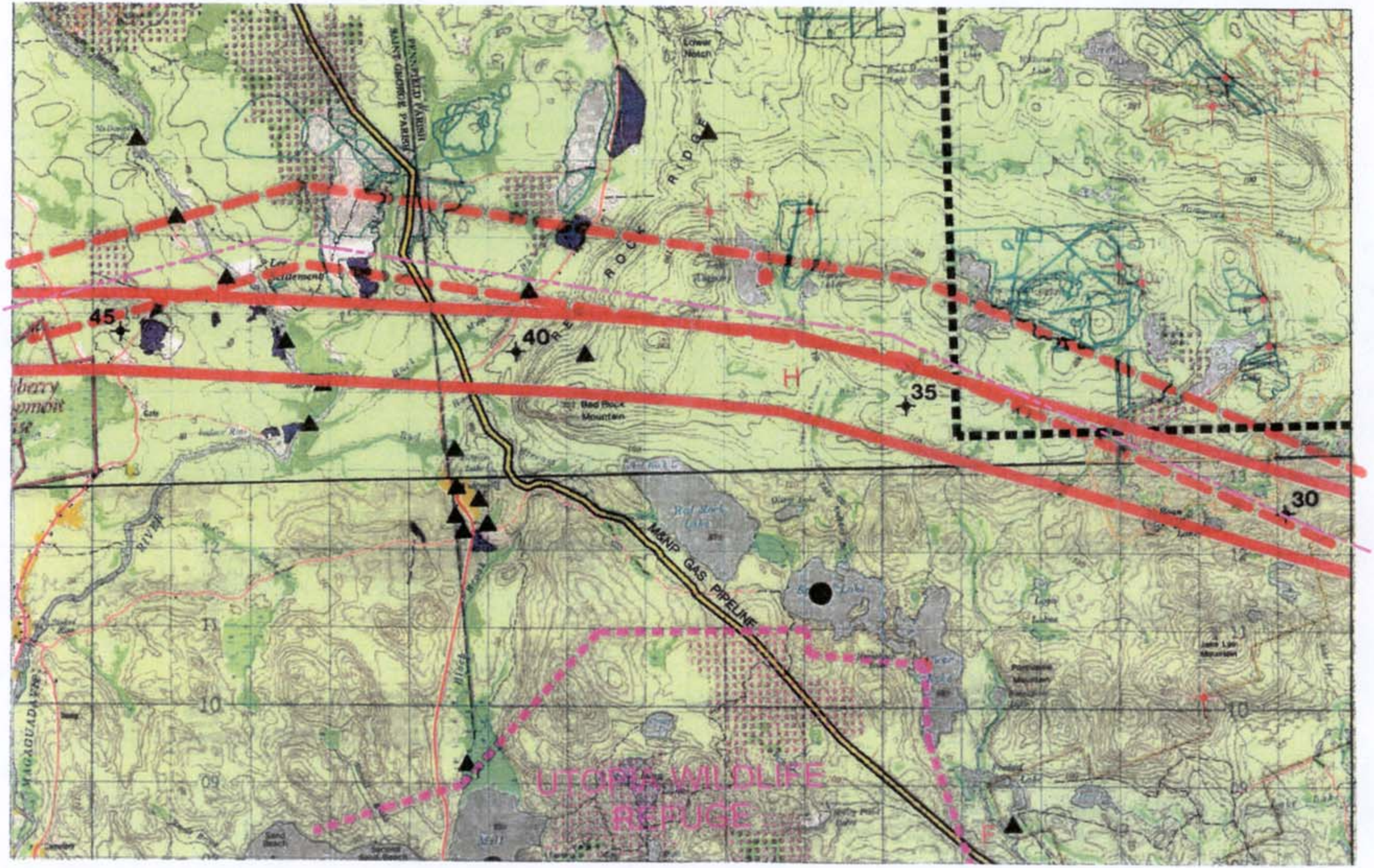


CONSTRAINT MAP #1
Rev.2 (02-07-12)

TE21002.3/constraint map1 (2002/07/12)



CONSTRAINT MAP #2
Rev.2 (02-07-12)



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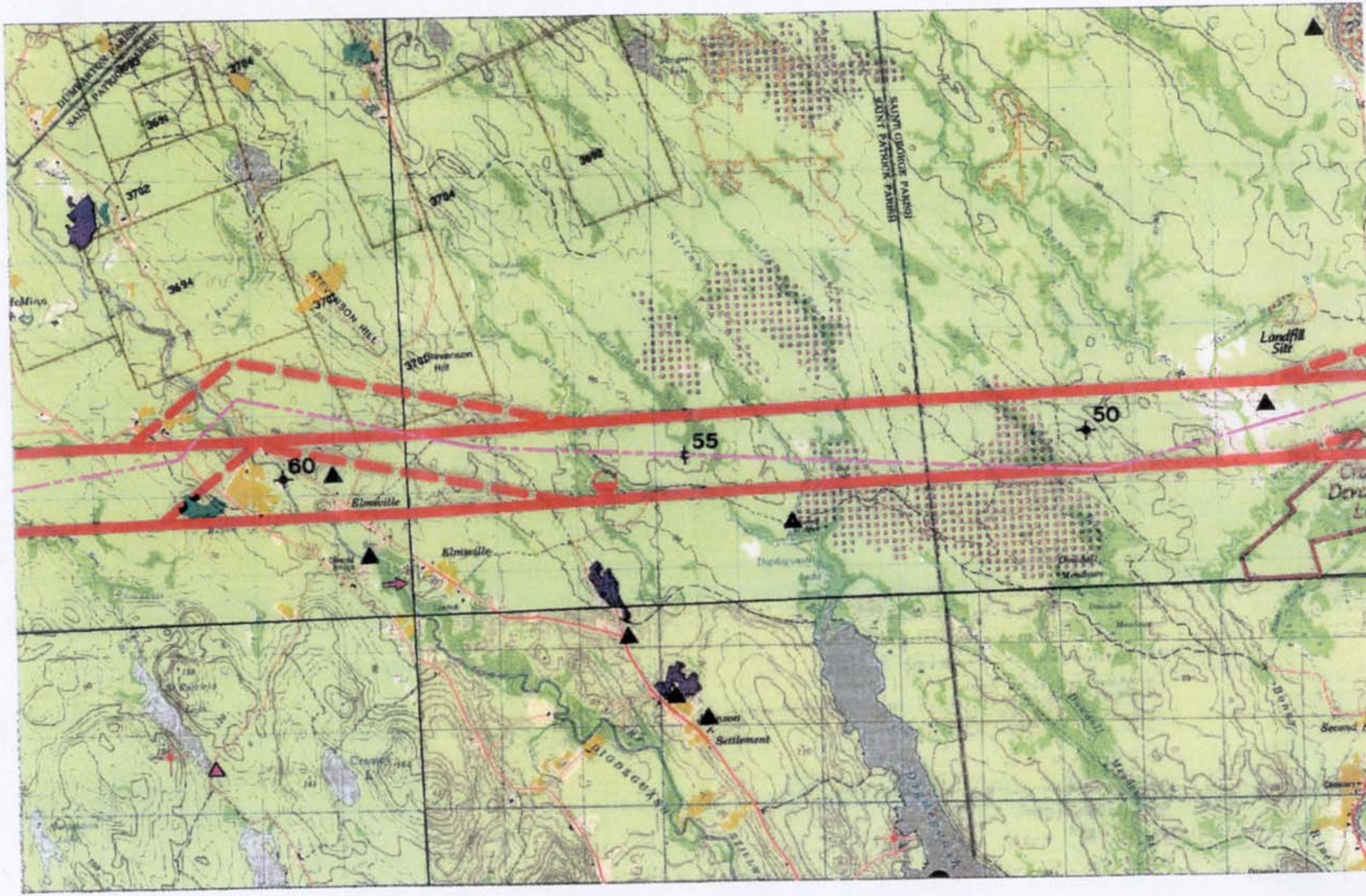
TE21002.3/constraint map3 (2002/07/12)

CONSTRAINT MAP #3
Rev.2 (02-07-12)



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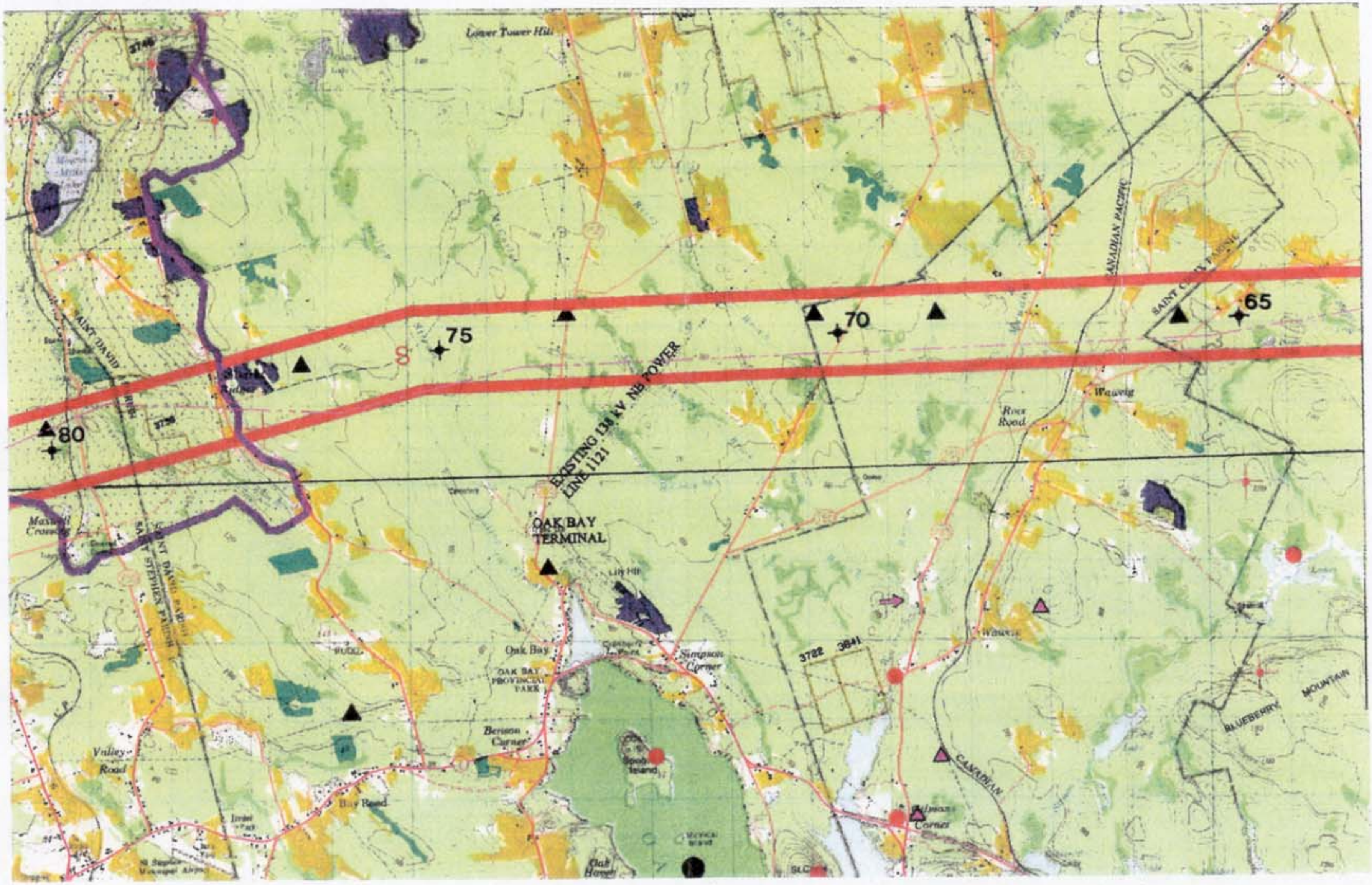
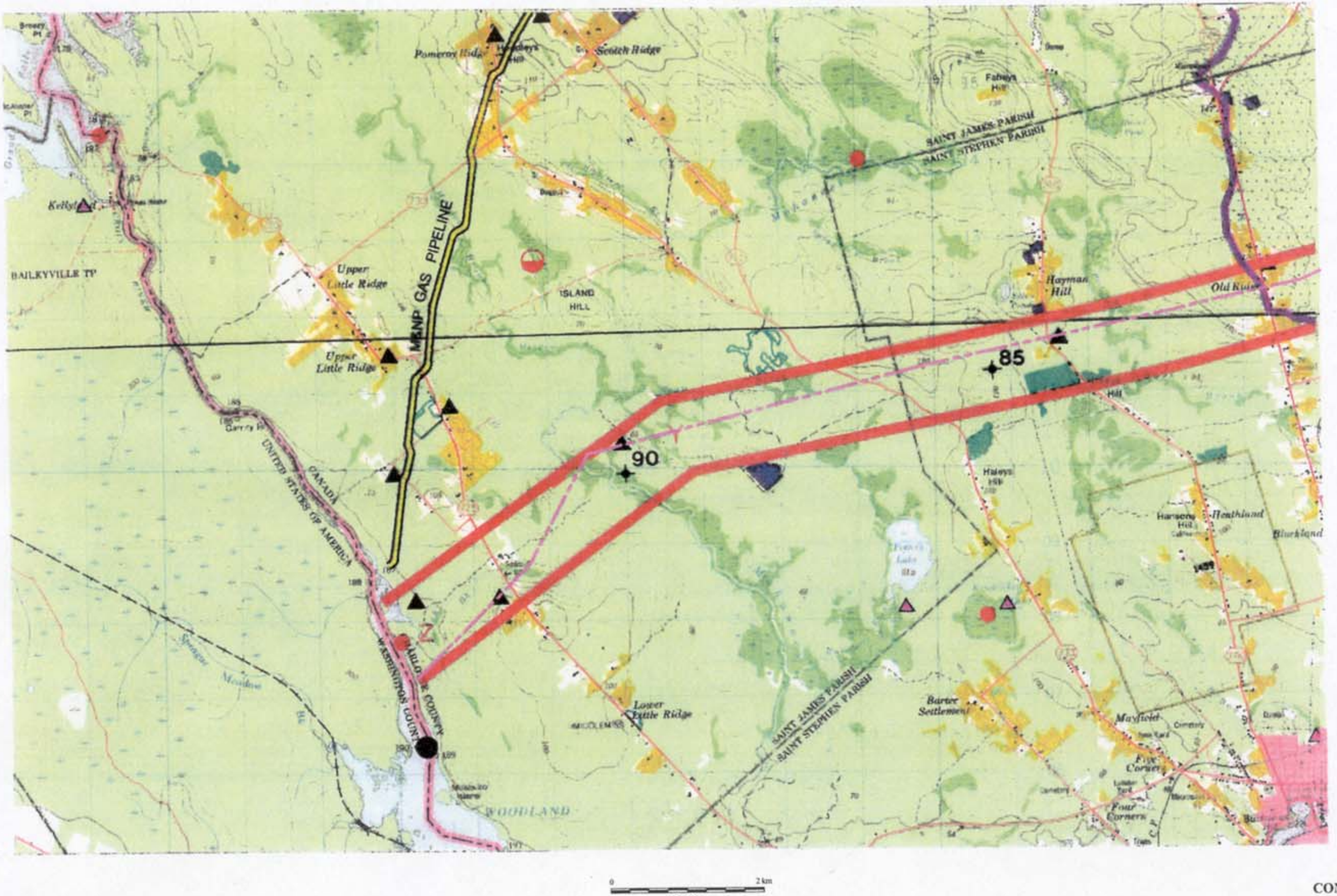
CONSTRAINT MAP #4
Rev.2 (02-07-12)



CONSTRAINT MAP #5
Rev.2 (02-07-12)

TE21002.3/constraint map5 (2002/07/12)



CONSTRAINT MAP #
Rev.2 (02-07-12)

1002.3/constraint map6 (2002/07/12)

APPENDIX F

Data Received From ACCDC

TABLE F-1
Species Ranked S1 to S3 Occurring within the Project Study Area (See Map Figure F-1)

MAP CODE	SCIENTIFIC NAME	COMMON NAME	SRANK	HRANK	STATUS IN NB
BARTlong	Bartramia longicauda	Upland Sandpiper	S1B		
CALImari	Calidris maritima	Purple Sandpiper	S3T		
HYLOmust	Hylocichla mustelina	Wood Thrush	S3B		
ALNUserr	Alnus serrulata	Brook-Side Alder	S1	S1	
VIBUacer	Viburnum acerifolium	Maple-Leaf Viburnum	S1	S1	threatened
VIBUlent	Viburnum lentago	Nannyberry	S1	S1	
GAYLdumo	Gaylussacia dumosa	Dwarf Huckleberry		S3	
GENTrubr	Gentiana rubricaulis	Closed Gentian	S1	S1	reg.endangered
GENTrubr	Gentiana rubricaulis	Closed Gentian	S1	S1	reg.endangered
GENTrubr	Gentiana rubricaulis	Closed Gentian	S1	S1	reg.endangered
GENTrubr	Gentiana rubricaulis	Closed Gentian	S1	S1	reg.endangered
GENTrubr	Gentiana rubricaulis	Closed Gentian	S1	S1	reg.endangered
HEDEpule	Hedeoma pulegioides	American Pennyroyal		S2	
UTRIgemi	Utricularia geminiscapa	Hidden-Fruited Bladderwort; Twin-Scaped Bladderwort	S1	S2	
EPILhorn	Epilobium hornemannii	Hornemann Willow-Herb		S2	
POLYpauc	Polygala paucifolia	Fringed Polygala; Gaywings	S2	S1	reg.endangered
POLYpauc	Polygala paucifolia	Fringed Polygala; Gaywings	S2	S1	reg.endangered
POLYpauc	Polygala paucifolia	Fringed Polygala; Gaywings	S2	S1	reg.endangered
POLYpauc	Polygala paucifolia	Fringed Polygala; Gaywings	S2	S1	reg.endangered
POLYarti	Polygonella articulata	Eastern Jointweed	S1	S1	
POLYarpu	Polygonum arifolium var pubesce	Halberd-leaved Tearthumb	S2	S2	
COLLline	Collomia linearis	Narrow-Leaved Collomia	S3SE?	S2	
CLEMocci	Clematis occidentalis	Purple Clematis		S3	
HEPAnoob	Hepatica nobilis var. obtusa	Round-lobed Hepatica;Round-Leaved Liverleaf	S2	S2	
RUBUcham	Rubus chamaemorus	Cloudberry	S3	S3	
RUBUcham	Rubus chamaemorus	Cloudberry	S3	S3	
RUBUcham	Rubus chamaemorus	Cloudberry		S3	
GEOClivi	Geocaulon lividum	Northern Comandra		S3	
LIMOaust	Limosella australis	Mudwort		S2	
LINDdubi	Lindernia dubia	Yellow-Seed False-Pimpernel		S3	
PEDIcana	Pedicularis canadensis	Early Wood Lousewort; Common Lousewort	S1	S1	reg.endangered
PEDIcana	Pedicularis canadensis	Early Wood Lousewort; Common Lousewort	S1	S1	reg.endangered
SYMPfoet	Symplocarpus foetidus	Skunk Cabbage		S2	
SYMPfoet	Symplocarpus foetidus	Skunk Cabbage		S2	
SYMPfoet	Symplocarpus foetidus	Skunk Cabbage		S2	
SYMPfoet	Symplocarpus foetidus	Skunk Cabbage		S2	
SYMPfoet	Symplocarpus foetidus	Skunk Cabbage		S2	
SYMPfoet	Symplocarpus foetidus	Skunk Cabbage		S2	
CAREmama	Carex magellanica ssp. magellan	Bog Sedge		S2	
CAREmama	Carex magellanica ssp. magellan	Bog Sedge		S2	
CLADmari	Cladium mariscoides	Twig Rush	S2	S2	
CLADmari	Cladium mariscoides	Twig Rush	S2	S2	
ELEOrobb	Eleocharis robbinsii	Robbins Spikerush	S1	S1	
ELEOrobb	Eleocharis robbinsii	Robbins Spikerush	S1	S1	
SCIRclin	Scirpus clintonii	Clinton Bulrush		S2	
SCIRclin	Scirpus clintonii	Clinton Bulrush		S2	
NAJAgrac	Najas gracillima	Thread-Like Naiad	S1	S1	reg.endangered
NAJAgrac	Najas gracillima	Thread-Like Naiad	S1	S1	reg.endangered
NAJAgrac	Najas gracillima	Thread-Like Naiad	S1	S1	reg.endangered
PLATgran	Platanthera grandiflora	Large Purple-Fringe Orchis	S2	S2	
PLATgran	Platanthera grandiflora	Large Purple-Fringe Orchis		S2	
GLYCobtu	Glyceria obtusa	Blunt Manna-Grass	S1	S1	
ASPLtric	Asplenium trichomanes	Maidenhair Spleenwort	S1S2	S1	reg.endangered
ASPLtric	Asplenium trichomanes-ramosum	Green Spleenwort	S3	S2	
DRYOxtr	Dryopteris x triploidea	a Hybrid Wood-fern	SHYB	S3	

TABLE F-2
Special Areas Occurring within the Project Study Area (See Map - Figure F-2)

SITE NAME	LOCAL JURISDICTION	DESCRIPTION
Black Brook	NGO (Duck Unlimited)	Freshwater marsh
Cranberry Lake	NGO (Duck Unlimited)	Freshwater marsh
Green Brown Brook	NGO (Duck Unlimited)	Freshwater marsh
Island Hill Flowage	NGO (Duck Unlimited)	Freshwater marsh
Little Pocologan	NGO (Duck Unlimited)	Freshwater marsh
Oak Bay Provincial Park	NB Dept Natural Resources & Energy	Provincial Park
Oven Head Provincial Park Reserve	NB Dept Natural Resources & Energy	Provincial Park
St. George Marsh	NGO (Duck Unlimited)	Freshwater marsh
The Brothers Coastal Management Area	Govt Prov	Seabird colony; important waterfowl staging area; important waterfowl overwintering area; waterfowl migration habitat
Utopia Wildlife Refuge	NB Dept Natural Resources & Energy	Game Management Area
Todd's Point	Nature Trust of NB(Private)	Broad diversity of habitat types; high number of breeding bird species; large undeveloped area and deeded intertidal zone; historical significance
New River Beach Provincial Park	NB Dept Natural Resources & Energy	Provincial Park
Lepreau Falls Provincial Park	NB Dept Natural Resources & Energy	Provincial Park
Sam Orr's Pond (Caughey Taylor Nature Preserve)	Nature Trust of NB(Private)	Well known spot for quahogs, only known location in Bay of Fundy; site of 270 acre NTNB preserve

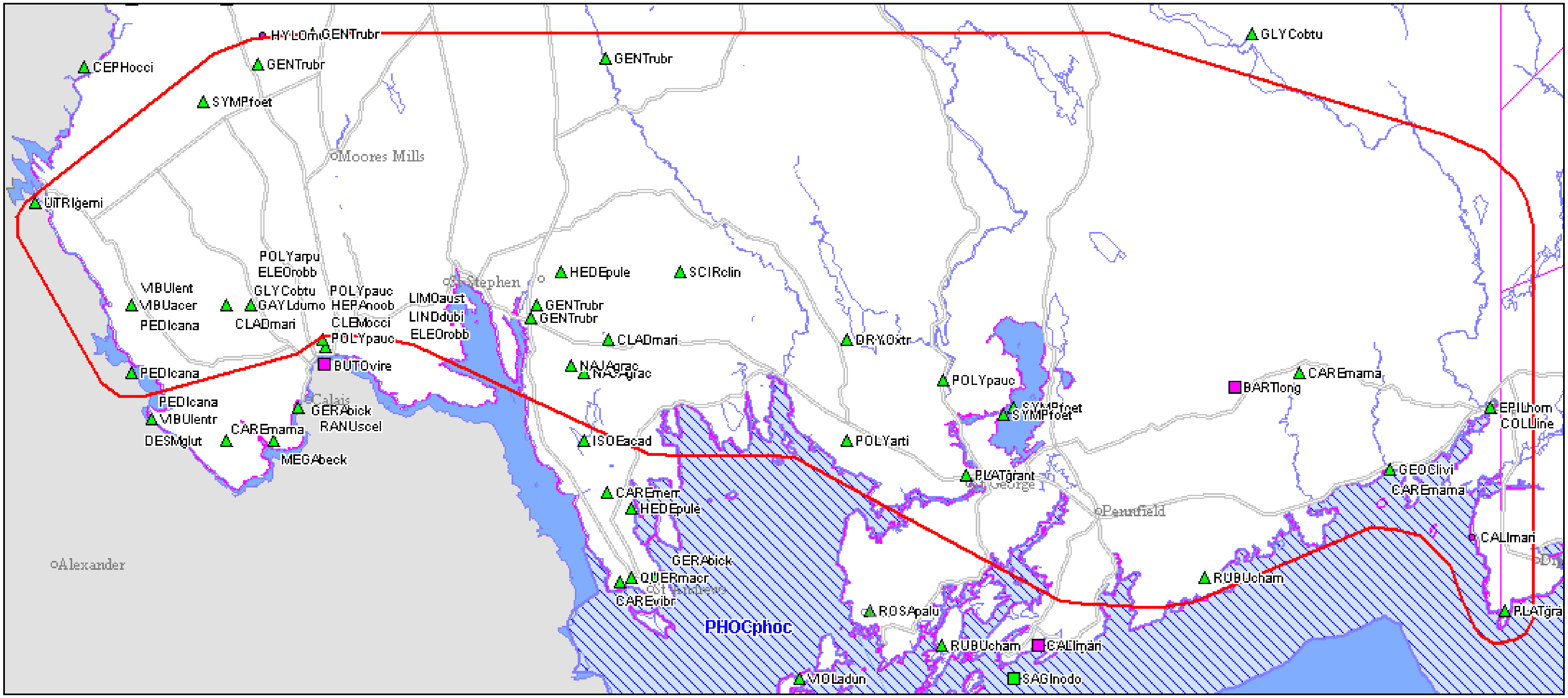


Figure F-1 Species Occurrence

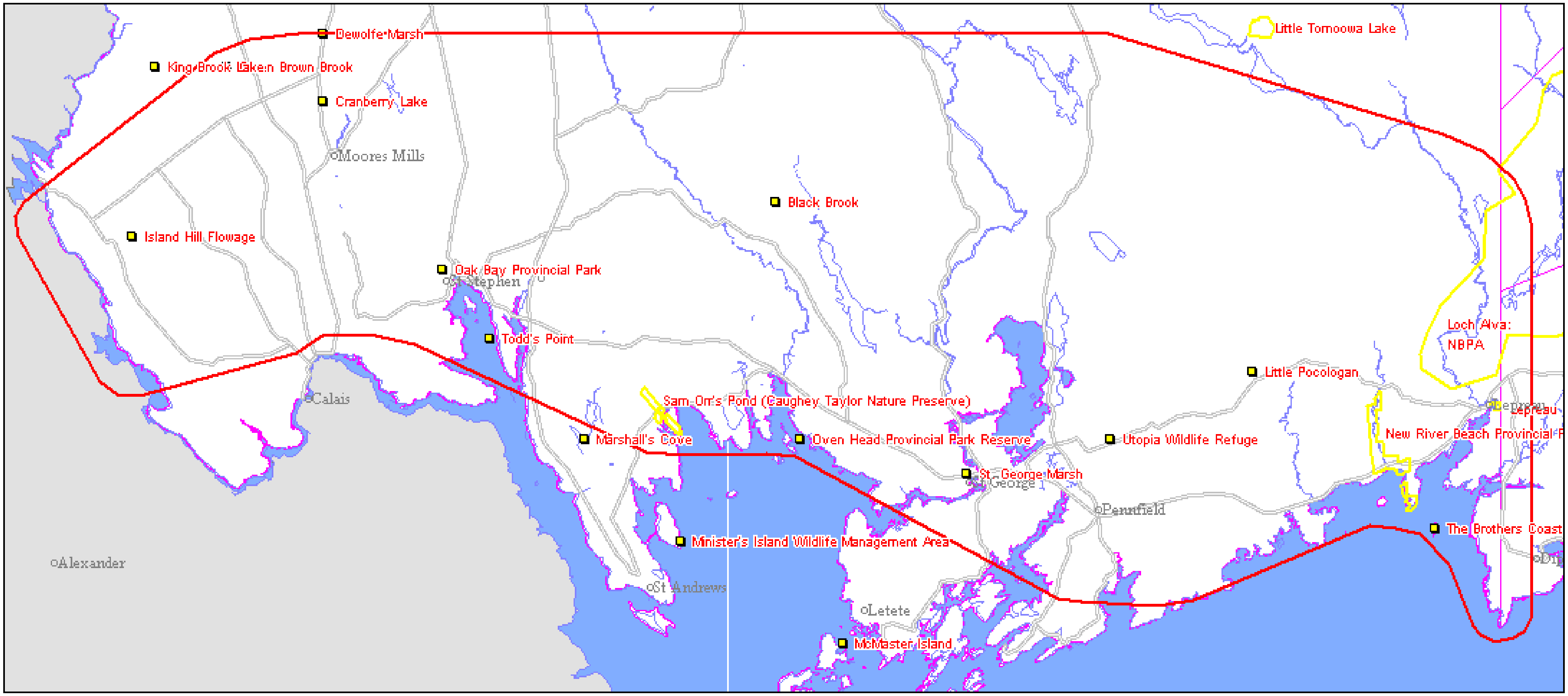


Figure F-2 Special Areas

Atlantic Canada CDC Canada Atlantique

Conservation Data Centre Species Ranking System

Biological diversity or biodiversity can be described at a number of levels, from molecules to ecosystems. Biodiversity is a combination of species diversity (the variety of species), genetic diversity (the genetic variability among individuals of that species), and ecological diversity (the variety of ecosystems/habitats in which they live). Conservation Data Centres (CDCs), as part of The Nature Conservancy's international network, track biodiversity at two levels: species and ecological communities. Species and ecological communities are referred to as **elements** of biodiversity. Elements are ranked in each jurisdiction (province or state) and at global and national levels in order to help prioritise conservation efforts.

The Nature Conservancy (TNC) and all CDCs (called Natural Heritage Programs in the US) use a standardised element ranking system that has evolved over 23 years with input from hundreds of scientists. The following material describes this element ranking system at the subnational (S) or provincial level and explains how ranks are assigned for species elements of biodiversity. (The community ranking process is slightly different.)

Definitions of Provincial (subnational) ranks - SRANKS

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

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

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

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

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

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

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

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

SX Extinct/Extirpated: Element is believed to be extirpated within the province.

S? Unranked: Element is not yet ranked.

SA Accidental: Accidental or casual in the province (i.e., infrequent and far outside usual range). Includes species (usually birds or butterflies) recorded once or twice or only at very great intervals, hundreds or even thousands of miles outside their usual range; a few of these species may even have bred on the one or two occasions they were recorded.

SE Exotic: An exotic established in the province (e.g., Purple Loosestrife or Coltsfoot); may be native in nearby regions.

SE# Exotic numeric: An exotic established in the province that has been assigned a numeric rank.

SP Potential: Potential that Element occurs in the province, but no occurrences reported.

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

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

SZ Zero occurrences: Not of practical conservation concern in the province, because there are no definable occurrences, although the species is native and appears regularly. An NZ rank will generally be used for long distance migrants whose occurrences during their migrations are too irregular (in terms of repeated visitation to the same locations) or transitory. In other words, the migrant regularly passes through the province, but enduring, mappable Element Occurrences cannot be defined.

Qualifiers

<u>Breeding Status</u>

B Breeding: Basic rank refers to the breeding population of the element in the province.

N Non-breeding: Basic rank refers to the non-breeding population of the element in the province.

Other Qualifiers:

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

C Captive or cultivated: Element is presently extant in the country or province only in captivity or cultivation.

Key to Completing the Ranking Matrix

To rank species elements, eight different biological criteria are assessed for each species. A letter value from A to D is assigned to each biological factor for which there is enough information. A species with all **A**s will likely be ranked S1 whereas a species with all **D**s would likely receive a S5. Where there is a mixture of letter ranks, the person doing the ranking must use their judgment to decide how much weight should be given to certain factors, depending on the biology of the species in question. The eight factors considered in assigning status ranks are described below. Following this there is a matrix (Table 1) summarising the guidelines for scoring (A-D) the eight criteria.

1. Provincial Abundance

A single letter code represents the estimated provincial abundance of the species. Abundance is measured in different ways depending on the biology of the species. For animal populations it is usually measured by the number of individuals, for plants it may be measured by the area occupied by a distinct population, and for aquatic invertebrates it may be measured by the stream length that the species occupies:

A = **Fewer than 1,000 individuals *or***
Fewer than 10 miles of stream length *or*
fewer than 800 ha

B = **1,000 - 3,000 individuals *or***
10 - 50 miles of stream length *or*
800 - 4000 ha

C = **3,000 - 10,000 individuals *or***
50 - 250 miles of stream length *or*
4,000 to 20,000 ha

D = **over 10,000 individuals *or***
over 250 miles of stream length *or*
over 20,000 ha

2. Provincial Range

This denotes the approximate range of the species as a percentage of the province's area. It is defined as the current area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of occurrence, but, *excluding* significant areas where the species does not occur due to unsuitable habitat. Thus the estimate of range for a species exhibiting a linear use of coastal forests or riverine habitats would not consider tracts of unsuitable habitat in the interior of the polygon.

A = **Very small range, less than 3% of province**
B = **Narrow range, less than 10% of province**
C = **Moderately widespread, less than half of province**
D = **Widespread, more than half of province**

3. Population Abundance Trend

Population Abundance Trend is an estimate of the change in the number of mature individuals over time, from long term monitoring data and historical accounts, where available. Natural fluctuations will not normally count as part of a decline. An observed decline should not be considered as part of a natural fluctuation unless there is evidence for this.

A = **Declining rapidly** (decrease of 50 % in the last 10 years or 3 generations, whichever is longer)
B = **Declining** (decrease of 20 % in the last 10 years…)
C = **Stable**
D = **Increasing**

4. Distribution Trend

A single-letter code which best characterizes the trend in the species' distribution over its provincial range:

A = **Declining rapidly** (decrease of 50 % in the last 20 years or 6 generations, whichever is longer)
B = **Declining** (decrease of 20 % in the last 20 years…)
C = **Stable**
D = **Increasing**

5. Number of Element Occurrences (EOs)

An “element occurrence” is the mapping unit of CDC methodology. It is generally defined as an area of land or water on which an “element of biodiversity” (plant and animal species or natural community) is or was present. It is a physical location important to the conservation of a species or community, an area worth preserving to insure the survival of a community or species at risk. For a species it is generally the habitat occupied by a local population, for a community it is the area containing a stand or patch. What constitutes an occurrence also varies between species (e.g. hibernacula, den sites, breeding ponds where adults, egg masses and/or larvae have been identified, breeding colonies, etc.). Some species can have more than one type of occurrence, for example breeding and wintering occurrences.

A single letter code (below) represents the number of estimated occurrences believed extant for the species in the province. When a species' distribution is extremely limited and there are very few site occurrences, it is very susceptible to any number of ecological disturbances, both predictable and unpredictable. This criteria is therefore an important factor influencing SRANK when the number of occurrences is few. If the letter code for this field is A or B, the species usually qualifies for a rank of S1 or S2.

A = 0 - 5 occurrences
B = 6 - 20 occurrences
C = 21 - 100 occurrences
D = 101+ occurrences

6. Number of Protected Element Occurrences

The estimated number of adequately protected occurrences of the species in the province.

A = Believed to be none protected.
B = At least one protected occurrence.
C = Several protected occurrences.
D = Many protected occurrences.
U = Unknown whether any occurrence protected.

7. Threats to Population

Threats to population include observed, inferred or projected 1) direct exploitation, 2) harassment, or 3) ecological interactions with predators, competitors, pathogens or parasites - which may result in population declines. Threats may arise from natural or man-made forces.

A = Very threatened in the province; threats are of high magnitude (affect more than half the population) and imminent; unmitigated.
B = Moderately threatened province-wide (less than half the population); threats imminent; mitigated by some level of human protection.
C = Not very threatened province-wide; threats not so imminent; threat is less significant to population viability; threats are being mitigated through protective measures.
D = Unthreatened on a province-wide basis, although it may be threatened in minor portions of the province.

8. Threats to Habitat

Threats to habitat include observed, inferred or projected habitat alterations (loss, conversion, degradation or fragmentation) which may result in population declines or loss of element occurrences.

- **A = Very threatened in the province (affects more than half the provincial range); threats are of high magnitude and imminent; unmitigated.**
- **B = Moderately threatened province-wide (affects less than half the provincial range); threats imminent; mitigated by some level of human protection.**
- **C = Not very threatened province-wide; threats not so imminent; threat is less significant to population viability; threats are being mitigated through protective measures.**
- **D = Unthreatened on a province-wide basis, although it may be threatened in minor portions of the province.**

9. Other Considerations

Other considerations in determining the rank that are not apparent from the letter codes selected for the above criteria. Generally, these considerations will raise rather than lower the rank, e.g., "Never sexually reproduces" or "All occurrences are in areas under development".

Table 1. Matrix showing ranking criteria and value of letter scores for each criteria.

	MATRIX SCORE			
	A	**B**	**C**	**D**
CRITERIA				
Population size	<1000	1000-3000	3000-10,000	> 10,000
Geographic Distribution	<4% of province	4-10% of province	11-50% of province	>50% of province
Population Trend	Rapid decline (>50% in 10 yrs)	Decline (>20% in 10 yrs)	Stable (natural fluctuation)	Increasing
Distribution Trend	Rapid Decline	Decline	Stable	Increasing
Number of Element Occurrences	0-5	6-20	21-100	>100
Number of protected EOs	Believed to be none	At least one	Several	Many
Threats to population	Extreme	Moderate	Limited	None
Threats to habitat	Extreme	Moderate	Limited	None

APPENDIX G

Summary of Residual Effects Assessment

SUMMARY OF RESIDUAL EFFECT ASSESSMENT

VEC: Designated Areas and Other Critical Habitat Features - Deer Wintering Areas (DWAs)

Project Phase (Potential Pathways)	Residual Effect Assessment Criteria (Determination of Significance)								
	Significance Criteria					Potentially Significant Effect (yes/no)	Mitigation	Likelihood	Residual Effects Conclusions
	Magnitude	Geographic Extent	Duration & Frequency	Reversibility	Ecological Context				
Construction	Effects of Construction on disturbance of deer and habitat: Low: No clearing occurs within DWA, and no disturbance to deer during the sensitive yarding period. Moderate: A non-critical (i.e., edge or wetland area) portion of DWA within RoW is cleared, but allowed to revegetate for a period. There is some disturbance to deer during the sensitive yarding period, but utilization of the DWA does not change. High: The critical portion (core) of the DWA is cleared, and deer become disturbed during the sensitive yarding period and leave the yarding area. Magnitude of effect on habitat is moderate, as areas cleared will be allowed to revegetate for a period, and are crossed through a non-critical portion of the DWA. The preliminary Preferred 50 m RoW crosses three DWAs near the outer boundary. The RoW divides a small portion of two DWAs from a larger one. The DWA located northeast of Digdeguash Lake is crossed twice by the preliminary Preferred 50 m RoW through a wetland portion of the DWA. Magnitude of disturbance to deer is moderate as a non-critical portion of DWA within the RoW is cleared outside the sensitive yarding period.	The geographical extent of any adverse effects will be regional (*i.e.,* includes all of the DWA habitat within the Study Area). The preliminary Preferred 50 RoW crosses 5 discrete DWAs (project footprint/area of DWA): 1. 0.025 km^2/82.2 km^2 2. 0.01 km^2/82.2 km^2 3. 0.005 km^2/82.2 km^2 4. 0.015 km^2/82.2 km^2 5. 0.075 km^2/82.2 km^2 Total: 0.13 km^2/82.2 km^2 = 0.16% The preliminary Preferred 50 m RoW crosses 0.16% of the DWAs within the Study Area.	Duration and frequency of disturbance to deer during construction is short-term (<1 year) and rare (<1/year). Duration and frequency of clearing activities on habitat in the DWA is long-term (i.e. RoW will be maintained under 12 ft) and rare (cleared one time every 5-7 years).	Effects on habitat are not reversible – the RoW will be kept clear during construction. Effects on disturbance to deer are reversible as construction-related activity is intermittent and short-term in the vicinity of the DWA.	Harsh winters are the major limiting factor for deer populations (Choate, 1973; Franzmann, 1978). Thus, suitable wintering areas are important to the maintenance of cervid populations. A DWA, or deer yard, is considered to be an area currently used by deer during winter and also includes adjacent stands that have a potential for providing shelter and food on a long-term (>50 years) basis (NBDNRE, 1994). Deer typically gather in DWAs when snow depths become approximately 30 cm in depth, and particularly in severe winter conditions when snow depths exceed 50 cm in open areas (NBDNRE, 1996). Though deer are normally solitary throughout most of the year, congregating in suitable wintering areas strongly increases winter survival. Active DWAs within and/or adjacent to the Preferred Corridor were identified, based on NBDNRE 2001 mapping. DWAs identified include those defined on Crown land through regular aerial surveys, but may not include all DWAs located on private land for which wintering area information is often incomplete or unavailable. The DWAs crossed by the RoW are well represented throughout southern New Brunswick and dependence of deer on DWAs in southern New Brunswick is known to be less critical than in other regions because of the relatively less severe climate. Increased access to DWAs may make deer susceptible to disturbance, especially during sensitive yarding periods. A significant adverse effect on DWAs is defined as an effect resulting in a reduction of greater than the regulated value of 15% of available DWA habitat within one Crown License over a five-year planning horizon, or an effect which limits the utilization of theDWA for the deer populations during the sensitive yarding period.	Yes – Project activities may coincide with sensitive yarding periods.	Construction and operations activities (including clearing) in and adjacent to DWAs should not be conducted during sensitive yarding periods (*i.e.,* when snow depths exceed 50 cm typically December to March). NBPower will work with major landowners (e.g., NBDNRE) to develop a program (e.g., education and awareness program) regarding responsible use of ATVs around DWAs and other ESAs. NB Power will work in cooperation with affected landowner(s) to control access (e.g., signage, fencing, gates) to the 50 m RoW.	Probability of occurrence: unlikely, no Project activity will occur during sensitive periods. Scientific uncertainty: minimal (assessment based on provincial government consultation past EIA experience, and proponents experience with similar projects). 15% maximum measurement/ mapping error.	No significant adverse residual effects are likely, as the identified mitigation will be implemented.
Operation	Magnitude of disturbance to deer is moderate, as the RoW will create additional access to the DWAs. Magnitude of disturbance to habitat will be low as RoW vegetation will be maintained below 12 feet and will be cleared every 5-7 years.	See above.	Long-term (*i.e.,* >25 year) and rare (*i.e.,* <1/year). RoW vegetation maintained below 12 ft, cleared every 5 –7 years.	Effects are partially reversible – the RoW will be allowed to partially revegetate, while respecting safety clearances.	See above Increased access to DWAs may make deer susceptible to disturbance, especially during sensitive yarding periods.	Yes – maintenance activities and increased access could interfere with deer activities during sensitive yarding periods.	Operational clearing should not be conducted during sensitive yarding periods (*i.e.,* when snow depths exceed 50 cm). NB Power will work with major landowners to develop a program regarding responsible use of ATVs around DWAs and other ESAs.	Probability of occurrence: increased access likely Scientific uncertainty: high – there is an uncertain success of access limitations.	No significant adverse residual effects are likely, as the identified mitigation will be implemented.

SUMMARY OF RESIDUAL EFFECT ASSESSMENT

VEC: Designated Areas and Other Critical Habitat Features - Deer Wintering Areas (DWAs) (Continued)

Project Phase (Potential Pathways)	Residual Effect Assessment Criteria (Determination of Significance)								
	Significance Criteria					Significant Effect (yes/no)	Mitigation	Likelihood	Residual Effects Conclusions
	Magnitude	Geographic Extent	Duration & Frequency	Reversibility	Socio-Economic Context				
Operation (Cont'd)							Fire prevention procedures, training, and contingency and emergency plans developed by NB Power in coordination with provincial and municipal fire fighting forces will be supported with ongoing training and public education. NB Power and contractors will have fire fighting equipment on site during the NB Fire Season as required by NBDNRE.		
Decommissioning	Magnitude of effects to habitat is low as no additional DWA habitat will be lost. Magnitude of effects of disturbance to deer will be low as decommissioning activities will be short-term and will occur outside the sensitive yarding period.	See above.	Duration and frequency of effects of decommissioning on disturbance to deer will be short-term (*i.e.,* <1 year) and rare (*i.e.,* one time event). There will be no effects on habitat from decommissioning as the RoW will be allowed to revegetate naturally.	Effects on habitat are reversible – RoW will be allowed to revegetate naturally	See above	Yes – decommissioning activities could interfere with deer activities during sensitive yarding periods.	Decommissioning and abandonment will require that an application be made to the NEB for these activities. Plans will be developed after consulting with the NEB and other regulatory authorities. Decommissioning should not occur during sensitive yarding periods (i.e. when snow depths exceed 50 cm.) All surface facilities will be removed. Site decommissioning will comply with legislative standards and the RoW will be left clean and safe.	Probability of occurrence: unlikely, as no activities will occur during sensitive periods. Scientific uncertainty: minimal (assessment based on provincial government database, past EIA experience, proponents experience with similar projects, and consultation).	No significant adverse residual effects are likely, as the identified mitigation will be implemented.
Emergency and Accidental Events	Magnitude of effects on disturbance to deer and habitat range from low to high. For example, an oil spill in DWA is low, a forest fire is high. Magnitude varies depending on the event.	See above.	Short-term (*i.e.,* <1 year) and rare (*i.e.,* <1/year).	Effects on habitat are reversible	See above	Yes – critical DWA habitat could be lost.	The principal means for minimizing the potential for effects related due to accidental events, including forest fires and the accidental release of hazardous materials, is by ensuring that an adequate level of awareness of the sensitivity of environmental components is maintained by maintenance crews, and through incorporation of appropriate measures in operating practices. In addition, measures identified in Sections 3 and 6 of the CSR should be implemented in the event of any accidental events.	Probability of occurrence: unlikely, as no activities will occur during sensitive periods. Scientific uncertainty: minimal (assessment based on provincial government database, past EIA experience, proponents experience with similar projects, and consultation).	No significant adverse residual effects are Likely, as the identified mitigation will be implemented.

SUMMARY OF RESIDUAL EFFECT ASSESSMENT

VEC: Air Quality

Project Phase (Potential Pathways)	Residual Effect Assessment Criteria (Determination of Significance)								
	Significance Criteria					Potentially Significant Effect (yes/no)	Mitigation	Likelihood	Residual Effects Conclusions
	Magnitude	Geographic Extent	Duration & Frequency	Reversibility	Ecological Context				
Construction	Variable (0-100%) (*i.e.,* 0% = compliance with applicable guideline(s); 100% = exceedance of guideline(s))	Local airshed – within the preliminary Preferred 50 m RoW (not anticipated to extend to provincial airshed).	Short-term (4-6 mo.) occurring rarely (<1/year)	Effects are reversible – expected to dissipate over distance from the preliminary 50 m Preferred RoW, and over time.	The local airshed is considered to be within the preliminary Preferred 50 m RoW, and potentially affected adjacent areas. A significant adverse effect on air quality is defined as an exceedance of regulatory guidelines. Particulate emissions generated during construction may be associated with grubbing and excavation activities. The potential effect of particulates is influenced by site and weather conditions (rain and wind direction) and by preventative measures implemented during construction to minimize emissions. Emissions of particulates that exceed air quality guidelines may result in problems on the construction site and under special circumstances (such as strong winds), off-site. The level of particulates at construction sites depends on the silt content of the soils being disturbed, the proportion of dry days, operator habits, construction vehicle type and speeds, vehicle weights, and the number of vehicles. Other than clearing, minimal ground-disturbing activity will be required for anchoring towers; Duff layer will remain intact. The potential effect of gaseous emissions from equipment operation during construction relates to the duration and intensity of the emissions. Construction activities progress along the length of the RoW over time and, therefore, emissions in any given area are short-term and localized.	Yes- heavy dust near residences may be unacceptable	Surface particulate near sensitive areas (*e.g.,* residential developments) will be controlled by the use of water sprays. Towers will be located to minimize blasting requirements. All blasting activities will be conducted as per guidelines. Operational practices will be employed to reduce or mitigate emissions to acceptable levels, including ensuring that equipment is kept in good repair and operates efficiently. All equipment will be kept in good working order, refuelling will be carried out using catchments to minimize spillage, and inlet caps will be maintained to reduce vaporization of fuel. Adequate environmental training will be provided for personnel who will be responsible for transportation, storage, handling, or use of hazardous materials (*e.g.,* WHMIS). The training will include spill prevention and response, including proper clean-up procedures for accidental spills to minimize the extent and magnitude of adverse effects to the environment. Appropriate spill clean-up materials will be maintained on site. Any contaminated areas will be remediated to meet all applicable regulatory requirements.	Probability of occurrence: unlikely Scientific uncertainty: minimal (*i.e.,* assessment based on available information, consultation, proponents experience with similar projects, and previous EIA experience). Mitigation has been proven successful for similar projects	No significant adverse residual effects are likely, as the identified mitigation will be implemented.
Operation	Variable (0-100%) (*i.e.,* 0% = compliance with applicable guideline(s); 100% = exceedance of guideline(s))	See above	Long-term (100 year lifetime) occurring rarely (<1/year)	Effects are reversible – expected to be insignificant	Potential effects on the environment would be similar to the construction, although more localized. Ozone and oxides of nitrogen are emitted in small quantities due to the corona discharge of high voltage transmission lines. Average ground level contributions from this source are not directly measurable with existing equipment, but are within guidelines. Concentrations of nitrogen oxides by themselves cannot cause major effects on people, animals, plants or property. In combination with pollutants from other sources, no significant influence on people, animals, plants or property can be expected (Koczkur, 1979).	No- see above	See above Periodic monitoring of all IPL infrastructure/facilities will be conducted by NB Power personnel to identify any required maintenance/repair activities. All debris/materials collected from the RoW during operational activities will be collected and disposed of at an approved disposal site.	Probability of occurrence: unlikely Scientific uncertainty: minimal (*i.e.,* assessment based on available information, consultation, proponents experience with similar projects, and previous EIA experience).	No significant adverse residual effects are likely, provided the recommended mitigation measures are implemented.

SUMMARY OF RESIDUAL EFFECT ASSESSMENT

VEC: Air Quality (Continued)

Project Phase (Potential Pathways)	Residual Effect Assessment Criteria (Determination of Significance)								
	Significance Criteria					Significant Effect (yes/no)	Mitigation	Likelihood	Residual Effects Conclusions
	Magnitude	Geographic Extent	Duration & Frequency	Reversibility	Ecological Context				
Decommissioning	Variable (0-100%) (*i.e.,* 0% = compliance with applicable guideline(s); 100% = exceedance of guideline(s))	See above	Short-term occurring sporadically.	Effects are reversible – expected to dissipate over distance from the RoW, and over time.	Potential effects on the environment would be similar to the construction effects, although more localized.	See above	Decommissioning and abandonment will require that an application be made to the NEB for these activities. Plans will be developed after consulting with the NEB and other regulatory authorities. Environmental issues (biophysical and socio-economic) associated with decommissioning and abandonment options will be considered. To protect the public and the environment, all surface facilities may be removed. Site decommissioning will comply with legislative standards and the RoW will be left clean and safe.	Probability of occurrence: unlikely Scientific uncertainty: minimal (*i.e.,* assessment based on available information, consultation, proponents experience with similar projects, and previous EIA experience).	No significant adverse residual effects are likely, provided the recommended mitigation measures are implemented.
Emergency and Accidental Events	Variable (0-100%) (*i.e.,* 0% = compliance with applicable guideline(s); 100% = exceedance of guideline(s))	See above	Short-term occurring very rarely.	Effects are reversible – expected to dissipate over distance from the RoW, and over time.	Hazardous materials may be released to the surrounding airshed as a result of accidental spillage of solvents, fuels, and epoxies being stored on site. The primary air quality concern resulting from the accidental release of contaminants is effect of solvent, hydrocarbon, and fuel vapours on air quality.	See above	The principal means for minimizing the potential for effects related due to accidental events, include ensuring that an adequate level of awareness of the sensitivity of environmental components is maintained by maintenance crews, and through incorporation of appropriate measures in operating practices. In addition to the measures identified for construction above, NB Power will adhere to its Standard Operating Procedure in the event of any accidental events.	Probability of occurrence: unlikely Scientific uncertainty: minimal (*i.e.,* assessment based on available information, consultation, proponents experience with similar projects, and previous EIA experience).	No significant adverse residual effects are likely, provided the recommended mitigation measures are implemented.

SUMMARY OF RESIDUAL EFFECT ASSESSMENT

VEC: Archaeological/Heritage Resources

Project Phase (Potential Pathways)	Residual Effect Assessment Criteria (Determination of Significance)								
	Significance Criteria					Potential Significant Effect (yes/no)	Mitigation	Likelihood	Residual Effects Conclusions
	Magnitude	Geographic Extent	Duration & Frequency	Reversibility	Socio-Economic Context				
Construction	High – if present, resources will be affected by construction activities (*i.e.*, clearing, excavation, etc.), including potential loss of resource integrity or resource information.	The entire heritage resource and adjacent areas related to the resource that occur within or overlapping the preliminary Preferred 50 m RoW.	Long-term (*i.e.*, >25 year). Frequency: one time event.	If a resource is affected, effects would be immediate and irreversible (although the potential that there will be significant loss of knowledge is minimal; refer to socio-economic context*).	*If unknown resources are encountered during construction, they will be affected, and effects will be site-specific; however, the potential for significant loss of knowledge will be minimized through initiation of contingency plan (see mitigation) for effected resources. Archaeological/heritage resources are defined as known archaeological sites, designated historic sites and heritage structures. Components of these resources are considered to be sensitive VEC by both regulators and segments of the population.	Yes – construction activities may disturb unknown resources.	Where avoidance is not possible conduct fieldwork to verify elevated potential within the preliminary Preferred 50 m RoW. This may result in additional mitigation. A contingency plan has been developed to deal with unexpected archaeological discoveries (*i.e.*, Archaeological Procedural Protocol). This plan was developed in consultation with NB Archaeological Services Unit & NB Power's Aboriginal Liaison Officers.	Probability of occurrence: unlikely Scientific uncertainty: moderate (*i.e.*, the potential to encounter unknown resources still exists within the preliminary Preferred 50 m RoW).	No significant adverse residual effects are likely, as the identified mitigation will be implemented.
Operation	Low – resources will have been affected during construction.	Restricted to the preliminary Preferred 50 m RoW.	N/A – resource has already been affected.	See above	See above Although activities associated with operation would not result in disturbance comparable to construction, potential effects on the environment would be similar to the construction effects, although more localized.	No, unless additional resources are found.	In the event a heritage resource is present within the RoW, measures outlined in the Archaeological Procedural Protocol will be implemented(Figure 6-1 in CSR).	See above	See above
Decommissioning	See above	See above	See above	See above	See above	No – resources have been affected during construction phase.	See above	See above	See above
Emergency and Accidental Events	Variable; site specific* (refer to socio-economic context)	Restricted to the preliminary Preferred 50 m RoW, except in the context of a catastrophic event, where effects could extend over a larger area.	Variable – depending on the extent of the event, may be a one time and long-term (*i.e.*, >25 years).	See above	See above	Yes – depending on the extent of the accidental event, a significant effect could occur (*i.e.*, Project-related fire destroys heritage structure adjacent to preliminary Preferred 50 m RoW).	See above	See above	See above

SUMMARY OF RESIDUAL EFFECT ASSESSMENT

VEC: Designated Area/Critical Habitat - Mature Coniferous Forest Habitat (MCFH)

Project Phase (Potential Pathways)	Residual Effect Assessment Criteria (Determination of Significance)								
	Significance Criteria					Potentially Significant Effect (yes/no)	Mitigation	Likelihood	Residual Effects Conclusions
	Magnitude	Geographic Extent	Duration & Frequency	Reversibility	Ecological Context				
Construction	Low: No clearing occurs within MCFH. Moderate: MCFH within RoW is cleared, but allowed to revegetate for a period. High: A reduction of the capacity for a Crown License to maintain the regulated value of 12% MCFH within the license land base. The magnitude will be moderate, as the MCFH will be cleared, but allowed to revegetate for a period.	The geographical extent of any adverse effects will be restricted to the 50 m wide RoW. Four areas of MCFH are crossed to some degree by the RoW (*i.e.*, a total area of 33.2 hectares of MCFH, representing <1% of the total amount of MCFH (12118 ha) in the Study Area). (Project footprint/Area of MCFH block): 1 – 9.9 ha/444 ha 2 – 11.1 ha/790 ha 3 – 5.5 ha/1400 ha 4 – 6.75 ha/680 ha	Long-term – 100 year life expectancy.	Effects are not reversible – the RoW will be kept clear during construction.	MCFH refers to mature stands of soft woods, which are of a size sufficient to provide habitat for populations of old growth forest-dependent species such as pine martin. A significant adverse effect on MCFH is defined as any effect resulting in a net reduction of MCFH in an entire block to less than 375 ha or a reduction in block width to less than 500 m. Forest harvesting and forest road construction are both permitted within MCFH stands. NBDNRE maintains MCFH amounts and stand conditions on a provincial basis, such that designated MCFH blocks change from year to year. The areas of clearing required are very small compared to the total areas of MCFH in the Study Area. Also, there are considerable opportunities for the Province to reallocate MCFH areas in order to maintain block standards. Finally, the presence of a 50 m wide powerline corridor in a MCFH block is not considered serious fragmentation (S. Gordon, pers. comm., 2001).	No.		Probability of occurrence: unlikely Scientific uncertainty: minimal (*i.e.*, assessment based on provincial government 1:50 000 scale mapping, consultation with NBDNRE, proponents experience with similar projects, and previous EIA experience).	No significant adverse residual effects are likely.
Operation	See above	See above	100 year life expectancy. Vegetation cropped to 12 ft every 5 to 7 years.	Effects are not reversible – The RoW will be maintained during operation.	See above	No.		See above	See above
Decommissioning	See above	See above	During decommissioning effects will be short-term.	Effects are reversible.	See above	No.		See above	See above
Emergency and Accidental Events	See above	See above	Short-term and very rare (<1/year).	Effects are reversible	See above	No.		See above	See above

SUMMARY OF RESIDUAL EFFECT ASSESSMENT

VEC: Migratory Birds

Project Phase (Potential Pathways)	Residual Effect Assessment Criteria (Determination of Significance)								
	Significance Criteria					Potentially Significant Effect (yes/no)	Mitigation	Likelihood	Residual Effects Conclusions
	Magnitude	Geographic Extent	Duration & Frequency	Reversibility	Ecological Context				
Construction	During clearing the magnitude of the disturbance will be low, as it will be conducted outside the nesting season. During construction, the magnitude of the disturbance will be moderate as migratory birds may be temporarily disturbed during the nesting season.	Localized, affecting birds which reside in or near the RoW, as well as birds that traverse the RoW during daily feeding and roosting migrations.	Short-term (*i.e.,* <1 year), and sporadic (<1 week).	Effects are reversible.	Migratory birds are protected under the *Migratory Bird Convention Act, and* typically nest from May 1st to August 1st. While there are no major migration flyways known to occur in the area, staging areas have been identified where birds may congregate. The Row consists of 488 ha of potential habitat. As stated in Section 4.4.2 (Migratory Birds), 8 broad habitat types were identified within the Study Area. The RoW is comprised of edge and field habitat (53.1 ha); hardwood habitat (31.1 ha); old (>90 years) hardwood habitat (31.6 ha); old (>90 years) mixedwood habitat (37.7 ha); old (>90 years) softwood habitat (35.1 ha); softwood habitat (131.1 ha); and wetland habitat (37.2 ha). While there will be a reduction in habitat along the preliminary Preferred 50 m RoW, the habitat that will be affected by the Project is mainly young softwood, which is not considered critical habitat. This accounts for 0.16% (131 ha) of the young softwood habitat in the Study Area (82,557 ha). The cleared RoW is 50 m and is not likely to isolate migratory bird species, since the RoW will be allowed to revegetate, there will be significant ground cover to serve as bridging habitat for most species. A migratory bird survey was conducted from June 6 to June 21, 2002. No significant or critical habitat was encountered during the survey, and only one species deemed sensitive (purple finch) was located during the survey. This species occurs in open coniferous forest and mixed forests, as well as forest edge, open woodlands, areas of silviculture, urban parks and the suburbs. Nesting typically occurs in tall conifer species. Suitable habitat is abundant for the purple finch surrounding the preferred 50 m RoW. A significant adverse effect on migratory birds is defined as any effect resulting in a permanent net loss of critical habitat, or a decrease in population density below naturally occurring levels for a duration greater than one lifecycle.	Yes – construction activities may disturb migratory birds during nesting periods, however, scheduling of clearing activities will ensure that nesting birds are not affected.	Clearing activities will be scheduled to avoid the nesting season for migratory birds (*i.e.,* May 1st to August 1st). Where clearing and construction activities must be conducted between May 1st to August 1st, NB Power will adopt appropriate mitigation.	Probability of occurrence: unlikely Scientific uncertainty: minimal	No significant adverse residual effects are likely, as the identified mitigation will be implemented.
Operation	During operations the magnitude of individual bird mortalities as a result of groundwire collisions will be low as these mortalities are not expected to decrease the population densities below naturally occurring levels for a duration greater than one lifecycle	Localized, affecting birdswhich reside in or near the RoW, that traverse the RoW between feeding and roosting areas, as well as those which use the area as a flyway during annual migrations.	Long-term (*i.e.,* > 25 years) and sporadic (*i.e.,* <1/week).	Effects at the individual level are not reversible.	See above	Yes, some potential.	Installation of bird diversion devices will minimize bird collision mortalities. Bird diversion devices will be inspected and maintained during regular maintenance activities.	Probability of occurrence: unlikely Scientific uncertainty: minimal	No significant adverse residual effects are likely, as the identified mitigation will be implemented.
Decommissioning	Low – ground wires and structures will be removed, alleviating the bird collision issue.	See above	Short-term (*i.e.,* > 1 year) and sporadic (*i.e.,* <1/week).	Effects are reversible	See above	Yes, some potential due to bird strikes.	The ground wire is removed, alleviating the bird collision problem.	Probability of occurrence: unlikely Scientific uncertainty: minimal	No significant adverse residual effects are likely, as the identified mitigation will be implemented.

SUMMARY OF RESIDUAL EFFECT ASSESSMENT

VEC: Migratory Birds

Project Phase (Potential Pathways)	Residual Effect Assessment Criteria (Determination of Significance)								
	Significance Criteria					Potentially Significant	Mitigation	Likelihood	Residual Effects Conclusions
	Magnitude	Geographic Extent	Duration & Frequency	Reversibility	Ecological Context				
Decommissioning (Cont'd)							Decommissioning and abandonment will require that an application be made to the NEB for these activities. Plans will be developed after consulting with the NEB and other regulatory authorities. To protect the public and the environment, all surface facilities will be removed. Site decommissioning will comply with legislative standards and the RoW will be left clean and safe.		
Emergency and Accidental Events	High – critical nesting/feeding habitat can be lost due to fire and/or release of hazardous materials (*i.e.*, POLs).	See above	Short-term (*i.e.*, > 1 year) and rarely (*i.e.*, <1/year).	Effects are reversible.	See above	Yes – Project related fires and/or release of hazardous materials (*i.e.*, oil) can destroy nesting/feeding habitat (*i.e.*, hollow trees for cavity nesters, and aquatic food sources).	The principle means of minimizing the potential for effects related due to accidental events, including the accidental release of hazardous materials, is by ensuring that an adequate level of awareness of the sensitivity of environmental components is maintained by maintenance crews, and through incorporation of appropriate measures in operating practices.	Probability of occurrence: unlikely Scientific uncertainty: minimal	No significant adverse residual effects are likely, as the identified mitigation will be implemented.

SUMMARY OF RESIDUAL EFFECT ASSESSMENT

VEC: Current Use of Lands and Resources for Traditional Purposes by Aboriginal Persons

Project Phase (Potential Pathways)	Residual Effect Assessment Criteria (Determination of Significance)								
	Significance Criteria					Potentially Significant Effect (yes/no)	Mitigation	Likelihood	Residual Effects Conclusions
	Magnitude	Geographic Extent	Duration & Frequency	Reversibility	Socio-Economic Context				
Construction	The preliminary Preferred 50 m RoW crosses several areas with plant and animal populations, which could be traditionally harvested by Aboriginal people for traditional use. Severity of effect will be low because abundant populations will remain locally in good health, after construction. No specific traditional use areas have been identified during consultation.	The geographical extent of any adverse effects on point resource use will be the entire traditional use area or plant population within or overlapping the preliminary Preferred 50 m RoW. The geographical extent of any adverse effects on traditional use areas (traditional use specific) or common plant species harvested may extend to associated areas beyond the preliminary Preferred 50 m wide RoW.	Variable from short term to permanent, depending on the specific traditional use (*i.e.*, plant harvest vs. ceremonial)	Variable – effects on point location for traditional use (*e.g.*, ceremonial) or uncommon plant resources may not be reversible. Effects on large traditional use areas (*e.g.*, hunting, fishing) or common plant resources will be reversible.	A significant adverse effect is defined as any long permanent loss of use/access to identified resources.	No.	N/A	Probability of occurrence: unlikely Scientific uncertainty: minimal	Significant adverse residual effects are not likely. Significant adverse residual effects are not likely.
Operation	See above	See above	N/A	See above	See above	No.	N/A	See above	See above
Decommissioning	See above	See above	N/A	See above	See above	No.	N/A	See above	See above
Emergency and Accidental Events	See above	See above	N/A	See above	See above	No.	N/A	See above	See above

SUMMARY OF RESIDUAL EFFECT ASSESSMENT

VEC: Agriculture

Project Phase (Potential Pathways)	Residual Effect Assessment Criteria (Determination of Significance)								
	Significance Criteria					Potentially Significant Effect (yes/no)	Mitigation	Likelihood	Residual Effects Conclusions
	Magnitude	Geographic Extent	Duration & Frequency	Reversibility	Socio-Economic Context				
Construction	Severity definitions: Low – short delay in planting crops (*i.e.,* 1 week). Moderate – long delay in planting crops (*i.e.,* $\geq$1 month) and/or removal of a portion of viable field. High – net loss of area currently under agricultural crop production. Magnitude is low, clearing is conducted outside of the growing season.	The geographical extent of any adverse effects will be restricted to the agricultural fields within the preliminary Preferred 50m RoW. The preliminary Preferred 50 m RoW crosses 0.03% of the agricultural land within the Study Area.	Short-term (*i.e.,* <1 year) and rare (<1/year).	Effects are reversible, with the exception of the tower footprint.	The soil capability for agriculture in the Study Area ranges from Class 3 to Class 7; severe limitations or no capability for the production of agricultural crops. The limitations referred to, however, cover traditional agricultural crops and do not exclude high productivity for a special adapted crop. Blueberries are such a crop, and their production is the major agricultural activity in the area. The 1 km wide Preferred Corridor crosses several traditional agricultural areas west of Digdeguash River, and some blueberry fields just west of the Magaguadavic River. A significant adverse effect on agriculture is defined as an uncompensated net loss of area currently under agricultural crop production.	No – using the standard Protection Measures outlined in Sections 3.0 and 6.0, the Project is not anticipated to have a significant effect on agricultural land.	Standard Protection Measures outlined in Sections 3.0 and 6.0.	Probability of occurrence: unlikely Scientific uncertainty: minimal	No significant adverse residual effects are likely.
Operation	Magnitude is low, agricultural operations can be conducted within the 50 m RoW.	See above.	Long-term (*i.e.,* >25 years) and rare (*i.e.,* <1/year).	Effects are partially reversible.	See above.	No – agricultural operations can be conducted in and around the structures.	Follow the perimeter of the field to access the towers.	Probability of occurrence: unlikely. Scientific uncertainty: minimal (*i.e.,* assessment based on provincial government 1:50 000 scale mapping, consultation with NBDNRE, proponents experience with similar projects, and previous EIA experience	No significant adverse residual effects are likely, as the identified mitigation will be implemented.
Decommissioning	Magnitude is low, all structures will be removed, allowing for full use of field for crop production.	See above.	Short-term (*i.e.,* <1 year) and rare (*i.e.,* <1/year).	Effects are reversible.	See above.	No – decommissioning activities will not interfere with agricultural operations.	Follow the perimeter of the field to access the towers.	See above	No significant adverse residual effects are likely, as the identified mitigation will be implemented.
Emergency and Accidental Events	Magnitude will vary with the type of event. For example, a Project-related fire during the growing season would be high.	The geographical extent of any adverse effects will be restricted to the agricultural fields within the RoW; except in the context of a catastrophic event, where effects could extend over a larger area.	Short-term (*i.e.,* <1 year) and rare (*i.e.,* <1/year).	Effects are reversible.	See above.	Yes – an accidental event such as fire or release of hazardous material (*i.e.,* petroleum) could damage crops or contaminate the soil.	The principal means for minimizing the potential for effects related due to accidental events, including forest fires and the accidental release of hazardous materials, is by ensuring that an adequate level of awareness of the sensitivity of environmental components is maintained by maintenance crews, and through incorporation of appropriate measures in operating practices (see Section 3.11.11 in the CSR).	See above	No significant adverse residual effects are likely, as the identified mitigation will be implemented.

SUMMARY OF RESIDUAL EFFECT ASSESSMENT

VEC: Community and Emergency Services

Project Phase (Potential Pathways)	Residual Effect Assessment Criteria (Determination of Significance)								
	Significance Criteria					Potentially Significant Effect (yes/no)	Mitigation	Likelihood	Residual Effects Conclusions
	Magnitude	Geographic Extent	Duration & Frequency	Reversibility	Socio-Economic Context				
Construction	During peak construction activity, an additional 40 workers will be employed in the local/regional area.	Restricted to the local and regional area.	Short-term (4-6 mo.) occurring sporadically <1/week).	Effects are reversible in the form of cost recovery for additional service requirements.	A significant adverse effect on emergency services is defined as an effect that results in any increased demand for emergency services within the Study Area and surrounding communities due to construction accidents or third-party damages on a daily basis. If emergency services become over extended, additional services from surrounding regional areas may be required. This could mean an increased cost to communities in the Study Area.	No – any likely increase in demand on community and emergency services will be very limited (*i.e.*, less than a daily requirement).	Provide safety training for contractors and NB Power Project personnel prior to entrance to the work site. Maintain fire suppression equipment with each Project crew	Probability of occurrence: unlikely Scientific uncertainty: minimal	No significant adverse residual effects are likely, provided the measures outlined in Section 3.0 and 6.0 of the CSR are implemented.
Operation	Personnel requirements during operation will be approximately 281 person days per year. Severity of effect will be nil.	See above	Long-term (100 yr lifetime occurring rarely (<1/year).	See above	See above	See above	Follow proper safety procedures, as outlined in Section 3.0 and 6.0 of the CSR.	See above	See above
Decommissioning	Decommissioning activities will require less workers than during construction (*i.e.*, <40). Therefore, the severity will be low.	See above	Short-term occurring sporadically.	See above	See above	See above	See above	See above	See above
Accidental Events	Variable; site specific Severity is considered low in consideration of the limited number of additional workers involved (see above) and NB Power work practices.	See above	Short-term occurring very rarely.	See above	See above	See above	See above	See above	See above

SUMMARY OF RESIDUAL EFFECT ASSESSMENT

VEC: Designated Areas and Other Critical Habitat Features - ESAs

Project Phase (Potential Pathways)	Residual Effect Assessment Criteria (Determination of Significance)								
	Significance Criteria					Potentially Significant Effect (yes/no)	Mitigation	Likelihood	Residual Effects Conclusions
	Magnitude	Geographic Extent	Duration & Frequency	Reversibility	Socio-Economic Context				
Construction	0% (see socio-economic context)	The preliminary Preferred 50 m RoW will span 6 watercourses identified as ESAs because they contain salmon.	Short-term (<1 year) construction period with sporadic (<1/week) activity.	N/A	Environmentally Significant Areas (ESAs) are designated by NBDELG. A significant adverse effect is considered a removal of the entire population/feature for which the ESA was designated. Sprague Falls – located within the Preferred Corridor, near Woodland, NB. Known for the presence of several rare plants along the St. Croix River. The RoW will be located to avoid this area, and therefore is not expected to have an effect on this ESA. Six other ESAs representing watercourses with salmon runs will be spanned.	No		Probability of occurrence: unlikely Scientific uncertainty: minimal (*i.e.*, assessment based on provincial government database, consultation, proponents experience with similar projects, and previous EIA experience).	No significant adverse residual effects are likely, provided that construction protection measures outlined in Sections 3.0 and 6.0 are adhered to.
Operation	0% (see socio-economic context)	See above	Long-term (100 year life expectancy) with rare (<1/year) activity.	N/A	See above	See above		See above	See above
Decommissioning	0% (see socio-economic context)	See above	During decommissioning effects will be short-term and sporadic, as during construction.	N/A	See above	See above	Decommissioning and abandonment will require that an application be made to the NEB for these activities. Plans will be developed after consulting with the NEB and other regulatory authorities.	See above	See above
Emergency and Accidental Events	0% (see socio-economic context)	See above	Infrequent and short-term	N/A	See above	See above		See above	See above

SUMMARY OF RESIDUAL EFFECT ASSESSMENT

VEC: Fish Habitat & Fishery Resources

Project Phase (Potential Pathways)	Residual Effect Assessment Criteria (Determination of Significance)								
	Significance Criteria					Potentially Significant Effect (yes/no)	Mitigation	Likelihood	Residual Effects Conclusions
	Magnitude	Geographic Extent	Duration & Frequency	Reversibility	Ecological Context				
Construction	Definitions Low – watercourses are crossed with no erosion or sedimentation problems. Moderate – temporary loss of riparian cover or habitat (*i.e.,* sedimentation event). High – permanent loss of riparian cover or fish habitat, resulting in a decrease in density of the population below naturally occurring levels for a duration greater than one lifecycle. Magnitude is moderate, watercourses will be crossed within the RoW, if alternate points of access do not exist. The magnitude of ARD effects is low, as minimal excavation is required for watercourse crossings (*i.e.,* temporary bridge use), and structures will be placed >30 m from watercourse edge. The total amount of excavated material from construction of tower structures is estimated at 50 m^3. Temporary bridges are the preferred crossing method, and require minimal excavation.	The geographic extent of any adverse effects will be restricted to the 49 watercourses and associated watersheds crossed by preliminary Preferred 50 m RoW, as well as any streams crossed by access trails. <1% of each watercourse is crossed by the preliminary Preferred 50 m RoW.	Short-term (*i.e.,* <1 year) and sporadic (*i.e.,* <1/week). ARD effects would be short-term (<1 year) and sporadic (*i.e.,* <1/week).	Effects are reversible. Effects are expected to be short-term and temporary. Any stream crossings will require a WAP from NBDELG. The effects of ARD are reversible.	Fish habitat and fishery resources are considered ecologically fragile for the following reasons: Fish habitat is defined as any effect resulting in a decrease in density in the population below naturally occurring levels for a duration of greater than one lifecycle. Fish and fish habitat are protected by statute/regulation and also potentially limiting to fish populations. Watercourses crossed by the preliminary Preferred 50 m RoW that have historically supported Atlantic salmon include, New River, Pocologan River, Magaguadavic River, Digdeguash River, the St. Croix River and Dennis Stream. Fish habitat in the Study Area has already been affected by extensive human activity. ARD may be generated when rocks containing sulfide minerals are disturbed and fresh rock fractures are created and exposed to oxygen and water. ARD depresses the pH value of receiving waters and releases the metal iron, and other metals occurring in the geologic formation (*i.e.,* aluminium, lead, zinc, arsenic, etc.) creating a potential adverse effect on the aquatic biota.	Yes – a potential significant effect will occur if watercourse crossings are required for access to and along the RoW. ARD may enter watercourses where blasting or excavation occur within a valley slope.	If watercourse crossing or blasting is required within 200m of a watercourse, then a pre-construction baseline aquatic habitat survey will be conducted to satisfy watercourse alteration permitting requirements/blasting setback distances. Limit removal of riparian zone vegetation. Promote regrowth of vegetation in areas adjacent to watercourses following disturbance. Conduct all construction activities within 30 m of a watercourse in consideration of the watercourse alteration process under the NB *Clean Water Act.* Finalize tower placement to "span" all watercourses. All tower structures will be located a minimum of 30 m from all watercourses. Any instream work required for access will be conducted during the June 1 to September 30th construction window. No construction activity will be conducted in any watercourses, unless authorized in a WAP. Inspection of erosion control devices will be conducted to ensure their proper functioning in areas of active construction. Detailed inspections of erosion control measures will be conducted on a regular basis following construction, and after major storm events until vegetation is re-established. Where greater than 50 m^3 per km of bedrock is excavated, the acid producing potential will be determined and if the rock is identified as acid generating then limestone will be mixed with exposed sulfide bearing rocks to counteract the effects of acid drainage. Any spills that occur will be remediated to meet Provincial regulatory requirements.	Probability of occurrence: unlikely Scientific uncertainty: minimal (*i.e.,* assessment based on available information, consultation, field investigations, proponents experience with similar projects, and previous EIA experience).	No significant adverse residual effects are likely, as the identified mitigation will be implemented.

SUMMARY OF RESIDUAL EFFECT ASSESSMENT

VEC: Fish Habitat & Fishery Resources (Continued)

Project Phase (Potential Pathways)	Residual Effect Assessment Criteria (Determination of Significance)								
	Significance Criteria					Significant Effect (yes/no)	Mitigation	Likelihood	Residual Effects Conclusions
	Magnitude	Geographic Extent	Duration & Frequency	Reversibility	Ecological Context				
Operation	Magnitude will be low to moderate as watercourses will only be crossed if alternate points of access are not available.	The geographic extent of any adverse effects will be restricted to the 49 watercourses and associated watersheds crossed by the preliminary Preferred 50 m RoW. <1% of each watercourse is crossed by the preliminary Preferred 50 m RoW.	Long-term (*i.e.*, >25 years) and rare (*i.e.*, <1/year).	Effects are reversible. Effects are expected to be short-term and temporary. A minimum 5 m buffer zone will be maintained along watercourses as per prior agreement with NBDELG.	See above	No – watercourses along route will not be crossed during maintenance activities if alternate access points are available.	See above Inspections will be conducted to identify areas where further stabilization and erosion control measures are required.	Probability of occurrence: N/A Scientific uncertainty: N/A	No significant adverse residual effects are likely, provided the recommended mitigation measures are implemented.
Decommissioning	Magnitude will be low to moderate as watercourses will only be crossed if alternate points of access are not available.	The geographic extent of any adverse effects will be restricted to the 49 watercourses and associated watersheds crossed by the preliminary Preferred 50 m RoW. <1% of each watercourse is crossed by the preliminary Preferred 50 m RoW.	Short-term (*i.e.*, <1 year) and rare (*i.e.*, <1/year).	Effects are reversible. Effects are expected to be short-term and temporary. RoW will be allowed to return to a natural vegetated state.	See above	No – watercourses will not be crossed during decommissioning activities, alternate access points are available.	Decommissioning and abandonment will require that an application be made to the NEB for these activities. Plans will be developed after consulting with the NEB and other regulatory authorities. Environmental issues (biophysical and socio-economic) associated with decommissioning and abandonment options will be considered. To protect the public and the environment, all surface facilities will be removed. Site decommissioning will comply with legislative standards and the RoW will be left clean and safe. Where necessary, groundwater and/or soils testing will be undertaken to ensure that the site is free of contamination from IPL activities. If contamination is discovered, the site will be remediated to meet all applicable regulatory requirements.	Probability of occurrence: N/A Scientific uncertainty: NA	No significant adverse residual effects are likely, provided the recommended mitigation measures are implemented.
Emergency and Accidental Events	Magnitude is moderate due to the potential to adversely effect the fish and fish habitat (*i.e.,* hazardous materials spill near watercourse).	The geographic extent of any adverse effects will be restricted to the 49 watercourses and associated watersheds crossed by the 50 m wide preliminary Preferred RoW, except in the context of a catastrophic event, where effects could extend over a larger area. <1% of each watercourse is crossed by the preliminary Preferred 50 m RoW.	Short-term (*i.e.*, <1 year) and sporadic (*i.e.*, <1/week).	Effects are reversible. Effects are expected to be short-term and temporary.	See above	Yes – project-related fire, or release of hazardous materials into a watercourse could adversely effect the fish population and/or habitat.	The principal means for minimizing the potential for effects related due to accidental events, including the accidental release of hazardous materials, is by ensuring that an adequate level of awareness of the sensitivity of environmental components is maintained by maintenance crews, and through incorporation of appropriate measures in operating practices.	Probability of occurrence: unlikely Scientific uncertainty: minimal (*i.e.*, assessment based on available information, consultation, field investigations, proponents experience with similar projects, and previous EIA experience).	No significant adverse residual effects are likely, provided the recommended mitigation measures are implemented.

SUMMARY OF RESIDUAL EFFECT ASSESSMENT

VEC: Forestry

Project Phase (Potential Pathways)	Residual Effect Assessment Criteria (Determination of Significance)								
	Significance Criteria					Potentially Significant Effect (yes/no)	Mitigation	Likelihood	Residual Effects Conclusions
	Magnitude	Geographic Extent	Duration & Frequency	Reversibility	Socio-Economic Context				
Construction	Severity of effect is high since all trees in the preliminary Preferred RoW will be cut.	The geographical extent of any adverse effects will be restricted to the 50 m RoW. 5% of the forested land within the 1 km wide Preferred Corridor is crossed by the preliminary Preferred RoW. The preliminary Preferred RoW contains approximately 4.8 km_2 of forested area which accounts for <0.01% of productive forest in the Study Area.	Long-term	Effects are not reversible – the RoW will be kept clear during construction.	Construction of the proposed IPL will remove an area of land from production equal to the area of the RoW. In the case of forested land, the requirement to control the vegetation on the RoW at a height which will not interfere with line-to-ground clearances will preclude the use of these areas for pulp or timber production. However, there is opportunity for production of Christmas trees, and other crops (*i.e.,* blueberries). Portions of the preliminary Preferred RoW pass through forested areas. The land in the Preferred Corridor ranges from Class 4 to Class 7 with respect to the growth of commercial forests. These classes range from moderately severe limitations to severe limitations which would preclude the growth of commercial forests. The dominant habitat type within the Preferred Corridor and most of the study area consists mainly of forested land. The major species are spruce, intolerant hardwood (white birch, grey birch and poplar), tolerant hardwood (red maple, sugar maple, yellow birch, beech, oak and ash) and balsam fir. (Note: Tolerant refers to species which would be capable of growing in shady areas while intolerant species are less capable of growing in shady areas). Forest harvesting is a primary economic driver in the Study Area. The Preferred Corridor contain approximately 86 km^2 of potentially forested area. Of the 86 km2, 39.1 km^2 (45.4%) is Crown Land with the remaining 46.9 km^2 (54.6%) being privately owned. One percent (1%) of Crown Land is scheduled to be harvested per year (Dan Boudett, pers. comm., 2001) through normal harvesting activities based on approved forest management plans/harvesting plans. Private lands are harvested on an irregular basis and the amounts and types of wood harvested are related to wood market demands. Also refer to VEC sheets for Permanent Forest Sample Plots (PSPs) and Mature Coniferous Forest Habitat (MCFH).	Yes – all timber within the final 50 m RoW will be cut.	Consult with/provide IPL Project information to timber harvest operations/companies during the detailed routing final stage (selection of the 50 m RoW). This will enable modification of cutting plans with respect to cutting schedule, MCFH, etc., well in advanced of IPL construction activities. Merchantable timber will be salvaged or landowners will be compensated for any loss in merchantable timber. It is NB Power's practice to offer fair compensation for granting of transmission easement (50 m wide RoW). The compensation paid to landowners by NB Power are in line with, or in excess of, those paid by other Canadian Utilities. The following components will be considered when RoW compensations are prepared: • value of land based on location and market value; • value of area removed from production determined by comparable sales in area; and • compensation for structures in cleared lands.	Probability of occurrence: unlikely Scientific uncertainty: minimal (*i.e.,* assessment based on provincial government 1:50 000 scale mapping, consultation with NBDNRE, proponents identified with similar projects, and previous EIA experience).	No significant adverse residual effects are likely, as the identified mitigation will be implemented.
Operation	Severity of effect is high since all trees in the preliminary Preferred RoW will be cut.	See above	100 year life expectancy Vegetation will be cut to 12 ft. every 5 years.	Effects are partially reversible – the RoW will be allowed to revegetate to the maximum extent possible, while still respecting safety clearances (*i.e.,* vegetation may grow up to 12 ft in height; clearing activities every 5 to 7 years)	See above The responsibility for firefighting in NB is shared between NBDNRE, the municipalities, and the volunteer firefighting units (WGA, 1998). Although each agency has its own jurisdiction (*e.g.,* municipal firefighters respond to building fires), cooperative agreements can be established to deal with forest fires (*e.g.,* due to the Project).	Yes – all timber within the final 50 m RoW will be cut.	See above.	See above.	No significant adverse residual effects are likely, as the identified mitigation will be implemented.

SUMMARY OF RESIDUAL EFFECT ASSESSMENT

VEC: Forestry (Continued)

Project Phase (Potential Pathways)	Residual Effect Assessment Criteria (Determination of Significance)								
	Significance Criteria								
	Magnitude	Geographic Extent	Duration & Frequency	Reversibility	Socio-Economic Context	Significant Effect (yes/no)	Mitigation	Likelihood	Residual Effects Conclusions
Operation (Cont'd)					Aerial detection of forest fires is implemented by the province during the fire season, typically April through October. There is at least one flight per day during moderate index periods, and up to six per day when the fire index is high. Additional fire detection is also provided by the general public. NBDNRE employs fire fighting techniques that include the use of water and sometimes forestry foam (WGA, 1998). Depending on the nature and severity of a forest fire, the application of foam and water is undertaken by a variety of equipment ranging from Wajax pumps to aircraft. Typical response time for NBDNRE to the scene of a forest fire is 30 to 40 minutes (WGA, 1998).				
Decommissioning	Severity of effect is high since all trees in the preliminary Preferred RoW will be cut.	See above	During decommissioning effects will be short-term.	Effects are reversible – RoW will be allowed to revegetate naturally	See above Although activities associated with decommissioning activities would not result in disturbance comparable to construction, potential effects on the environment would be similar to the construction effects, although more localized.	Yes – all timber within the final 50 m RoW will be cut.	Decommissioning and abandonment will require that an application be made to the NEB for these activities. Plans will be developed after consulting with the NEB and other regulatory authorities. Environmental issues (biophysical and socio-economic) associated with decommissioning and abandonment options will be considered.	See above	No significant adverse residual effects are likely, as the identified mitigation will be implemented.
Emergency and Accidental Events	Severity of effect is high since all trees in the preliminary Preferred RoW will be cut.	See above	Localized and short-term (infrequent)	Effects are reversible	See above	No – see Socio-Economic Context – Operation		See above	No significant adverse residual effects are likely, provided the identified mitigation measures are implemented.

SUMMARY OF RESIDUAL EFFECT ASSESSMENT

VEC: Designated Areas and Other Critical Habitat Features – Game Management Areas (GMAs)

Project Phase (Potential Pathways)	Residual Effect Assessment Criteria (Determination of Significance)								
	Significance Criteria					Potentially Significant Effect (yes/no)	Mitigation	Likelihood	Residual Effects Conclusions
	Magnitude	Geographic Extent	Duration & Frequency	Reversibility	Ecological Context				
Construction	Approximately 0.04% of the total area will be crossed. Severity of effect will be low since the IPL RoW will provide habitat for many of the species occurring in the Lepreau Game Management Area (GMA).	The preliminary Preferred RoW will cross 0.1 km^2 of the Lepreau Game Management Area (GMA), which represents approximately 0.04% of the total area (225.8 km^2).	Long-term (100 year life expectancy) with rare (<1/year) activity.	Not reversible; the RoW will be cleared of trees over 12 feet in height every 5 to 7 years for the 100 year life expectancy of the Project.	The preliminary Preferred RoW passes through the southwestern corner of the Lepreau Game Management Area. There are no restrictions on hunting or trapping in this area, and there are no restrictions on timber clearing on Crown Land (R. Cumberland, pers. comm., 2001). A significant effect is defined a loss of critical wildlife habitat which would prevent achievement of the goal of the Game Management Area.	No	Standard Construction Practices identified in Section 3.	Probability of occurrence: unlikely Scientific uncertainty: minimal (*i.e.*, assessment based on provincial government database, consultation, proponents experience with similar projects, and previous EIA experience).	No significant adverse residual effects are likely, provided the standard construction practices identified in Section 3 are adhered to.
Operation	See above	See above	Long-term (100 year life expectancy) with rare (<1/year) activity.	See above	See above	No	Standard Construction Practices identified in Section 3.	See above	See above
Decommissioning	See above	See above	During decommissioning effects will be short-term and sporadic.	Reversible; the RoW will be allowed to regenerate naturally after decommissioning activities.	See above	No	Standard Construction Practices identified in Section 3.	See above	See above
Emergency and Accidental Events	Variable. By their nature, accidental events (such as fire) may occur over an unknown area, however, it is anticipated that the magnitude and severity of accidental events will be low due to NB Power standard practices.	See above	Short-term and very rare (< 1/year)	Reversible; areas damaged through accidental event (such as fire) will regenerate.	See above	No	The principal means for minimizing the potential for effects related due to accidental events, including the accidental release of hazardous materials, is by ensuring that an adequate level of awareness of the sensitivity of environmental components is maintained by maintenance crews, and through incorporation of appropriate measures in operating practices. In addition, measures identified in the NB Power EPP should be implemented as appropriate in the event of any accidental events.	See above	See above

SUMMARY OF RESIDUAL EFFECT ASSESSMENT

VEC: Groundwater Resources (Quality and Quantity)

Project Phase (Potential Pathways)	Residual Effect Assessment Criteria (Determination of Significance)								
	Significance Criteria					Potentially Significant Effect (yes/no)	Mitigation	Likelihood	Residual Effects Conclusions
	Magnitude	Geographic Extent	Duration & Frequency	Reversibility	Ecological Context				
Construction	Low - no loss in quantity and/or no reduction in quality below guideline(s). Moderate – a temporary loss in quantity and no reduction in quality below guideline(s). High –a permanent non-compensable loss in quantity below current yield and/or reduction in quality below guideline(s). Magnitude is moderate, minimal excavation and blasting is required, however these activities could have an effect on shallow well yields.	The geographical extent of effects on groundwater resources is localized including areas up to 200 m from the RoW (*i.e.*, the area of influence for well systems within and overlapping the 50 m RoW); except for blasting, when effects may extend up to 500 m from the blast site. Seven wells occur within 200 m of the centerline of the preliminary Preferred RoW.	Short-term (*i.e.*, <1 year) and rare (*i.e.*, <1/year).	Quantity effects may not be reversible; quality effects typically are reversible.	There are no groundwater protection areas for municipal water supplies located within the Preferred Corridor, however, there are public and private wells developed for use. Seven wells have been identified as within 200 m of the centerline of the preliminary Preferred RoW. During construction, only minor excavation will be required for placement of towers (to a depth of 4-6 m). The groundwater table may be encountered within this depth. Dewatering may be necessary in these areas to facilitate construction and/or may be a result of construction activities. If dewatering occurs, the groundwater table in shallow aquifers will be depressed and the yield for shallow wells in the vicinity could potentially be reduced. Effects on these wells will depend on the proximity of the wells to the RoW (once selected), their depth, hydraulic characteristics of the aquifer material, and extent of dewatering. In the unlikely event that dewatering occurs, it is expected that these effects will be temporary (reversible) and limited to shallow wells (if present) in the vicinity of the tower locations. If the effects are not reversible (i.e., well yields may not recover), compensation may be required (refer to Mitigation column). The nearest well located between 200 m and 500 m from a blasting site will be monitored for seismic activity.	Yes – due to excavation and blasting in the vicinity of shallow wells (if present).	Given the minimal amount of excavation required to construct the proposed IPL, disturbance of groundwater resources is not anticipated. Excavation will leave exposed a maximum amount of 50 m^3 of sulfide bearing rock per kilometres of RoW, an amount that has been deemed acceptable in previous linear projects. After the 50 m RoW has been finalized, a survey will be conducted to determine the presence and type of water supply wells within 50 m of the RoW. If springs are reported in an area near the RoW and are used for water supply, the landowner will be compensated for any loss. A hoe ram will be used to break up bedrock within 200 m of a well. The nearest well between 200 m and 500 m of blast areas will be seismic monitored. If any decrease in quantity and/or reduction in well water quality occurs, NB Power will restore to pre-construction state.	Probability of occurrence: unlikely Scientific uncertainty: minimal (*i.e.*, assessment based on available information, consultation, field investigations, proponents experience with similar projects, and previous EIA experience, also a pre-construction well survey will be conducted).	No significant adverse residual effects are likely, as the identified mitigation will be implemented.
Operation	Magnitude is low as no ground-disturbing activities are required.	The geographical extent of effects on groundwater resources is localized, including areas up to 200 m from the RoW (*i.e.*, the area of influence for well systems within and overlapping the 50 m RoW). Seven wells occur within 200 m of the centerline of the preliminary Preferred RoW.	Long-term (*i.e.*, >25 year) and rare (*i.e.*, <1/year).	Quantity effects may not be reversible; quality effects typically are reversible.	See above Although activities associated with operation would not result in disturbance comparable to construction, potential effects on the environment would be similar to the construction effects, although more localized.	No – ground-disturbing activities are not required for operation activities.	See above All debris/materials collected from the RoW during operational activities will be collected and disposed of at an approved disposal site. Periodic monitoring of all IPL infrastructure/facilities will be conducted and the measures outlined in Section 3 and 6 of the CSR followed in the case of any required maintenance/repair activities.	Probability of occurrence: N/A Scientific uncertainty: N/A	No significant adverse residual effects are likely, as the identified mitigation will be implemented.
Decommissioning	Magnitude is low as no blasting and minimal excavation is required.	The geographical extent of effects on groundwater resources is localized, including areas up to 200 m from the RoW (*i.e.*, the area of influence for well systems within and overlapping the 50 m RoW). Seven wells occur within 200 m of the centerline of the preliminary Preferred RoW.	Short-term (*i.e.*, <1 year) and rare (*i.e.*, <1/year).	Quantity effects may not be reversible; quality effects typically are reversible.	See above Although activities associated with decommissioning would not result in disturbance comparable to construction, potential effects on the environment would be similar to the construction effects, although more localized.	No – no blasting, and minimal excavation required for decommissioning.	Decommissioning and abandonment will require that an application be made to the NEB for these activities. Plans will be developed after consulting with the NEB and other regulatory authorities. Environmental issues (biophysical and socio-economic) associated with decommissioning and abandonment options will be considered.	Probability of occurrence: N/A Scientific uncertainty: N/A	No significant adverse residual effects are likely, as the identified mitigation will be implemented.

SUMMARY OF RESIDUAL EFFECT ASSESSMENT

VEC: Groundwater Resources (Quality and Quantity) (Continued)

Project Phase (Potential Pathways)	Residual Effect Assessment Criteria (Determination of Significance)								
	Significance Criteria								
	Magnitude	Geographic Extent	Duration & Frequency	Reversibility	Ecological Context	Significant Effect (yes/no)	Mitigation	Likelihood	Residual Effects Conclusions
Decommissioning (Cont'd)							To protect the public and the environment, all surface facilities may be removed. Site decommissioning will comply with legislative standards and the RoW will be left clean and safe. Where necessary, groundwater and/or soils testing will be undertaken to ensure that the site is free of contamination from IPL activities. If contamination is discovered, the site will be remediated to meet all applicable regulatory requirements.		
Emergency and Accidental Events	Magnitude is high due to the potential for a release of hazardous materials into the groundwater which could reduce water quality to below guidelines(s).	The geographical extent of effects on groundwater resources may include areas up to 200 m from the centerline of the RoW (*i.e.,* the area of influence for well systems within and overlapping the 50 m RoW); except in the context of a catastrophic event, where effects could extend over a larger area.		Quantity effects may not be reversible; quality effects typically are reversible.	Accidental events, including release of hazardous materials could potentially adversely effect groundwater quality.	Yes – due to potential to reduce water quality to below guideline(s).	The principal means for minimizing the potential for effects related due to accidental events, including the accidental release of hazardous materials, is by ensuring that an adequate level of awareness of the sensitivity of environmental components is maintained by maintenance crews, and through incorporation of appropriate measures in operating practices. In addition, measures identified in Sections 3 and 6 of the CSR and NB Power's Standard Operating Procedure will be implemented as appropriate in the event of any accidental events.	Probability of occurrence: unlikely Scientific uncertainty: minimal (*i.e.,* assessment based on available information, consultation, field investigations, proponents experience with similar projects, and previous EIA experience, also a pre-construction well survey will be conducted).	No significant adverse residual effects are likely, as the identified mitigation will be implemented.

SUMMARY OF RESIDUAL EFFECT ASSESSMENT

VEC: Local Economy

Project Phase (Potential Pathways)	Residual Effect Assessment Criteria (Determination of Significance)								
	Significance Criteria					Potentially Significant Effect (yes/no)	Mitigation	Likelihood	Residual Effects Conclusions
	Magnitude	Geographic Extent	Duration & Frequency	Reversibility	Socio-Economic Context				
Construction	Variable; site specific* (refer to socio-economic context)	The geographical extent of the effects will be restricted to the general study area, and surrounding communities.	Short-term (<1 year).	N/A	It is estimated that approximately 1/3 of the cost to construct the proposed IPL will be spent on materials. Of this, a major portion of the cost is for the towers and wire with the remainder for other materials such as: fencing, fuel, pumps, generators, etc. It is anticipated that it will be possible to purchase most of the required materials and construction equipment locally. Most of the clearing/construction activities will be sub-contracted out to local firms. Types of services that might be subcontracted include: clearing, owner operated trucks, tractor drivers, and clean-up crews. The installation of the IPL will be carried out by NB Power personnel, supplemented by local contractors (*e.g.,* clearing). In addition to construction/ installation personnel, employees will also be required for warehousing, transportation and equipment maintenance duties. It is expected that a small portion of the workforce will not be from the local area and will therefore require temporary lodging and food services.	Yes – it is anticipated that the IPL construction will have a beneficial effect on local economy.	NB Power will inform the local business communities and labour organizations of the opportunities arising from construction of the Project. The information will detail the items that will be purchased, the contracts that will be awarded and the skills/training required by workers.	Probability of significant adverse effect occurrence: nil Scientific uncertainty: minimal (*i.e.,* as a result of local purchases and contracts, there will be a positive benefit to the local economy).	No significant adverse residual effects are likely. Only a net benefit to local economy is anticipated.
Operation	Variable; site specific* (refer to socio-economic context)	The geographical extent of the effects will be restricted to the general study area, and surrounding communities. The geographic extent of effects will be more local and changing each year with RoW maintenance schedule.	Long-term (100 year lifetime) but rare (1/year).	N/A	See above Although activities associated with operation would not result in an economic effect comparable to construction of the transmission line, potential effects on the economy would be similar to the construction effects as identified above, although more localized.	Yes – it is anticipated that the IPL construction will have a beneficial effect on local economy.	See above	Probability of occurrence: unlikely Scientific uncertainty: minimal (*i.e.,* as a result of local purchases and contracts, there will be a positive benefit to the local economy).	No significant adverse residual effects are likely. Only a net benefit to local economy is anticipated.
Decommissioning	Variable; site specific* (refer to socio-economic context)	The geographical extent of the effects will be restricted to the general study area, and surrounding communities.	Short-term (<1 year).	N/A	See above Although activities associated with transmission line decommissioning would not result in an economic effect comparable to construction of the transmission line, potential effects on the economy would be similar to the construction effects as identified above, although more localized.	Yes – it is anticipated that the IPL construction will have a beneficial effect on local economy.	See above	See above	No significant adverse residual effects are likely. Only a net benefit to local economy is anticipated.
Accidental Events	Nil (refer to socio-economic context)	N/A	N/A	N/A	No accidental event related to the IPL is anticipated which could have a significant adverse effect on local economy.	No	N/A	See above	No significant adverse residual effects are likely, (refer to socio-economic context)

SUMMARY OF RESIDUAL EFFECT ASSESSMENT

VEC: Mineral Aggregate Resources/Mining Areas

Project Phase (Potential Pathways)	Residual Effect Assessment Criteria (Determination of Significance)								
	Significance Criteria					Potentially Significant Effect (yes/no)	Mitigation	Likelihood	Residual Effects Conclusions
	Magnitude	Geographic Extent	Duration & Frequency	Reversibility	Socio-Economic Context				
Construction	Two aggregate resource areas and three mining claims are crossed by the Preferred Corridor. Severity of effect is low. Since the IPL will represent only a minor obstruction to mineral exploration and may be moved to accommodate future mineral development.	The geographical extent of any adverse effects will be restricted to the 50 m wide RoW. The Preferred Corridor crosses three mining claims (Area crossed/percent of total claim): 1. 0.4 km^2/2% 2. 0.6 km^2/3% 3. 1.3 km^2/6.5%	Short-term	Effects are reversible.	Three areas of mining claims are crossed by the Preferred Corridor, which represent areas of potential mineral occurrence. Two aggregate deposits are crossed by the preliminary Preferred 50 m RoW, which are being actively worked periodically on an "on demand" basis. A significant adverse effect on mineral aggregate resources/mining areas is defined as an effect resulting in additional restrictions to future development potential.	Yes – significant mineral occurrence beneath the final preliminary Preferred 50 m RoW is considered unlikely but if such mineral deposits are discovered, the IPL will preclude mineral development.	If significant mineral resources are discovered beneath the IPL which warrant further development, the IPL will be moved to accommodate economically viable mining activities.	Probability of occurrence: unlikely Scientific uncertainty: moderate (*i.e.*, the potential to encounter areas of unknown resources still exists within the preliminary Preferred 50 m RoW).	No significant adverse residual effects are likely, as the identified mitigation will be implemented.
Operation	See above.	See above	Short-term	100 year life expectancy. Infrequent and localized.	See above	See above	See above.	See above	See above
Decommissioning	See above.	See above	Short-term	Effects are reversible.	See above	See above	Decommissioning and abandonment will require that an application be made to the NEB for these activities. Plans will be developed after consulting with the NEB and other regulatory authorities. Environmental issues (biophysical and socio-economic) associated with decommissioning and abandonment options will be considered.	See above	See above
Accidental Events	Nil (refer to socio-economic context).	N/A	N/A	N/A	No accidental event related to the proposed IPL is anticipated which could have a significant adverse effect on mineral aggregate resources/mining areas.	No	N/A	N/A	No significant adverse residual effects are likely (refer to socio-economic context).

SUMMARY OF RESIDUAL EFFECT ASSESSMENT

VEC: Other Infrastructure

Project Phase (Potential Pathways)	Residual Effect Assessment Criteria (Determination of Significance)								
	Significance Criteria					Potentially Significant Effect (yes/no)	Mitigation	Likelihood	Residual Effects Conclusions
	Magnitude	Geographic Extent	Duration & Frequency	Reversibility	Socio-Economic Context				
Construction	Variable; site specific* (refer to socio-economic context)	The geographical extent of any effects will be restricted to the preliminary Preferred 50 m RoW.	Short-term (4-6 mo.) occurring sporadically (<1/week)	Effects are reversible.	Other infrastructure includes municipal water and sewer mains and service lines, conduits carrying electrical, telephone, fibre optics and cable services and natural gas lines, as well as RFI sensitive equipment including T.V., radio, and microwave towers. In this context, a significant adverse effect on infrastructure is defined as an effect resulting in any reduction in infrastructure function, or resulting in increased difficulty in accessing/repairing infrastructure. Construction/installation of the proposed IPL has the potential to affect existing infrastructure located within the preliminary Preferred 50 m RoW (finalized). The main concern relates to temporary loss of use/interruption of service.	Yes – construction of IPL towers may disturb buried infrastructure and proximity to aboveground cables and communications facilities may cause EMP related interruptions.	NB Power design/engineer staff will confer with municipal engineering personnel, the outside plant personnel from NB Tel, M&NP, etc., to identify specific locations of other infrastructure crossed by the RoW (*e.g.*, SJLPP), including RFI sensitive equipment (*e.g.*, TV, radio, microwave towers). The purpose of these sessions will be to locate all infrastructures along the Preferred Corridor. Based on this information NB Power can then finalize a RoW that can avoid installation conflicts. The proposed NB Power alignment must also recognize that maintenance and repair (emergency and otherwise) will be required on the already installed infrastructure. Therefore, the NB Power facility will be located at the greatest feasible distance from the other infrastructure in order to minimize future problems. NB Power will meet all applicable Permit and Approval requirements.	Probability of occurrence: unlikely Scientific uncertainty: minimal	No significant adverse residual effects are likely, as the identified mitigation will be implemented.
Operation	See above	The geographical extent of any effects will be restricted to the preliminary Preferred 50 m RoW.	None	N/A	See above	No – all potential effects will be mitigated during construction.	See above	Probability of occurrence: unlikely Scientific uncertainty: minimal	No significant adverse residual effects are likely.
Decommissioning	See above	The geographical extent of any effects will be restricted to the preliminary Preferred 50 m RoW.	Short-term occurring sporadically.	Effects are reversible	See above Although activities associated with transmission line decommissioning would not result in disturbance comparable to construction of the transmission line, potential effects on the environment would be similar to the construction effects , although more localized.	Yes – construction of IPL towers may disturb buried infrastructure and proximity to aboveground cables and communications facilities may cause EMP related interruptions.	See above	Probability of occurrence: unlikely Scientific uncertainty: minimal	No significant adverse residual effects are likely, as the identified mitigation will be implemented.
Accidental Events	See above	The geographical extent of any effects will be restricted to the preliminary Preferred 50 m RoW, except in the context of a catastrophic event, where effects could extend over a larger area.	Short-term occurring very rarely.	Effects are reversible.	See above	Yes – construction of IPL towers may disturb buried infrastructure and proximity to aboveground cables and communications facilities may cause EMP related interruptions.	See above	Probability of occurrence: unlikely Scientific uncertainty: minimal	No significant adverse residual effects are likely, as the identified mitigation will be implemented.

SUMMARY OF RESIDUAL EFFECT ASSESSMENT

VEC: Designated Area/Critical Habitat - Permanent Forest Sample Plots (PSPs)

Project Phase (Potential Pathways)	Residual Effect Assessment Criteria (Determination of Significance)								
	Significance Criteria					Potentially Significant Effect (yes/no)	Mitigation	Likelihood	Residual Effects Conclusions
	Magnitude	Geographic Extent	Duration & Frequency	Reversibility	Ecological Context				
Construction	Low – RoW avoids PSP by more than 50 m. Moderate – RoW passes within 50 m of a PSP. High – Any loss of the designated PSP habitat. Magnitude is low as all PSPs are avoided by more than 50 m.	The geographical extent of any adverse effects will be restricted to the 50 m wide RoW. The Preferred Corridor includes 2 PSPs, however, they are avoided by the preliminary Preferred RoW.	Short-term (*i.e.*, <1 year) and sporadic (*i.e.*, <1/week).	No effects are anticipated.	PSPs are an ecologically fragile feature. These plots have a research and educational value. Information is collected from these areas over the long-term (*i.e.*, 30 years) and used to enhance forest management practices in NB.	No – no PSPs occur within the preliminary Preferred RoW.	No PSPs are crossed.	Probability of occurrence: N/A Scientific uncertainty: N/A	No significant adverse residual effects are likely. PSPs are avoided.
Operation	Magnitude is low as all PSPs are avoided by more than 50 m.	The geographical extent of any adverse effects will be restricted to the 50 m wide RoW. The Preferred Corridor includes 2 PSPs, however, they are avoided by the preliminary Preferred RoW.	Long-term (*i.e.*, >25 years) and rare (<1/year).	No effects are anticipated.	PSPs are an ecologically fragile feature. These plots have a research and educational value. Information is collected from these areas over the long-term (*i.e.*, 30 years) and used to enhance forest management practices in NB.	No – no PSPs occur within the preliminary Preferred RoW.	No PSPs are crossed.	Probability of occurrence: N/A Scientific uncertainty: N/A	No significant adverse residual effects are likely. PSPs are avoided.
Decommissioning	Magnitude is low as all PSPs are avoided by more than 50 m.	The geographical extent of any adverse effects will be restricted to the 50 m wide RoW. The Preferred Corridor includes 2 PSPs, however, they are avoided by the preliminary Preferred RoW.	Short-term (*i.e.*, <1 year) and rare (*i.e.*, <1/year).	No effects are anticipated.	PSPs are an ecologically fragile feature. These plots have a research and educational value. Information is collected from these areas over the long-term (*i.e.*, 30 years) and used to enhance forest management practices in NB.	No – no PSPs occur within the preliminary Preferred RoW.	No PSPs are crossed.	Probability of occurrence: N/A Scientific uncertainty: N/A	No significant adverse residual effects are likely. PSPs are avoided.
Emergency and Accidental Events	Magnitude is low as all PSPs are avoided by more than 50 m.	The geographical extent of any adverse effects will be restricted to the 50 m wide RoW; except in the context of a catastrophic event, where effects could extend over a larger area.	Short-term (*i.e.*, <1 year) and rare (*i.e.*, <1/year).	No effects are anticipated.	PSPs are an ecologically fragile feature. These plots have a research and educational value. Information is collected from these areas over the long-term (*i.e.*, 30 years) and used to enhance forest management practices in NB.	Yes – in the case of a Project related fire, adjacent PSPs can be lost.	The principle means for minimizing the potential for effects related due to accidental events, including forest fires and the accidental release of hazardous materials, is by ensuring that an adequate level of awareness of the sensitivity of environmental components is maintained by maintenance crews, and through incorporation of appropriate measures in operating practices.	Probability of occurrence: unlikely Scientific uncertainty: minimal (*i.e.*, assessment based on provincial government 1:50 000 scale mapping, consultation with NBDNRE, proponents experience with similar projects, and previous EIA experience).	No significant adverse residual effects are likely, as the identified mitigation will be implemented.

SUMMARY OF RESIDUAL EFFECT ASSESSMENT

VEC: Recreation

Project Phase (Potential Pathways)	Residual Effect Assessment Criteria (Determination of Significance)								
	Significance Criteria					Potentially Significant Effect (yes/no)	Mitigation	Likelihood	Residual Effects Conclusions
	Magnitude	Geographic Extent	Duration & Frequency	Reversibility	Socio-Economic Context				
Construction	Magnitude of effects will be low.	The geographical extent of any adverse effects will be restricted to the 50 m wide RoW.	Short-term (*i.e.*, <1 year) and sporadic (<1/week).	Effects are reversible	Trails utilized for recreation (*e.g.*, biking, snowmobiling, ATV use, etc.) are located throughout the 1 km wide Preferred Corridor. If the RoW (once selected) crosses any trails, loss of use is anticipated to be restricted to the construction window. The two campgrounds in the vicinity of the Project are over 6 km from the preliminary Preferred 50 m RoW, and will not be affected by the Project. A significant adverse effect is defined as any interruption of recreational trail access for greater than one week during peak usage times.	No – construction may temporarily impede passage on recreational trails, however the loss of use is anticipated to be restricted to the construction window.	Following construction, trail use will be restored.	Probability of occurrence: unlikely Scientific uncertainty: minimal (*i.e.*, assessment based on provincial government 1:50 000 scale mapping, consultation with NBDNRE, proponents experience with similar projects, and previous EIA experience).	No significant adverse residual effects are likely, provided the identified mitigation is implemented.
Operation	Magnitude of effects will be low, the use of recreational areas will not be affected.	See above	Long term (*i.e.*, >25 years) and rare (<1/year).	See above	See above	No-repair and maintenance activities will not interfere with recreational use		See above	No significant adverse residual effects are likely, provided the identified mitigation is implemented.
Decommissioning	Magnitude of effects will be low.	See above	Short-term (*i.e.*, <1 year) and rare (<1/year).	See above	See above	No-decommissioning activities will not interfere with recreational use		See above	No significant adverse residual effects are likely
Accidental Events	See above	See above	See above	See above	See above	No– accidental events may temporarily impede passage on recreational trails, however the loss of use is anticipated to be short term.		See above	See above

SUMMARY OF RESIDUAL EFFECT ASSESSMENT

VEC: Species At Risk (Flora and Fauna)

Project Phase (Potential Pathways)	Residual Effect Assessment Criteria (Determination of Significance)								
	Significance Criteria					Potentially Significant Effect (yes/no)	Mitigation	Likelihood	Residual Effects Conclusions
	Magnitude	Geographic Extent	Duration & Frequency	Reversibility	Socio-Economic Context				
Construction	Magnitude of effects would not represent population – level effects. Severity of effects are considered low, based on the following definitions: Low – some rare species may be disturbed, but habitat is undisturbed and a healthy rare species population remains. Moderate – some rare species and/or habitat are disturbed, but a healthy rare species population and some habitat remains. High – a suppression of fitness for a duration of greater than one lifecycle. For species designated as endangered (or significant for other reasons) the loss of these species at an individual level may be considered a significant adverse effect.	The geographic extent of any adverse effects will include the regional population of most species, which would also be the provincial population in the case of extremely rare species.	Short-term.	Reversible. Rare species populations are expected to re-colonize habitat within the RoW. Since habitat will be protected by standard NB Power work practices.	The province of NB provides species protection through its Endangered Species Act. Under this Act, an endangered species (or sub-species) is defined as "…any indigenous species of fauna or flora threatened with imminent extinction or imminent extirpation throughout all or a significant portion of its range and designated by regulation as endangered." Species included in the Act include both species designated by COSEWIC and species not designated by COSEWIC. This Act prohibits the destruction or interference of, and the attempt to destroy or interfere with, any member of an endangered species or the habitat of an endangered or regionally endangered species. Species designated as rare by species experts (*e.g.,* Hinds, 2000; Clayden, et al., 1984) AC CDC have been included to provide a more regional context for the assessment. In some cases, species may be common to more than one list. Mammal species at risk include those listed by COSEWIC as endangered, threatened, or special concern, those protected under the NB Endangered Species Act, and those designated as rare on a provincial basis. For species designated as endangered (or significant for other reasons), the loss of these species at an individual level may be considered a significant adverse effect. Several rare plant species are known to occur in one area within the Preferred Corridor (*i.e.,* Spragues Falls, ESA # 823). Field surveys have identified 15 locations within the preliminary Preferred RoW which contain plant species at risk. At 14 of these sites all rare plant species are aquatic or emergent (*i.e.,* they occur in the permanently wet portion of a stream or wetland) and will therefore be protected within the established buffer zones. One rare plant species, Toothed Arrow-wood (*Viburnum dentatum* var. *recognitum*), occurs in the broad flood plain of Mohannes Stream and will likely be effected by IPL construction. Toothed Arrow-wood occurs abundantly outside the preliminary Preferred RoW and is expected to recolonize the RoW after construction. During botanical field surveys, several rare plants were found to occur at Fowle Lake, including the first known occurrence of comb leaved mermaid weed (*Proserpinaca pectinata*). It was considered likely that recreational ATV traffic in the completed RoW would severely effect rare plant habitat in the muddy Lake Margin, therefore, the preliminary Preferred RoW was moved south to avoid this location. A bald eagle was observed flying near Anthony Lake, but no nest was identified. Wood turtles were observed at Dennis Stream and Black Brook. Wood turtle is designated as a species of special concern by COSEWIC.	Yes – some species at risk may suffer temporary disturbance within or adjacent to the preliminary Preferred RoW.	With respect to plant species at risk, the known location (*i.e.,* Sprague Falls, ESA #823) will be avoided. During construction, in the vicinity of Dennis Stream and Black Brook, construction crews will remain vigilant for wood turtle occurrence. Any wood turtles identified will be removed from the RoW. Developing a site-specific environmental protection plan (SSEPP) for each site where species at risk were identified (showing the distribution within the preliminary Preferred 50 m RoW if applicable), in order to ensure that Project personnel are aware of the special concern. The SSEPP will provide instruction on habitat protection measures such as temporary flagging to mark the buffer zones, and erosion/sedimentation control. In addition, the Environmental Inspector will be trained in the identification of these species and relevant construction personnel made aware of the sensitivity of species at risk. Submitting SSEPPs to NBDELG and NBDNRE prior to construction for review.	Probability of occurrence: unlikely Scientific uncertainty: minimal (*i.e.,* assessment based on available information, consultation, field investigations, proponents experience with similar projects, and previous EIA experience).	No significant adverse residual effects are likely, as the identified mitigation will be implemented.

SUMMARY OF RESIDUAL EFFECT ASSESSMENT

VEC: Species At Risk (Flora and Fauna) (Continued)

Project Phase (Potential Pathways)	Residual Effect Assessment Criteria (Determination of Significance)								
	Significance Criteria					Significant Effect (yes/no)	Mitigation	Likelihood	Residual Effects Conclusions
	Magnitude	Geographic Extent	Duration & Frequency	Reversibility	Socio-Economic Context				
Operation	See above	See above	Infrequent and short-term.	Effects are reversible.	See above Although activities associated with operation would not result in disturbance comparable to construction of the IPL, potential effects on the environment would be similar to the construction effects as detailed above, although more localized.	See above	See above	See above	No significant adverse residual effects are likely, as the identified mitigation will be implemented.
Decommissioning	See above	See above	During decommissioning effects will be short-term.	See above	See above Although activities associated with decommissioning would not result in disturbance comparable to construction, potential effects on the environment would be similar to the construction effects as detailed above, although more localized.	See above	See above	See above	No significant adverse residual effects are likely, as the identified mitigation will be implemented.
Emergency and Accidental Events	Magnitude of effects would not represent population – level effects.	The geographic extent of any adverse effects will be restricted to the 1 km wide Preferred Corridor.	Short-term and very rare (<1/year).	See above	See above	See above	See above	See above	No significant adverse residual effects are likely, as the identified mitigation will be implemented.

SUMMARY OF RESIDUAL EFFECT ASSESSMENT

VEC: Transportation Infrastructure (Traffic Circulation)

Project Phase (Potential Pathways)	Residual Effect Assessment Criteria (Determination of Significance)								
	Significance Criteria					Potentially Significant Effect (yes/no)	Mitigation	Likelihood	Residual Effects Conclusions
	Magnitude	Geographic Extent	Duration & Frequency	Reversibility	Socio-Economic Context				
Construction	The preliminary Preferred 50 m RoW crosses 13 primary highways and 57 secondary roads (including 47 seasonal roads, 4 gravel roads, and 6 local roads). Severity of effect will be low based on temporary slow downs and/or stops in local traffic flow (usually not more than 1/2 an hour).	The geographical extent of any adverse effects will be restricted to the transport infrastructure of the area immediately adjacent to the Preliminary Preferred 50 m RoW.	Short-term (4-6 mo.) occurring sporadically (<1/week)	Effects are reversible	A significant adverse effect on traffic circulation is defined as an effect resulting in an increase in peak traffic volumes over & above the roads designed level of service. Traffic flow will be interrupted for short periods where the IPL crosses roads during conductor stringing activities and when construction vehicles cross transportation infrastructure. Traffic circulation may be affected during the IPL construction period from the equipment and supply trucks servicing construction activities and personnel. Construction generated traffic (which is generally slow moving), if not properly managed, could disrupt local road users due to the movement of equipment, supplies and personnel to/from the work site.	No – any likely disruption in traffic will be limited.	Discussions will be held with NBDOT staff to identify peak travel times along each road segment required for access to the preliminary Preferred 50 m RoW, in order to coordinate any interruption of flow of traffic with NBDOT and the RCMP. In addition, all transportation related infrastructure (*e.g.*, roads) damaged during proposed IPL construction will be restored following completion of construction, in consultation with NBDOT.	Probability of occurrence: unlikely Scientific uncertainty: minimal	No significant adverse residual effects are likely.
Operation	See above	See above	Long-term (100 year lifetime) occurring rarely (<1/year)	Effects are reversible	See above Although activities associated with operation would not result in disturbance comparable to construction of the transmission line, potential effects would be similar to the construction effects.	See above	See above	See above	See above
Decommissioning	See above	See above	Short-term occurring sporadically.	Effects are reversible.	See above Although activities associated with transmission line decommissioning would not result in disturbance comparable to construction of the transmission line, potential effects on the environment would be similar to the construction effects.	See above	See above	See above	See above
Accidental Events	See above	See above	Short-term occurring very rarely.	Effects are reversible.	See above	See above	See above	See above	See above

SUMMARY OF RESIDUAL EFFECT ASSESSMENT

VEC: Wetland Habitat Function (including water quality)

Project Phase (Potential Pathways)	Residual Effect Assessment Criteria (Determination of Significance)								
	Significance Criteria					Potential Significant Effect (yes/no)	Mitigation	Likelihood	Residual Effects Conclusions
	Magnitude	Geographic Extent	Duration & Frequency	Reversibility	Ecological Context				
Construction	Fifty-seven wetlands are crossed by the preliminary Preferred RoW with no more than 1% of any individual wetland area crossed by the RoW). Severity of effects from alteration/displacement of wetland habitat, soil erosion (i.e., sedimentation), and changes in water quality in each wetland will vary from low to high as follows: Low – some vegetation clearing and power line over hanging wetland (most wetlands). Moderate – vegetation clearing and temporary road construction (some wetlands). High – placement of tower in wetland will cause permanent displacement of habitat (one wetland). Effects from noise/physical disturbance of wildlife will be low since wildlife reaction is expected to be avoidance or flight only and non-harmful. Introduction of alien invasive plant species could, if unchecked, displace part or all of any wetland.	The RoW crosses 57 wetlands, totalling approximately 0.35 km^2 of wetland habitat comprising <0.1% of total wetland habitat (271.2 km^2) in the Study Area. Temporary trails may be constructed in some wetlands consisting of 3-5 metre wide brush-mats or corduroy. Tower structures will be located in one wetland which will occupy 30 m^2. Effects of sedimentation will be local in area where temporary roads and/or the tower is located in wetlands. Effects of noise/physical disturbance of wildlife will be restricted to the RoW where Project activities will occur in wetlands. Introduction of alien invasive plant species could occur in the RoW where construction equipment will pass through or operate within a wetland.	Effects of alteration/displacement of wetland habitat will be short-term in most wetlands but where towers will be located in wetlands the effect will be permanent. Effects from sedimentation and changes in water quality will be short-term and will cease after revegetation. Effects from noise/physical disturbance will be short term (< 2 wks) and infrequent (<1/yr). Once established, alien invasive plant species could persist for long periods or indefinitely.	Effects of alteration/displacement of wetland habitat are not reversible in the wetland where the tower will be located. Effects of alteration/displacement of wetland habitat are expected to be short-term and temporary in all other wetlands. Changes in water quality due to sedimentation are fully reversible after natural re-vegetation and habitat restoration (if required) following construction. Establishment of alien invasive plant species in a wetland may not be reversible in some cases.	Both collectively and as individual units, wetland resources serve a variety of important ecological and socio-economic functions. Wetlands function in the maintenance of surface and groundwater resources and quality, as well as providing fish and wildlife habitat, including habitat for migratory bird species. All species of wildlife in NB rely on wetland habitat at some point in their life cycle. The value of wetlands to society and their ecological value are derived from their biological productivity and biodiversity. Wetland functions have been defined as the capability of wetland environments to provide goods and services including basic life-support functions (Bond et. al., 1992). Alteration of a wetland may remove or interrupt the ability of the wetland to continue to support the same level of pre-development functions. Wetlands are protected in NB by the Watercourse Alteration Regulation under the *Clean Water Act*.	Yes – alteration/displacement of habitat will be unavoidable where the tower is located in a wetland, however, the area of displacement relative to the total wetland area is very small and any interruption of hydrology will be extremely localized. Introduction of alien invasive plant species may displace wetland habitat.	Minimize the construction area, and construction period in wetlands. Compensation will be provided for any loss in wetland function, as determined in consultation with provincial regulatory authorities. Trees (dead or alive) should be left standing, while respecting safety clearances. Maintain vegetative diversity by incorporating practices to prevent the spread of non-desirable invasive species throughout the construction area such as washing of construction equipment prior to use in wetland areas. Do not apply fertilizer, lime or mulch to wetland as part of revegetation plan except where necessary to stabilize watercourse banks. Restoring original contours and cross drainage patterns, if affected.	Probability of occurrence: unlikely Scientific uncertainty: minimal (*i.e.*, assessment based on available information, consultation, field investigations, proponents experience with similar projects, and previous EIA experience).	No significant adverse residual effects are likely, as identified mitigation will be implemented.
Operation	Effects from noise/physical disturbance of wildlife will be low since wildlife reaction is expected to be avoidance or flight only and non-harmful. Introduction of alien invasive plant species could, if unchecked, displace part or all of any wetland.	Effects of noise/physical disturbance of wildlife will be restricted to the RoW where Project activities will occur in wetlands. Introduction of alien invasive plant species could occur in the RoW where operation personnel may pass through a wetland.	100 year life expectancy Disturbances will be rare (<1/year).	See above	See above Although activities associated with transmission line operation would not result in disturbance comparable to construction, potential effects on wetlands would be similar to the construction effects, although more localized. Migratory bird usage of wetland habitat.	See above	See above	See above	No significant adverse residual effects are likely, as identified mitigation will be implemented.

SUMMARY OF RESIDUAL EFFECT ASSESSMENT

VEC: Wetland Habitat Function (including water quality)

Project Phase (Potential Pathways)	Residual Effect Assessment Criteria (Determination of Significance)								
	Significance Criteria					Potential Significant Effect	Mitigation	Likelihood	Residual Effects Conclusions
	Magnitude	Geographic Extent	Duration & Frequency	Reversibility	Ecological Context				
Decommissioning	See Construction	See Construction	During decommissioning effects will be short-term.	See above	See above Although activities associated with transmission line decommissioning would not result in disturbance comparable to construction of the transmission line, potential effects on the environment would be similar to the construction effects.	See above	See above	See above	No significant adverse residual effects are likely, as identified mitigation will be implemented.
Emergency and Accidental Events	Severity is high if a large petroleum/oil/lubricant spill occurs. The affected area could be very large and reduction in wetland function would be extreme.	The RoW crosses 57 wetlands, totalling approximately 0.35 km^2 of wetland habitat. Tower structures will be located in one wetland which will occupy 30 m^2.	Long-term	Effects may not be reversible in the case of a large petroleum oil/lubricant (POL) spill.	See above	Yes – contamination in wetlands may occur if POL or other construction material is spilled.	The principal means for minimizing the potential for effects related due to accidental events, including the accidental release of hazardous materials, is by ensuring that an adequate level of awareness of the sensitivity of environmental components is maintained by maintenance crews, and through incorporation of appropriate measures in operating practices (see Section 3.11.11 in the CSR).	See above	No significant adverse residual effects are likely, as identified mitigation will be implemented.