

ANGLICAN PARISH OF SHEDIAC

# SHEDIAC CAMPING ENVIRONMENTAL IMPACT ASSESSMENT

CONFIDENTIAL

MAY 2017



# SHEDIAC CAMPING ENVIRONMENTAL IMPACT ASSESSMENT

Anglican Parish of Shediac

## Final Report

Project no.: 161-15376

Date: May 2017

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## EXECUTIVE SUMMARY

The Town of Shediac is known as the lobster capital of the world and the region draws thousands of tourists each summer for its beaches, festivities and vibrant community (Province of New Brunswick, 2017). The purpose of this undertaking is to create a 4-star campground to accommodate the needs of the multitude of tourists that visit the Shediac region every year. The 4-star campground will focus on a niche market of tourists that are interested in staying in a top tier, eco-friendly campground that prides itself in minimizing its impact on the environment all while providing first class service. This Project is considered to be an “undertaking” pursuant to the New Brunswick Regulation 87-83, under the *Environmental Impact Assessment Regulation – Clean Environment Act*, as described by item (p) of Schedule “A” (“all major recreational or tourism developments, including developments which consist of changing the use of land so that it is used for recreational or tourism purposes”).

The proposed new commercial campground is expected to accommodate approximately 600 to 700 camp sites, depending on the final detailed design layout. While some sites may have variable service levels, all sites will be serviced by water, sewer and electrical. Water services will be supplied by the Town of Shediac and sewer services will be serviced through a connection to the GSSC sewer system. In addition, all patrons will have access to public washrooms with toilets and showers. The proposed site will also include an administrative office, a playground area equipped with a swimming pool and splash pad, visitor parking and various maintenance storage areas and buildings, as required. A network of local roadways is required to access the site and individual campsites.

The majority of the site is forested with some former field/pasture habitat observed to the east of the arterial residential development along Point-du-Chêne Road near the intersection of Greenwood Promenade. A provincially significant wetland (PSW) is located at least 30 metres (m) to the north of the northern border of the PDA. The northern border is bounded by a pedestrian/bicycle trail that links the Point Du Chêne Road and Parlee Beach Road. The proposed development area is bounded at its southwest corner with a retail/commercial development that faces onto Main Street and includes a gas station/convenience store, propane refilling station and recycling depot. The remaining southern boundary of the site is populated by retail and commercial buildings along Main Street. The east side of the Site is bounded by a number of residences along the Point-du-Chêne Road. The Greater Shediac Sewer Commission’s (GSSC) main sewer trunk line crosses the centre of the site.

A review of Project activities, applicable legislation, and previous assessment experience identified the following VECs:

- Topography and Drainage
- Air Quality
- Ambient Noise
- Groundwater Resources
- Wildlife, Migratory Birds and Species at Risk
- Local Economy
- Road Transportation Network
- Heritage and Archaeological Resources

The review indicated that with the application of the mitigation measures there should be no significant residual impact.

Effects of the environment on the Project was also reviewed. Extreme weather and sea level rise were the two potential environmental effects that could potentially impact the Project. A review indicated with the application of mitigation measures and a design of the camp site layout that takes into consideration potential flooding effects from rain events as well as tidal surges, there should be no significant residual impact to the Project during construction and operation.

A cumulative effects review was also conducted. Existing and future projects of similar nature were examined within a 10 km radius of the proposed Project location. There are currently three (3) campgrounds operation in and around the Town of Shediac with one additional campground requesting approval to construct and operate. Of ten (10) VECs identified in the environmental impacts assessment, two (2) were selected for cumulative effects analysis: Local Economy and Local Traffic.

The Project is anticipated to provide a positive impact to the local economy through the creation of employment opportunities for local and regional businesses during construction as well as the creation of permanent employment during the operation of the facility. In addition to the direct positive economic impacts, during operation indirect positive impacts include increased visitation of local gas stations, restaurants and boutiques in the area. The presence of more businesses has a cumulative effect of creating more opportunities for growth of local businesses and/or the creation of new businesses, which in turns increases employment opportunities in the area.

However, there is a potential to reduce occupancy rates at the other existing camp grounds in the area. That being said, the focus of this campground is to tap into a niche market that is interested in 4 star eco-friendly campground accommodations. The hope is to attract new users and limit the removal of existing visitors to the usage of the other campground areas. Another concern is the potential that the proposed Project will attract more new users which will exacerbate what is already seen as a population problem at the beach. The playground, pool, water features and other recreational opportunities are intended for use by campers as an alternative to the beach. This will be especially attractive to families with small children for safety reasons and to minimize travel time to the beach, etc. Pre-teens and teens will be attracted to the volleyball and basketball courts as well. The campground facilities may be available to the public for a nominal charge and the community will be encouraged to participate in campground activities such as concerts and other shows at the community recreation center.

With respect to local traffic, the Town of Shediac developed an Active Transportation Plan in 2013 and 2014. Many of the suggested recommendations have already been implemented or anticipated to be completed in the near future prior to the operation of the proposed campground (Town of Shediac, 2017). In addition, the Project site access road will include a four lane holding lane area that will be controlled to reflect the variation in inflow and exiting of traffic during peak traffic periods, such as Friday night and Sunday morning. During peak registration periods (intake) there will be at least two inflow lanes open and the holding lanes will allow guests to park inside of the facility boundaries while registering without interfering with traffic on Main Street. During peak exit times (check out) there will be one inflow lane and two exit lanes to facilitate traffic flow onto Main Street, the holding lanes will provide wait space for exiting campers while other guests sign out of the campground during peak hours.

Based on the results of the review of the potential Project impacts to the environment, impacts of the environment on the Project and a cumulative effects assessment, WSP is of the opinion that, with the use of the mitigation measures described in this report and adjustments to the detailed design plan, there will be no significant residual impact to the environment. In addition, it is believe that the Project will be beneficial to the Town of Shediac, region and the Province of New Brunswick as a leading example of a top-tier, eco-friendly premier campground.



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# 1 INTRODUCTION

## 1.1 NAME OF THE UNDERTAKING AND PROPONENT INFORMATION

### 1.1.1 NAME OF THE UNDERTAKING

Shediac Camping Environmental Impact Assessment

### 1.1.2 PROPONENT INFORMATION

The name, address and identification of the Proponent, as well as the contact persons for the proposed undertaking, are as follows:

**Name of the Proponent:**

Anglican Parish of Shediac  
3400 Route 134  
Shediac Cape, NB  
E4P 3J2  
(506) 532-6960

**Environmental Assessment Contact**

Bill Murray & Petrina Ferris, Land Administrators  
Anglican Parish of Shediac  
3400 Route 134  
Shediac Cape, NB  
E4P 3J2  
(506) 532-6960

**Chief Executive Officer**

Rev. Kevin Borthwick, Priest & Rector of Anglican Parish of Shediac  
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**Prepared by:** WSP Canada Inc.

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**Property Ownership:** Anglican Parish of Shediac

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Signature of Owner (Representative)

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Date

### 1.1.3 FUNDING

The estimated project cost has not yet been determined, however, funding for the Project, will be provided entirely by the Proponent and its investors, without any foreseen government funding.

## 1.2 REGULATORY FRAMEWORK

### 1.2.1 FEDERAL

Based on a review of the Regulations Designating Physical Activities SOR/2012-47, a federal environmental assessment is not required for the Project as it is not located on federal land or listed as a physical activity that constitutes a "designated project" as listed under the Regulations Designating Physical Activities of the Canadian Environmental Assessment Act (CEAA) (2012). However, it is likely that several federal departments will identify themselves as having jurisdiction in some component of the Project and will be part of the Technical Review Committee (TRC).

The following Federal Acts and Regulations may be applicable to the Project and include:

- Fisheries Act (<http://laws-lois.justice.gc.ca/eng/acts/f-14/FullText.html>)
- Migratory Birds Convention Act (<http://laws-lois.justice.gc.ca/eng/acts/M-7.01/FullText.html>)
- Species at Risk Act (<http://laws-lois.justice.gc.ca/eng/acts/s-15.3/FullText.html>)

The *Fisheries Act* is applicable in situations where a project may impact fish or fish habitat within fish bearing waterbodies. Under S.35(1) and S.36(3) the Act prohibits any undertaking or activity that may negatively impact fish or fish habitat. The act further prohibits the release (or permitting to release) of any deleterious substance of any type in water frequented by fish. This includes the release of any deleterious substance to any place under any conditions where the deleterious substance may enter fish bearing waters or their habitat.

The *Migratory Birds Convention Act* is applicable in all situations where birds, nests, eggs or their habitat may be impacted. Bird habitat includes but is not limited to forests, wetlands, fields, and buildings. Under S.6 the Act Prohibits activities that will result in negative effects on migratory birds (listed under the MBCA) or their eggs, nests and young. Under S.5.1 the Act prohibits the deposit of a deleterious substance into migratory bird habitat.

The Species at Risk Act (SARA) is applicable in situations where a species listed on Schedule 1 is impacted by project activities. The Act prohibits activities that will result in negative effects on Species at Risk (listed in Schedule 1 of SARA) or their Critical Habitat (as identified in a species Recovery Plan).

### 1.2.2 PROVINCIAL

The Project is an "undertaking" pursuant to the New Brunswick Regulation 87-83, under the *Environmental Impact Assessment Regulation – Clean Environment Act*, as described by item (p) of Schedule "A" ("all major recreational or tourism developments, including developments which consist of changing the use of land so that it is used for recreational or tourism purposes"). As such, a registration and review ("Determination Review") of the Project is required under the EIA Regulation.

Other provincial regulations and policies that may be applicable to the Project are included in Table 1.1.

**Table 1-1 Provincial Environmental Legislation and Guidelines which may be Applicable to the Project**

Acts or Regulations	Section	Requirement	Department or Agency
Clean Air Act and Regulation 97-133 under the Clean Air Act – Air Quality Regulation	S.6(2) S.3(1)	Permission or authority required for the release of contaminant into the air.	New Brunswick Department of Environment and Local Government (NBDELG)
Clean Environment Act	S.5.3(1)	Authority or permission required under Act or Legislation to release waste or contaminant.	NBDELG – due diligence required to avoid releases.
Clean Water Act	S.12(1)	Authority or permission under Act or Legislation required for release of contaminant in watercourse.	NBDELG – due diligence required to avoid releases.
Regulation 82-126 under the Clean Environment Act – Water Quality Regulation	S.3(1)	Approval required to release contaminant that may cause water pollution.	NBDELG
Regulation 87-83 under the Clean Environment Act – Environmental Impact Assessment Regulation	S.4	Authority or permission required prior to carrying out an undertaking (as defined in Schedule A of the Regulation).	NBDELG
Regulation 87-97 under the Clean Environment Act – Petroleum Product Storage and Handling Regulation	S.6(1)	Permit required for the storage of two thousand litres or more of petroleum products onsite.	NBDELG
Regulation 90-80 under the Clean Water Act – Watercourse and Wetland Alteration (WAWA) Regulation – and –Clean Water Act	S.3(1) And 15(1) (b)	Permit required for any project or structure involving alteration of designated watercourse or wetland.	NBDELG
Community Planning Act	S.81	Development Officer must approve any development where any community development scheme is in effect.	NBDELG
Fish and Wildlife Act	S.37(2)	Do not disturb, injure, gather or take the nest or egg of any bird.	New Brunswick Department of Energy and Resource Development (NBDERD)
Highway Act	S.36(7)	Special permit under subsection 13 required to operate a vehicle exceeding road weight restriction.	New Brunswick Department of Transportation and Infrastructure (NB DTI)
Historic Sites Protection Act	S.2(1) S.3	Authority to declare any site, parcel of land, building, or structure a Protected Site. License required to conduct archaeological field research in the province.	New Brunswick Department of Tourism, Heritage and Culture
Motor Vehicle Act	S.261	Permit required for vehicles carrying excess of maximum load under Act.	New Brunswick Department of Public Safety

Acts or Regulations	Section	Requirement	Department or Agency
		All loads are to be properly secured during transit.	
Pipeline Act, 2005	S.29.1 – S.29.6	Take all necessary precautions for ground disturbance over or near pipeline.	NBDERD
Regulation 89-108 under Municipality Act		Authority or permission under Act or Legislation required for blasting operations.	NBDELG
Regulation 95-66 under Topsoil Preservation Act - Blasting Code Approval Regulation	S.3(1)	Permit required for removal of topsoil from a site	NBDELG
Regulation 96-26 under Species at Risk Act		Compliance with established prohibitions on persons in terms of impacts on specific endangered species of flora and fauna and their habitat.	NBDERD
Transportation of Dangerous Goods Act	S.4(1)	Permit required for the transportation of dangerous goods	New Brunswick Department of Public Safety
Transportation of Primary Forest Products Act	S(2)	Compliance with specified documentation requirements for the transportation of primary forest products within New Brunswick.	NBDERD

### 1.2.3 MUNICIPAL

Land Use Bylaws exist in the Town of Shediac which require approval for corporate development. This Project footprint was rezoned by the Town of Shediac on December 8, 2014 with by-law no# Z-14-44-3Z, to Campground (CA) Zone in order to allow the construction of a campground with approximately 650 sites, pursuant to Section 39 of the *Community Planning Act*. By-law No. Z-14-44-11Z was recently enacted to amend by-law Z-14-44-1Z by striking out “within two (2) years of the date this rezoning comes into effect” and substituting “within three (3) years of the date by-law Z-14-44-11Z comes into effect.”

Other municipal by-laws and policies that may be applicable to the Project include:

- By-Law No. 05-24 – A by-law relating to the water system ([https://shediac.ca/images/pdf/arretes/EN/Arrete\\_05-24\\_Reseau\\_de\\_distribution\\_deau.pdf](https://shediac.ca/images/pdf/arretes/EN/Arrete_05-24_Reseau_de_distribution_deau.pdf))
- By-Law No. 14-46 – A by-law relating to buildings in the Town of Shediac ([https://shediac.ca/images/pdf/arretes/ARR%C3%8AT%C3%89-BY-LAW\\_14-46\\_-\\_Arr%C3%AAt%C3%A9\\_de\\_construction.pdf](https://shediac.ca/images/pdf/arretes/ARR%C3%8AT%C3%89-BY-LAW_14-46_-_Arr%C3%AAt%C3%A9_de_construction.pdf))
- By-Law No. 14-49 – A by-law relating to municipal emergency planning for the Town of Shediac ([https://shediac.ca/images/pdf/arretes/EN/ARRETE\\_BY-LAW\\_NO\\_14-49\\_Planification\\_durgence.pdf](https://shediac.ca/images/pdf/arretes/EN/ARRETE_BY-LAW_NO_14-49_Planification_durgence.pdf))



- By-Law No. 15-28 – A by-law relating to the use of streets and sidewalks in the Town of Shediac (<https://shediac.ca/images/ByLaw1521Theuseofstreetsandsidewalks.pdf>)
- By-Law No. 15-28 – A by-law to regulate street traffic and parking in the Town of Shediac (<https://shediac.ca/images/pdf/arretes/BY-LAW-ARRETENo15-28trafficandparkingintheTownofShediac.pdf>)
- General Policy 12-07 – Respecting the Linguistic Landscape ([https://shediac.ca/images/pdf/politiques/POLITIQUE\\_GENERALE\\_-\\_12-07\\_PAYSAGE\\_LINGUISTIQUE.pdf](https://shediac.ca/images/pdf/politiques/POLITIQUE_GENERALE_-_12-07_PAYSAGE_LINGUISTIQUE.pdf))
- General Policy 12-09 – Incentive Program as Regards Commercial Development ([https://shediac.ca/images/pdf/politiques/POLITIQUE\\_GENERALE\\_No\\_12-09\\_-\\_INCITATIF\\_COMMERCIAL.pdf](https://shediac.ca/images/pdf/politiques/POLITIQUE_GENERALE_No_12-09_-_INCITATIF_COMMERCIAL.pdf))
- General Policy 12-15 – Cultural Policy ([https://shediac.ca/images/pdf/arretes/General\\_Policy\\_12-15\\_Cultural\\_Policy.pdf](https://shediac.ca/images/pdf/arretes/General_Policy_12-15_Cultural_Policy.pdf))

### 1.3 STRUCTURE OF THE DOCUMENT

This report describes:

- Baseline environmental conditions.
- Project-related activities and potential impacts on the receiving environment.
- Mitigative and/or monitoring measures to be employed during construction and operation to minimize or eliminate potential impacts.

The EIA report consists of the following sections:

- Section 1.0 – Introduction;
- Section 2.0 – Scope;
- Section 3.0 – Project Description;
- Section 4.0 – Environmental and Socio-Economic Setting;
- Section 5.0 – Environmental Impacts and Associated Mitigation;
- Section 6.0 – Effects of the Environment on the Project;
- Section 7.0 – Cumulative Effects Assessment;
- Section 8.0 – Public Involvement;
- Section 9.0 – Other Approvals Required; and
- Section 10.0 – Closing Remarks.

## 2 SCOPE

### 2.1 SCOPE OF THE UNDERTAKING

The following describes the rationale for the undertaking and alternatives considered for the layout of the proposed campground.

#### 2.1.1 PURPOSE/RATIONALE/NEED FOR THE PROJECT

The Town of Shediac is known as the lobster capital of the world and the region draws thousands of tourists each summer for its beaches, festivities and vibrant community (Province of New Brunswick , 2017). The purpose of this undertaking is to create a 4-star campground to accommodate the needs of the multitude of tourists that visit the Shediac region every year. The 4-star campground will focus on a niche market of tourists that are interested in staying in a top tier, eco-friendly campground that prides itself in minimizing its impact on the environment and providing first class service. Further details on this aspect of the project can be found in the project description section of this report.

#### 2.1.2 CONSIDERATION OF ALTERNATIVES

The Project is located in a large undeveloped area owned by the Anglican Parish of Shediac. The land will be leased from the Parish by the developer (e.g., Shediac Camping Inc.) and land ownership will remain with the Parish. The Parish will expect the leasee to abide by the environmental principals developed through this EIA. That is, the Project detailed design and construction will need to maintain design principals that are in line with low impact development best management practices such as including adequate green space and stormwater runoff practices that will minimize ecological impacts while allowing economic development based on the “best land use option” principal. There is no alternative location for this project within this area at this time, as this is the only area large enough to accommodate the number of lots required for the campground.

Alternatives were considered for the configuration of the landscape. Initially seasonal lease lots were to be placed closest to the wetland and shoreline. Discussions with the Town of Shediac, local residents and the consultant led to the reconfiguration of the project site to minimize flood damage risks. Therefore, consideration for predicted sea level rise and local stormwater drainage patterns, seasonal sites will now be located within the upslope area of the site.

It is the Parish’s intention to leverage the natural beauty of the area while creating a viable commercial venture that creates economic growth and social benefit to the region. The project is deliberately set back from the wetland buffer to minimise environmental impacts. Further, they feel that development of the land in its entirety, rather than individual mini projects, is the best way to maintain continuity and minimize environmental impacts to the land. The Parish has reviewed many prospective projects in the past, including a strip mall type shopping center, two former campground proposals, a “European Village” type cottage community and several proposals for residential development.

### 2.2 SCOPE OF THE ENVIRONMENTAL ASSESSMENT

The proposed Project is considered an “Undertaking” under Schedule A of Regulation 87-83 of the *Clean Environment Act*, and therefore subject to the provincial EIA process. The EIA process for this Project will follow the outline provided by the 2012 publication of the NBDELG, “A Guide to Environmental Impact Assessment in New Brunswick” (Environment and Local Government, 2012).

The purpose of an EIA is to proactively gather information about the Project and assess potential interactions between the environment and Project development activities. Potential positive and negative interactions between Project activities and the environment are identified. Where negative interactions are anticipated and potential effects are a concern, methods for mitigating the potential effects are then proposed.

### 2.2.1 APPROACH TO SELECTION OF VALUED ECOLOGICAL COMPONENTS (VECS)

The impact assessment of an EIA focuses on the evaluation of potential interactions between Project components and activities, and Valued Environmental Components (VECs) identified through an issues scoping process.

Issues are identified during development of the EIA Document as well as comments received from regulatory bodies and members of the public. The concerns of the public potentially affected by the Project are identified. These include concerns expressed by the public at large, community groups and stakeholders, the scientific community, and governments during public consultation.

Pathways between the raised issues and Project activities are then identified. Where pathways cannot be identified, the issues or issue is deemed not to be affected by the Project and is therefore no longer part of the analysis. Appendix C of the New Brunswick Guide to EIA Assessment describes the minimum stakeholder standards for registered projects (Environment and Local Government, 2012).

Identified issues that have a pathway with Project activities are classified as VECs.

### 2.2.2 APPROACH TO BOUNDING

In order to properly assess VECs, they are bounded by temporal and spatial boundaries. Temporal bounds delineate the time period(s) over which project-related impacts/effects can be expected. Spatial bounds delineate the physical area in which VECs may be affected by Project activities.

The temporal bounds for this Project is categorized into two phases: construction and operation. Decommissioning and abandonment is not considered as it is an unknown factor that cannot be quantified.

The spatial bounds for most of the identified VECs will include only the immediate environs of the Project footprint and access routes. Other VECs will be bounded by the Project footprint as well as areas potentially affected by down-gradient movement of groundwater, surface water, and air. For socio-economic components of the environment, bounding extends to communities that have a stake, such as the Town of Shediac, in the potential effects resulting from the proposed Project.

### 2.2.3 APPROACH TO DETERMINATION OF SIGNIFICANCE

The assessment or determination of the significance of potential effects is based on the framework/criteria provided in Canadian Environmental Assessment Agency (the Agency) guidance document "Responsible Authorities Guide" (Canadian Environmental Assessment Agency, 1994) which summarizes the requirements that have been applied to similar projects in the past. An updated version is now available for Projects designated under CEAA 2012 (Canadian Environmental Assessment Agency, 2015). These documents are similar in nature and are widely accepted as guidance documents utilized by government and regulatory agencies in Canada.

The reference guide entitled "Determining Whether A Project Is Likely To Cause Significant Adverse Environmental Effects" included in the "Responsible Authority's Guide" (Canadian Environmental Assessment Agency, 1994) as well as the updated guide developed for CEEA 2012 (Canadian Environmental Assessment Agency, 2015), are used as the basis for determining the significance of identified potential effects. This determination consists of the following steps:

- determining whether the environmental effect is adverse;
- determining whether the adverse environmental effect is significant; and
- determining whether the significant environmental effect is likely.

For the purposes of the EIA, an effect is defined as the change effected on a VEC(s) as a result of project activities. A project-induced change may affect specific groups, populations, or species, resulting in modification of the VEC(s) in terms of an increase or decrease in its nature (characteristics), abundance, or distribution. Effects will be categorized as either negative (adverse) or positive. Any adverse effects will be determined to be significant or non-significant in consideration of assessment criteria discussed above. The Assessment will focus on those interactions between the VECs and project activities which are likely or significant.

The assessment will also determine whether the residual environmental effects of the project are significant or non-significant after application of mitigation measures. The significance of the residual environmental effects is determined after a consideration of the magnitude, geographic extent, duration/frequency, reversibility and ecological context. Where residual impacts are identified, measures to compensate will be considered. Impact of malfunctions and accidents, as well as cumulative effects, are included in the evaluation of the environmental effects.

## 3 PROJECT DESCRIPTION

WSP Canada (WSP) was retained by the Anglican Parish of Shediac (the Parish) to complete an Environmental Impact Assessment (EIA) on the proposed campground development that is shown in the conceptual site plan (Figure 2, Appendix A). Previous environmental site survey work for this project was conducted by WSP for Camping Shediac Camping Ltee/Ltd. The report summarizing that field survey work is included with this EIA document in Appendix B (WSP, 2014). The field work included a rare plant survey, an aquatic resources inventory and migratory bird surveys within the proposed project site boundaries. WSP understands that the Parish is conducting this EIA in support of plans for the future development of a campground facility at the site that will be developed by others under a lease agreement with the Parish. At this time the Parish has a Letter of Understanding with Camping Shediac Camping Ltee/Ltd., who is expected to be the developer for the proposed campground development.

### 3.1 PROJECT LOCATION AND DIMENSIONS

The proposed campground development project site is located on PIDs 70596374 and 01068147 in the Town of Shediac and is bounded by Main Street to the south, Pointe-du-Chêne Road to the west and the Parlee Beach access road to the east, as shown in Figure 1, Appendix A.

The total area of the proposed development area (PDA) is approximately 25.5 hectares (63 acres). The total built area for roads, campsites, and infrastructure will comprise of approximately 75% of the site area, or approximately 21.7 hectares (53.6 acres). The remainder of the site will include buffers, setbacks and green space, as described below.

#### 3.1.1 PROJECT OVERVIEW

The majority of the site is forested with some former field/pasture habitat observed to the east of the arterial residential development along Point-du-Chêne Road near the intersection of Greenwood Promenade. A provincially significant wetland (PSW) is located at least 30 metres (m) to the north of the northern border of the PDA. The northern border is bounded by a pedestrian/bicycle trail that links the Point Du Chêne Road and Parlee Beach Road. The site is bounded at its southwest corner with a retail/commercial development that faces onto Main Street and includes a gas station/convenience store, propane refilling station and recycling depot. The remaining southern boundary of the site is populated by retail and commercial buildings along Main Street. The east side of the Site is bounded by a number of residences along the Point-du-Chêne Road. The Greater Shediac Sewer Commission's (GSSC) main sewer trunk line crosses the centre of the site (Figure 3, Appendix A).

The site is proposed for a new commercial campground with up to approximately 600 to 700 camp sites, depending on the final detailed design layout. While some sites may have variable service levels, all sites will be serviced by water, sewer and electrical. Water services will be supplied by the Town of Shediac and sewer services will be achieved through a connection to the GSSC sewer system. In addition, all patrons will have access to public washrooms with toilets and showers. The proposed site will also include an administrative office, a playground area equipped with a swimming pool and splash pad, visitor parking and various maintenance storage areas and buildings, as required. A network of local roadways is required to access the site and individual campsites. The site plan is expected to evolve at the detailed design stage, but will generally follow the basic configuration shown in the conceptual site plan provided in Figure 2, Appendix A.

### 3.2 PROJECT COMPONENTS AND ACTIVITIES

This section describes the components and activities required for, and associated with, the Project. While the various project components indicated herein are not fully reflected on the conceptual site plan (Figure 2,

Appendix A), this project description is intended to portray the main project features the proposed development principles planned for site development. Actual site configuration is expected to evolve during the detailed design phase of the project, but the features and site development principles described herein will form the basis of the design principals directed toward environmental stewardship and sustainability that will be adhered to in the design phase.

One important aspect of the design principals for this project is the intention to locate the premium serviced lots (i.e., permanent/seasonal camp sites) into the upslope area above the GSSC sewer line road that bisects the development, nearer to Main Street. This decision was made to afford better flood protection for these more permanent, seasonal campsites. Flood risk due to potential sea level rise, storm surge and flooding from overland flow during large storm events would have more financial impact on these sites that often include permanent structures, such as large trailers, decks and sheds, etc. Having the temporary lots (i.e., those intended for overnight and weekend campers) located in the downslope area of the site represents less risk, since no permanent structures will be located on these site and it is unlikely that campers would be on the sites during the periods of high flood risk. That is, tidal surges and large storms tend to occur in the off season in the Shediac region and campers are less likely to go camping during inclement weather, such as during intense storm events.

Project components include:

- Buildings:
  - Reception/ main entrance building
  - Grocery store
  - Laundromat, washroom and shower facilities
  - Maintenance building
  - Pool house
  - RV Campsites
  - Community recreation center
- Infrastructure:
  - Access roads
  - Ditches
  - Water and sanitary sewer systems
  - Electrical and telecommunications transmission lines
  - External lighting
- Recreational structures:
  - Playgrounds
  - Pool
  - Splash pad
  - Beach volley ball court
  - Basketball court
  - Gazebo's and picnic tables
  - Walking trails

Playground, pool, water features and other recreational opportunities are intended for use by campers as an alternative to the beach. This will be especially attractive to families with small children for safety reasons and to minimize travel time to the beach, etc. Pre-teens and teens will be attracted to the volleyball and basketball courts as well. The campground facilities may be available to the public for a nominal charge and the community will be encouraged to participate in campground activities such as concerts and other shows at the community recreation center.

### 3.2.1 SITE ACCESS AND TRAFFIC MANAGEMENT

The development is anticipated to increase vehicular traffic (cars and RVs) on Main Street during peak intake and check out periods. A combination of holding lanes and variable entrance/exit lanes, designed to manage inflow and exit traffic generated by registering guests, will minimize impact to Main Street traffic. The Project site access road will include a four lane holding lane area that will be controlled to reflect the variation in inflow and exiting of traffic during peak traffic periods, such as Friday night and Sunday morning. During peak registration periods (intake) there will be at least two inflow lanes open and the holding lanes will allow guests to park inside of the facility boundaries while registering without interfering with traffic on Main Street. During peak exit times (check out) there will be one inflow lane and two exit lanes to facilitate traffic flow onto Main Street, the holding lanes will provide wait space for exiting campers while other guests sign out of the campground during peak hours. The customer queue/holding lanes, as indicated in Figure 2, Appendix A, are each approximately 120 to 140 m long, providing a minimum of 360 m of waiting space. Based on an average vehicle/trailer train length of 12 m, this will provide queuing space for approximately 30 to 40 units.

There are two controlled access ways leading to/from Pointe-du-Chêne Road. These are gated access ways that are accessible only to service vehicles. The southernmost ingress from Pointe-du-Chêne Road controls access to campground maintenance equipment sheds as shown on Figure 2, Appendix A. The northernmost access to/from Pointe-du-Chêne Road provides access to GSSC maintenance and inspection crews to maintain the sewer trunk line located beneath the east/west bisecting roadway through the campground. These gated access roads will have locks that will be accessible to campground stand GSSC employees only.

The proposed main entrance configuration is subject to approval from NBDTI. The proponent will submit a tentative site plan to the Town of Shediac and NBDTI to get approval to proceed with construction of street connections for this Project. These approvals will be filed in parallel with the EIA registration and review.

### 3.2.2 SETBACKS, BUFFERS AND STORMWATER MANAGEMENT PRACTICES

The developer intends to minimize existing ground cover disturbance to maintain natural vegetation as much as practically possible. Preserving existing ground cover and/or including landscaped vegetated plantings will also minimize potential for increased runoff, erosion and sediment transport from the site. That is, maintain natural vegetative cover and soil conditions will reflect existing hydrological characteristics and minimize runoff increases. Consequently, as much as practically possible, all buffer areas will be composed of the existing natural vegetation in an undisturbed state. Where this is impractical, appropriately sized trees, shrubs, bushes and ground cover will be planted to replace the inappropriate native vegetation. This will also provide habitat to birds in the area

As indicated above, we estimate that approximately 75% of the site will be developed. The provision to provide a minimum treed buffer of at least 3.0 m (approximately 10 ft) between all camp sites for privacy purposes will reduce ground disturbance during construction and help to maintain hydrological conditions at the site in the long term. Furthermore, there is a "No Build" buffer areas between the new development and existing residences and businesses along Pointe-du-Chêne Road to the west and those along Main Street to the south of the PDA. . These ten metre (10 m) wide buffers are intended to provide privacy screening between the campground and existing land uses. They will also reduce the disturbed area required for construction of the project.

Project design respects the 30 m natural conservation buffer required between the development and the wetland area surrounding the saltwater inlet located to the north of the PDA. Furthermore, the realigned walking trail located along the northern boundary of the proposed project site was developed as a “floating embankment” to minimize disturbance to the land and to allow surface and groundwater flow continuity within the local environment. There is to remain a 22 m (72 ft) wide buffer between the existing residential lots along Pointe-du-Chêne Road, as well as a 3 to 5 m (10 to 16 ft) buffer between the PDA and the back of the commercial lots along Main Street.

### 3.2.2.1 IMPERVIOUS SURFACES

Impervious surfaces include service building roofs, entrance access road, reception parking area, various recreational and playground facilities and RV site trailer roofs, decks and sheds. The remainder of the area will, wherever possible, remain as natural ground cover. Additional developed areas will be maintained as landscaped surfaces or permeable granular roadways that permit water infiltration. The following site features will have an impermeable asphalt surface cover:

- The main entrance road
- The reception area parking lot
- The maintenance access road
- The road over the GSSC sanitary trunk line, and
- The parking area associated with the main recreation area/playground area (adjacent to the GSSC access road).

### 3.2.2.2 STORMWATER MANGEMENT CONSIDERATIONS

As noted above, the preservation of natural vegetative cover and establishment of landscaped surfaces will mitigate the potential for increased runoff, erosion and sediment impacts due to site development. Furthermore, some minor stormwater storage is created by the barrier imposed by the walking trail, located between the campground development and the wetland to the north of the site. That trail has five small (300 millimetre (mm)) culverts that will control runoff until the water backs up enough to overtop the trail. WSP’s modelling showed that this feature will control flows from an approximately 1:2 year return storm event, as shown in Figure 3, Appendix A. This modelling did not consider further stormwater reductions due to the addition of low impact development practices, such as those indicated in Table 3-1.

Detailed design of runoff and sediment control features will be developed during the detailed design stage of project development. All design features will be in compliance with the specification requirements of the Town of Shediac, the GSSC and any stipulations indicated in the EIA registration and response documents. Principles and practices expected to be incorporated into the design and during construction to minimize project impacts related stormwater in the short and long term are outlined in Table 3-1. Additional or alternative practices may be considered, where advantageous to environmental impact management, based on actual site conditions.



**Table 3-1 Runoff Erosion Control Mitigation Measures**

PRACTICE	SHORT TERM	LONG TERM
Maintain Vegetation During Construction (as much as possible)	Erosion Control	Runoff Mitigation
Silt Fence Installation	Silt Transport Control	N/A
Include Vegetative Buffers (Between camp sites and between existing development and project)	Reduce Runoff/Sediment & Increase Infiltration	Reduce Runoff/Sediment & Increase Infiltration
Minimize Hard Paved Surfaces	Reduced Runoff	Reduced Runoff
Use of Porous Pavement (i.e., gravel road surface)	N/A	Reduced Runoff
Infiltration Ditches	N/A	Reduced Runoff
Rain Gardens	N/A	Reduced Runoff
Set back From Wetland	Reduce Potential Wetland Impacts	Reduce Potential Wetland Impacts

### 3.2.2.3 WATER SUPPLY

The Town of Shediac municipal water supply network will provide water services to the proposed campground and its various facilities. The Town has agreed to supply the water to the campground, based on current development plans and predicted future water supply inventory and future growth projections for the Town. Therefore, the proposed campground will be a customer of the Town, just as any other consumer of water resources for drinking water and other authorized uses.

### 3.2.2.4 WASTEWATER

The Town of Shediac and approximately 14 kilometres (km) of coastline development is serviced by a municipal wastewater collection and treatment system that is managed by the GSSC. The system currently accommodates approximately 5,192 units, including single-family and multi-family dwellings, commercial and industrial infrastructure and seasonal residences. The waste is processed at the GSSC treatment facility at Cap-Brulé. The Cap-Brulé facility consists of eight (8) two-cell aerated lagoons and a polishing pond. From June to October, the final effluent is chlorinated before it is discharged into Lac des Boudreau via a small unnamed stream. Eighteen (18) lift stations, and a combination gravity and forcemain based pipe network transports sanitary sewage throughout the Town of Shediac, Pointe-du-Chêne and the Cap-Brulé area to the Cap-Brulé treatment facility.

Sanitary sewage from the campground will be disposed of through the GSSC sewage conveyance and treatment system. An approximately 600 mm trunk sewer pipe passes through the proposed Site, as shown in Figure 3, Appendix A, which will serve as the receiving pipe for sewage from the proposed campground project. The trunk sewer line will be covered with a paved access roadway to accommodate GSSC maintenance activities, as reflected in Figure 2, Appendix A. WSP completed a flow analysis to predict the expected sanitary sewer flows from the campsite development. The predicted peak flow from all known sources, based on the Atlantic Canada Wastewater Guide Manual (ACWGM) (ABL Environmental Consultants Ltd., 2006), is 12.6 L/sec (1.08 million litres per day). Crandall Engineering, the engineer of record for the GSSC, reviewed the predicted flows for acceptability relative to network flow and treatment facility capacity. Their assessment indicated that it is allowable to accept sanitary flows from the proposed campground site into the GSSC wastewater treatment system. This assessment was summarized in a February 6, 2017 e-mail from Joey Frenette, General Manager, GSSC, as follows:

*We have reviewed the preliminary concept drawings provided by WSP Ltd. received January 3, 2017 as well as the excel sheet attached with the proposed flows received February 1, 2017. Based on the flows provided we do not estimate any significant capacity issue for the trunk sewer or the WWTP with a peak flow of 12.6 l/s (1.08 million liters per day). The peak flow provided would be equivalent to taking up approximately 15% of the overall pipe capacity in the existing 600mm diameter trunk sewer that is located through this property.*

*Additional comments:*

- 1) It would be recommended that the park be equipped with gate valves at each inlet to the existing trunk sewer to be closed during the off season. This would ensure no infiltration occurs in the system during non-operational periods.*
- 2) We recommend each service connection to have a water tight cover to be installed when not connected to a mobile trailer.*
- 3) We would recommend that during the detailed design, the GSSC Standard Specification and By-laws be followed. We would also recommend a second review of the proposed system once a more detailed design is complete.*
- 4) At the design stage it may also be beneficial to confirm the existing flows in the 600mm diameter trunk sewer prior to final approval of the additional flows using the GSSC flow meters.*

Based on the above noted information, WSP accepts that the existing sanitary sewer line that crosses the site, as upgraded in 2009, has the capacity to accommodate anticipated sewage flows associated with the proposed campground and its activities. All camp sites within the project will be connected to the GSSC sewer system through an on-site pipe network. Trailer sewage connections are provided for each site that will meet the GSSC design standard for backflow and flood protection. An engineering plan for the proposed on-site sanitary sewer system and connections to the GSSC trunk sewer line will be submitted to the GSSC for approval prior to construction for approval before making any connections to the GSSC sewer line.

### **3.2.2.5 POWER, LIGHTING AND CAMP SITE CONNECTIONS**

All campsites will be provided with an electrical power connection to power campers for lighting and appliance use. Seasonal sites will have 50 AMP connections, while temporary sites will be fitted with 30 AMP connections.

Illumination of buildings, parking areas, entrances and roadways will be provided using low-intensity lighting fixtures. The fixtures will include suitable shielding to prevent light from escaping to adjoining properties where appropriate and/or required. Wherever possible, renewable energy fixtures, such as solar powered lighting, will be utilized.

## **3.3 CONSTRUCTION DETAILS**

The construction of roads, electrical utility lines, water and sanitary sewer systems will service up to 700 camp sites. The Project will meet the requirements for campground facilities as set out by the Tourism Establishment Regulation under the Tourism Development Act 2008.

### **3.3.1 SITE CHARACTERISTIC CONSIDERATIONS**

The majority of the PDA is dominated by early successional mixed wood forest, which is predominantly trembling aspen (*Populus tremuloides*), red maple (*Acer rubrum*) with minor amounts of white spruce (*Picea glauca*) and balsam fir (*Abies balsamea*). This site was previously disturbed and a review of historical aerial photography indicated the following:

- 1944, Photo 194407326025 – land is occupied almost entirely by farm fields with clumps of bush evident in random locations.
- 1963, Photo 196306320239 – land is occupied by farm fields and small groupings of forested/shrubby areas.
- 1976 – Photo 197600510137 the sewage line and drainage ditches are evident, less farm fields and more forested/shrubby areas are apparent as natural encroachment occurs onto previously grazed lands.

Based on this review, it is evident that this land is previously disturbed. In fact a 1892 aerial photo shows the foundation of the former attempt to develop a strip mall on the property and the remnants of that foundation was observed during the 2014 field survey performed by WSP.

There is a PSW located north of the northern border of the planned development area. The PDA respects the required 30 m buffer from that wetland area. A portion of the site also contains former field/pasture habitat observed to the east of the arterial residential development along Point-du-Chêne Road near the intersection of Greenwood Promenade.

### 3.3.2 SITE CONSTRUCTION

The reception and administration office will be located near the main entrance off Main Street, Shediac. There will also be a parking lot area to accommodate visitors and arriving/departing guests. The reception area will also have a four lane holding lane area to stack incoming customers and reduce interference with traffic on Main Street, as shown in Figure 2, Appendix A.

Street right-of-ways and roadway surface width will be a minimum of 7.5 m to accommodate two-way traffic. Road material will consist of granular material to permit water infiltration. The exception to this is the entrance driveway and parking areas and the main bisecting roadway that will be constructed over the GSSC sewer trunk line. RV pads will measure approximately 3.65 m wide by 16 m long. RV pads will also be finished with the same granular material as the roadways.

There are three different lot configurations proposed; the largest will be for seasonal campers, considered as permanent camp sites, which are 15.24 m by 21.34 m (50 ft by 70 ft) in size. The temporary, or overnight, camp sites that will be available for reservation and/or drive in customers will vary in size between 12.2 m by 19.8 m (40 ft by 65 ft) and 10.7 m by 19.8 m (35 ft x 65 ft). These various camp site configurations will be developed into three separate clusters within the proposed project site. Three laundromat/washroom facilities will be located within the three camp site clusters to serve the various seasonal and daily campers. The facilities will offer both male and female toilet facilities and shower stations as well as laundry services. The larger permanent sites will come with a 50 AMP electrical service, while the smaller, temporary sites will have a 30 AMP service. All sites will have sewer and water service connections.

#### 3.3.2.1 CONSTRUCTION PERIOD DURATION

Construction will begin upon approval of this EIA, and the conditions of the Certificate of Approval have been met. The total construction period is estimated to take 30 to 43 weeks and is planned for the fall of 2017 and spring of 2018. Some of these tasks will overlap, but the following is a generalized schedule for the work:

- Step 1: grubbing & clearing where necessary (1 -2 weeks);
- Step 2: excavation & services installation (10 - 12 weeks);
- Step 3: site & road improvements (6 -8 weeks);
- Step 4: campsite landscaping (4 - 5 weeks);

- Step 5: foundation for various facilities (including pool and water features) (4 - 6 weeks);
- Step 6: framing and construction of various facilities (6 – 8 weeks);

### 3.3.2.2 ESTIMATED HOURS OF CONSTRUCTION

Construction hours will begin at 7 am and will end around 7 pm / dusk from Monday to Friday and occasionally Saturday.

### 3.3.2.3 CONSTRUCTION EQUIPMENT

Typical construction equipment used in land development will be used for the Project such as bulldozers, excavators, loaders, rollers, trucks and other heavy equipment.

### 3.3.2.4 POTENTIAL SOURCES OF POLLUTANTS DURING CONSTRUCTION

Airborne pollutants in the form of dust is a common side effect of road and site construction. Another common potential nuisance impact of site construction is the tracking of mud onto public streets. The following measures will be implemented to control these impacts:

- Regularly apply water to construction areas;
- Stabilize the site entrance using water, calcium chloride or asphalt millings, depending on severity of the issue; and
- Regular sweeping of debris at entrance and adjoining public roadways.

Silt transport during construction is another potential impact that will need to be controlled. Erosion control fences, catch basin donuts and other devices, as appropriate, will be installed to prevent silt transport off of the construction site. Such measures will be inspected regularly to maintain performance.

### 3.3.2.5 SITE ACCESS

During construction, the Project will be accessed via Main Street and, potentially, Point-du-Chêne Road to reduce traffic conflicts and improve safety, as necessary.

## 3.3.3 INFRASTRUCTURE INSTALLATION DETAILS

### 3.3.3.1 ROADWAYS

Following the completion of clearing and grubbing, the roadway subgrade will be prepared. This will entail levelling the roadway routes and excavation to expose a suitable subgrade surface. To achieve this objective, unsuitable soils will be excavated and replaced with approved borrow material, placed in layers of specified thickness and compacted to a specified density. Compaction testing and proof roll testing will be conducted to obtain a suitable subgrade surface. The roadway structure and subbase will be designed to support vehicular traffic expected at the site. The current thinking is that the gravel based roads will consist of approximately 500 mm of sub base aggregate (suitable sandstone) and 150 mm of base aggregate (32.5 minus crushed rock). Again, quality control will be maintained using appropriate compaction and materials testing procedures. Aggregate based roadways will be graded to the approximate elevation of the surrounding surfaces to minimize interference with natural drainage patterns. Parking lots and roadways that will be finished with asphalt, as previously noted, will have a similar structure as the gravel roads and will be topped off with a base and seal asphalt. Asphalt surfaces will consist of approximately 100 mm thick asphalt surface, comprised of 60 mm base and 40 mm seal asphalt layers.

### 3.3.3.2 STORMWATER

Culverts and ditches will be installed in roadways and parking areas to maintain, as much as possible, to follow the natural stormwater runoff flow patterns across the site. As the majority of the roadways will be constructed level with the surrounding landscape, the need for these measures will be minimized and will likely be mostly limited to the asphalt paved roads and parking areas. Culverts may also be necessary where flows collect in swales to minimize erosion of the aggregate roadway surfaces. Stormwater flows from the site will be directed to the lower area of the DPA, near the estuary at the north end of the project site. Berms constructed around that area will form a “dry pond” to contain runoff that will be released at predevelopment flow levels using typical water control structures.

### 3.3.3.3 UTILITIES

#### WATER SUPPLY

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As noted earlier, water supply will be sourced from the Town of Shediac municipal water supply system. All water lines will be buried in trenches to connect all camp sites, washroom, laundry, recreational and public recreation facilities, as required. The water system design will consider flow needs and network limitations to ensure adequate supply is delivered to each supply node. Trenches will be designed and constructed to reflect typical construction and Town of Shediac municipal specifications. Water supply pipe network materials will typically require small pipe diameters (i.e. 0.75 mm) and will likely be composed of PVC, ABS or other similar, food grade plastic pipes.

#### SANITARY SEWER

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All camp sites and public washroom and laundry facilities will have a sanitary sewer hookup. Furthermore, the pool and splash pad overflow waters will also be directed to the GSSC sewer trunk line that passes through the site. All sewer pipes and connections will be constructed to the standard required by the GSSC and the Town of Shediac. The pipe network will be constructed to direct all flows to one of two outlets pipes to the GSSC sewer trunk that passes through the site. The outlet structures will be located on either side of the sewer trunk pipe to collect flows from up and down slope areas of the PDA. The depth of the trunk sewer pipe will allow gravity flow from both sides of the PDA and will consist of a manhole that will be fitted with a gate valve at its outlet to allow the sanitary flows to be cut off for the system maintenance and repairs. All service connections located in areas that may experience flooding (i.e., within the dry pond area) will be equipped with backflow preventers in order to prevent flood waters from infiltrating into the sanitary sewer system during flood periods.

#### POWER, LIGHTING AND CAMP SITE CONNECTIONS

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All campsites will be provided with an electrical power connection to power campers for lighting and appliance use. Seasonal sites will have 50 AMP connections, while temporary sites will be fitted with 30 AMP connections. Illumination of buildings, parking areas, entrances and roadways will be provided using low-intensity lighting fixtures. The fixtures will include suitable shielding to prevent light from escaping to adjoining properties where appropriate and/or required. Wherever possible, renewable energy fixtures, such as solar powered lighting, will be utilized.

Electrical utilities will be operational during the open season at the camp site and will, except for minimal facility requirements for heat, etc., be shut down during the off-season. All electrical lines, outlets and other utility wires and connections will be inspected regularly for wear and function and will be repaired and replaced as necessary according to the appropriate codes and standards of the day.

### 3.3.4 CONSTRUCTION WASTE

All construction waste will be collected and contained to prevent litter from entering the environment. Construction waste materials will be transported to a suitable landfill or recycle depot appropriate disposal according to the rules and regulations of the South East Regional Services Commission (SERSC/ECO 360) and the Province of New Brunswick.

## 3.4 OPERATIONS

The proposed campground is expected to be operated over a period of 50 to 100 years. Therefore, municipal sewer and water utilities will need to be operated and maintained over the lifespan of the facility. Stormwater management features, such as those described in Table 3-1, Section 3.2.2.2 of this report will also require maintenance to retain functionality and aesthetics. Water, sewer and electrical utilities will need to be monitored, maintained and repaired based on typical life cycle expectations. Gavel based roadways will be graded periodically to maintain grades and minimize potholes, etc. Paved surfaces will be monitored, repaired and replaced to maintain aesthetic, functionality and life span expectations.

### 3.4.1 CAMPGROUND INFRASTRUCTURE OPERATION AND MAINTENANCE

#### 3.4.1.1 UTILITIES

##### WATER SUPPLY

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Water demand, based on a consumption rate of 230 L/person/day and an average occupancy rate of 3.5 persons per camp site, for a full buildout of 700 camp sites would be approximately 600,000 L/day. Assuming the site will be open from June 1<sup>st</sup> until Sept 30<sup>th</sup>, the annual consumption rate would be approximately 7.3 million litres (ML). This does not account for water being consumed a pool or other water based recreation facilities, such as splash pads, etc. The sewage production calculations indicated an amount of approximately 1.0 ML/day of sewage water generation, which is typically similar to the water consumption rate, so it is safe to assume that the water consumption rate would be 1.0 ML/day. Therefore, a fair annual consumption estimate, including consumption for recreational water usage at the Project site combined with a June to September open season (122 days), would be approximately 122 ML.

Water supply demands will be met by the Town of Shediac municipal water system. The presumed developer, Camping Shediac Camping Ltd., has spoken with the Town of Shediac and the Town has indicated that supplying the estimated water to the campground project is an acceptable arrangement.

##### SANITARY SEWAGE

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The on-site sanitary sewer pipe networks will be monitored to ensure free flow of sewage to the GSSC trunk sewer line, where all sanitary flows will be received. The GSSC is responsible for the operation of the Trunk sewer line and its maintenance. Normal monitoring and maintenances is expected to allow continuous operation of the on-site sewer pipe network over the life span of the Project.

##### ELECTRICAL

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Electrical utilities will be operational during the open season at the camp site and will, except for minimal facility requirements for heat, etc., be shut down during the off-season. All electrical lines, outlets and other utility wires and connections will be inspected regularly for wear and function and will be repaired and replaced as necessary according to the appropriate codes and standards of the day.

### **3.4.1.2 WASTE MANAGEMENT**

All waste will be collected and contained in bins provided on site to prevent litter from entering the environment. Bins will have the appropriate separation to meet SERSC/ECO 360 (Albert-Westmorland Landfill) waste management and recycling criteria. Recyclable containers will have a separate bin to allow return and recycle of cans and bottles. All waste materials will be transported to a suitable landfill or recycle depot for appropriate disposal according to the rules and regulations of the SERSC/ECO 360 and the Province of New Brunswick.

### **3.4.2 TRAFFIC MANAGEMENT**

All public traffic access to the site is through the main entrance gate off of Main Street. The access roads will be controlled to reflect the variation in inflow and exiting of traffic during peak traffic periods, such as Friday night and Sunday morning. The four lane holding lane area, as indicated in Figure 2, Appendix A, will provide queuing space for approximately 30 to 40 units at any one time. This system is expected to relieve traffic during peak period to have little or no effect to traffic flow on Main Street in Shediac.

### **3.5 DECOMMISSIONING AND ABANDONMENT**

At the present time, there is no foreseeable plan for decommissioning and abandonment of the Project. Should decommissioning and abandonment be recommended in the future, a decommissioning and abandonment plan will be developed using federal and provincial regulations of the time.

## 4 ENVIRONMENTAL AND SOCIO-ECONOMIC SETTING

This section provides a description of the environmental and socio-economic setting for the region, and includes those components of the environment potentially affected by the proposed Project or which may influence or place constraints on the execution of Project-related activities. The Study Area includes the Project footprint with related infrastructure, utilities, and access roads as well as the surrounding biophysical environment as depicted in Figure 1 and Figure 2, Appendix A.

The components of the environmental (bio-physical) setting of the Project include:

- Topography and Drainage
- Surficial and Bedrock Geology
- Climate and Greenhouse Gas Emissions
- Air Quality
- Ambient Noise
- Groundwater Resources
- Surface Water Resources
- Terrestrial Habitat
- Wetland Habitat
- Aquatic Habitat
- Wildlife (including Migratory Birds and Species at Risk)
- Environmentally Sensitive Areas or Protected Areas

### 4.1 GENERAL ENVIRONMENTAL SETTING

This Section provides a brief description of the physical setting for the Project. The physical setting includes a description of the topography and drainage of the site as well as a description of the surficial and bedrock geology.

#### 4.1.1 TOPOGRAPHY AND DRAINAGE

The Project lies within the Tormentine Peninsula of the New Brunswick Lowlands (Rampton, 1984). Based on a review of topographical information (New Brunswick Department of Natural Resources, 2015), the project area has a northwest to northeast aspect with a slope of the area is 0 to 2%.

The forest soil unit located within the study area is the Barrieu-Bouctouche Unit. Barrieu-Bouctouche soils are derived from non-calcareous red mudstones (Mark C. Colipitts, 1995). These glacial till soils are derived from a red, fine textured parent material, are typically poorly drained and acidic. The parent rocks are not metamorphosed, lack calcium, and the derived soil materials are moderately fertile. Because of the relatively fast weathering rates, the red mudstone parent rock is generally not found within the soil profile and the topography is gently rolling. The soils in the project area are described as dominantly well drained with significant rapidly or moderately well drained areas (New Brunswick Department of Natural Resources,



2015). According to the geonb ecosite GIS layer, the soil in the Project footprint (ecosite 6-6-7-2) is considered to be moist, very acidic tills on mid-to-lower slopes.

#### 4.1.2 SURFICIAL AND BEDROCK GEOLOGY

The surficial geology of the Project area typically consists of blankets and plains of sand, silt, minor clay and gravel with the occasional, patchy organic sediment veneer. These soils are generally 1 to 10 m thick (Rampton, 1984).

Bedrock in the project area is associated with the Maritime Plains of New Brunswick and includes Pennsylvanian and Triassic red to grey sandstone, conglomerate, siltstone, shale and minor mafic volcanic flows (Sherif H. Fahmy, 2010). Bedrock geological mapping indicates bedrock beneath and surrounding the Project area includes late Carboniferous aged rock in the Pictou Group. The bedrock geology is composed of The Pictou Group which comprises the Salisbury, Richibucto, and Tormentine formations in the Moncton Sub basin of southeastern New Brunswick; and the Minto, Hurley Creek, and Sunbury Creek formations on the New Brunswick Platform. Lithologically equivalent rocks in the Cumberland Subbasin of Nova Scotia include the Malagash, Balfron, Tatamagouche, and Cape John formations. The Pictou Group consists of coarse- to fine-grained, dark red, reddish brown and grey, commonly micaceous sandstones, red siltstones and mudstones, and minor grey argillaceous shales. Limestone pebble conglomerate and grey and minor red mud-chip conglomerates are distinctive constituents, as are rare lacustrine limestone beds. Coals beds tend to be thin. Silica-cemented paleosols are common near the base of the group on the New Brunswick Platform and parts of the Moncton Sub basin. The strata represent primarily fluvial depositions (New Brunswick Department of Environment, 2008).

## 4.2 ATMOSPHERIC ENVIRONMENT

The existing conditions atmospheric environment conditions for the Project is characterized through a brief overview of New Brunswick and the site's climate and greenhouse gas (GHG) emissions, air quality and ambient noise.

### 4.2.1 CLIMATE AND GREENHOUSE GAS EMISSIONS

#### 4.2.1.1 CLIMATE

Most of the climate in New Brunswick is considered to be continental as a result of westerly air flows passing over the interior of the continent, as opposed to a Maritime Climate that is impacted by flows over a temperature-moderating ocean. The Project is situated in the southwestern portion of the Province in the Eastern Lowlands Ecoregion. This region lies at the intersection of two rain shadow areas, with moisture from the westerly winds intercepted by the Highlands Ecoregion, and the southwesterly storms of the Bay of Fundy intercepted by the higher elevations of the Fundy Coast and Central Uplands areas. Consequently the area is generally drier with warmer inland summer temperatures that remain warm since the prevailing winds minimize cool oceanic air coming onshore. In the winter, the waters of the Northumberland Strait warm the adjacent land areas (Zelazny, 2007).

In New Brunswick, there are forty-seven (47) climate stations. The climate norms at each climate station are calculated from data between 1981 and 2010. The closest station to the Project is at Moncton Airport, which is a Canadian Climate Station that meets the United Nations' World Meteorological Organization (WMO) standard. That climate station is located at an elevation of 70.70 m at latitude 46°06'N and longitude 64°40'W (Government of Canada, 2016).

Temperatures in the region range widely from an extreme maximum of 37.2°C (recorded in August, 1944) to a minimum of -32.2°C (recorded in January, 1957). The mean average annual temperature is 5.4°C and

July is the warmest month with a mean daily temperature of 18.8°C. January is the coldest month, with a mean daily temperature of -8.9°C (Government of Canada, 2016).

The average annual precipitation in the area is 876 mm, with October being the wettest month with an average precipitation of 112.1 mm. January is typically the snowiest month, with an average monthly snowfall of 78 cm. Extreme precipitation events occur, and in April 1962 a total of 131.8 mm of rain was recorded. In February 1992, 83.0 cm of snowfall was recorded in one day (Government of Canada, 2016).

Winds generally blow in from the west and west-northwest (meteoblue, 2017) with an average wind speed of 16.8 km/hr. On average, there are 23.6 days per year with wind speeds greater than 52 km/h. In March 1963 a wind gust of 161 km/h was recorded. The windiest months, on average, are in March and January (Government of Canada, 2016).

#### 4.2.1.2 GREENHOUSE GAS EMISSIONS

GHGs includes carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O), and can be emitted from a variety of natural and anthropogenic sources. GHGs emitted from natural sources generally exhibit little variation from one year to the next, and are considered to be nominal when compared to those resulting from the combustion of fossil fuels.

Total GHG emissions are normally reported as CO<sub>2</sub>-equivalents (CO<sub>2</sub>e). This is accomplished by multiplying the emission rate of each compound by the global warming potential relative to CO<sub>2</sub>. CO<sub>2</sub>e considers the global warming potential of the three main GHGs: CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O. The global warming potential of these gases are as follows: CO<sub>2</sub> = 1.0, CH<sub>4</sub> = 21 and N<sub>2</sub>O = 310. Therefore, the CO<sub>2</sub> equivalency factor (CO<sub>2</sub>e) is equal to ((CO<sub>2</sub> mass x 1.0) + (CH<sub>4</sub> mass x 21) + (N<sub>2</sub>O mass x 310)).

Emissions vary significantly by province, owing to factors such as population, energy sources and economic base. In 2015, New Brunswick released its "Guidelines for Greenhouse Gas Management for Industrial Emitters in New Brunswick". New Brunswick's goal is to reduce greenhouse gas (GHG) emissions to 10% below 1990 levels by 2020 and 75% to 85% below 2001 levels by 2050. In 1990, New Brunswick's GHG emissions were 16.4 megatonnes of CO<sub>2</sub>e. In 2014, New Brunswick's GHG emissions were 14.9 megatonnes of CO<sub>2</sub>e (Environment and Climate Change Canada, 2016). The majority (65%) of New Brunswick's GHG emissions are from stationary fuel combustion of which, electricity generation was the main source. The remainder of the emission sources are derived from transport (21%), industrial processes (8%), waste (3%), agriculture (2%) and fugitive sources (1%) (Environment Canada, 2015).

In the Town of Shediac GHG air emission sources can be expected to be generated from vehicles and fugitive sources from commercial and residential buildings.

#### 4.2.2 AIR QUALITY

The Air Quality Regulation in New Brunswick's *Clean Air Act*, details the maximum permissible ground level concentrations of several parameters for air quality in New Brunswick. The Air Quality Regulation states that a stationary "source" that releases air contaminants to the environment must obtain approvals to release those air contaminants.

The Project is situated near the coast within the limits of the Town of Shediac. There are no major industrial facilities in the Town of Shediac and area. However, the area near the Site is relatively densely populated and there are several commercial businesses directly adjacent to the Project location. Air emissions would principally be generated from commercial, residential and transportation related activities, such as home heating systems, fueling stations, restaurants and motor vehicles.

The ambient air quality is monitored by the New Brunswick Department of Environment and Local Government at established monitoring stations throughout the province as shown in Figure 4 in Appendix A. The closest air quality monitoring station to the Project Area is located in Moncton, approximately 25 km northwest of the Project Area. The air quality monitoring station in Moncton measures Ozone, Carbon Monoxide, Hydrogen Sulphide, Nitrogen Dioxide, Sulphur Dioxide, and Particulate Matter as part of the ambient air monitoring network (New Brunswick Department of Environment and Local Government, 2017). Air quality in the Town of Shediac would be of a better quality than those observed in the City of Moncton.

The Air Quality Health Index (AQHI) is provided by Environment and Climate Change Canada (Government of Canada, 2016a). This tool is an indexed scale to help Canadians understand how air quality affects health. The AQHI scale is separated into four categories; Low Risk (1-3); Moderate Risk (4-6); High Risk (7-10); and Very High Risk (above 10), as shown in Table 4-1. The tool is meant to allow Canadians to determine levels of ambient air pollution levels to assist with outdoor activity planning.

**Table 4-1 Quality Health Index Categories (Government of Canada, 2016a)**

HEALTH RISK	AIR QUALITY HEALTH INDEX	GENERAL POPULATION
Low	1-3	Ideal air quality for outdoor activities
Moderate	4-6	No need to modify usual outdoor activities unless you experience symptoms such as throat irritation and coughing
High	7-10	Consider reducing or rescheduling strenuous activities outdoors if you experience symptoms of throat irritation or coughing
Very High	Above 10	Reduce or reschedule strenuous activities, especially if you experience symptoms of throat irritation or coughing.

Average monthly AQHI for Moncton are summarized in Table 4-2 for the period November 2015 to November 2016 (Government of Canada, 2016). The yearly average AQHI of 1.73 corresponds to a 'Low Risk' AQHI rating, which indicates ideal air quality for outdoor activities.

**Table 4-2 Moncton AQHI monthly averages (November 2015 to November 2016)**

MONTH	MAXIMUM	MEAN	MINIMUM
Nov-15	2.7	1.5	1.0
Dec-15	2.7	1.6	1.0
Jan-16	4.0	2.0	1.1
Feb-16	3.7	2.0	1.1
Mar-16	3.6	2.0	1.1
Apr-16	2.6	2.0	1.3
May-16	2.9	1.6	1.0
Jun-16	3.1	1.4	1.0
Jul-16	3.1	1.4	1.0
Aug-16	4.4	1.3	1.0
Sep-16	2.5	1.2	1.0
Oct-16	2.4	1.3	1.0
Nov-16	2.9	1.4	1.0
<b>Yearly Average</b>	<b>3.38</b>	<b>1.73</b>	<b>1.15</b>
Reference: (Government of Canada, 2016)			

### 4.2.3 AMBIENT NOISE

Sound is what we hear, while noise is unwanted sound. The difference between the two is dependent on the listener and the circumstance. Outdoor ambient noise is produced and influenced by a variety of natural and anthropogenic factors. The noise can be continuous, variable, intermittent or impulsive. The loudness and type of noise heard can lead to annoyance, stress and interference with speech communication. Some research suggests that the adverse effects described above may also cause sufficient stress on the body to increase the risk of developing stress-related illnesses (Health Canada, 2014).

While no site specific baseline noise survey was conducted for the subject Site, baseline noise levels are expected to be typical of an urban environment due to its proximity to residential areas, commerce's and high-volume roadways. There are sensitive receptors adjacent to the Project site and include residences, daycares, hotels, restaurants, hospital, nursing homes and schools.

Neither the Province of New Brunswick or Health Canada have specific guidelines or enforceable noise thresholds or standards for environmental noise as it relates to public exposure. Health Canada does however recommend noise mitigation where long term ambient noise levels are above 75 decibels (dB) (Health Canada, 2010). Further information about noise can be found at the Canadian Center for Occupational Health and Safety (Government of Canada, 2015).

## 4.3 AQUATIC ENVIRONMENT

The existing conditions aquatic environment conditions for the Project is characterized through a brief overview of New Brunswick and Site water resources profiles. The discussion includes surface and groundwater resources for drinking water and other residential, agricultural, commercial or industrial purposes. Freshwater fish and fish habitat as it relates to the subject Site is addressed in section 4.4.3.

### 4.3.1 GROUNDWATER RESOURCES

The primary source of potable water in the Town of Shediac is provided by the municipality. Seven wells supply high quality potable water that is treated at the Water Treatment Plant, located on Breaux Bridge Street. The municipality is responsible for the operation and the maintenance of the water system and the Town is committed to providing its citizens with safe, clean drinking water that far exceeds the Canadian Drinking Water Guidelines (Town of Shediac, 2017).

The Project is not located within a Wellfield Protected Area or a Watershed Protection Area. A portion of the Project is located within the boundaries of Pointe-du-Chêne, where residents use private groundwater wells as their primary source of potable water.

Under the Potable Water Regulation of the *Clean Water Act*, the Province of New Brunswick maintains a database of domestic water wells drilled since 1994. A query of the New Brunswick Online Well Log System (New Brunswick Department of Environment and Local Government, 2016), identified at least 275 water wells within a 1 km radius of the project. Water well depths range from approximately 15 m to more than 100 m with a median well depth of 25.9 m. All of the wells in the area are constructed into bedrock, and are designed to withdraw water exclusively from the bedrock formation. Well driller estimates indicate that the median well yield is approximately 75 L/min, although yields vary quite widely between a low of 22.7 L/min to a high of 819 L/min.

The groundwater quality based on the NB OWLS query depicts the groundwater to be moderately hard (median hardness of 102 mg/L) and alkaline (median pH 8.1). A comparison of the water quality in the area to the Guidelines for Canadian Drinking Water Quality (GCDWQ; (Health Canada, 2015) shows that several wells exceed the GCDWQ for aluminum, chloride, fluoride, iron, manganese, selenium and sodium.

Exceedances of iron and manganese are common throughout New Brunswick, and elevated concentrations of chloride, fluoride and sodium are also common in the region (New Brunswick Department of Environment, 2008). Groundwater quality typical for the general area of the project is shown in Table 4-3.

**Table 4-3 Groundwater Quality in the Shediac Area**

PARAMETER	CONCENTRATION(S)*	CANADIAN DRINKING WATER QUALITY GUIDELINES**
Alkalinity	< 200 mg/L	-
Aluminum	< 0.1 mg/L – 1.0 mg/L	< 0.1 mg/L <sup>3</sup>
Antimony	≤ 0.006 mg/L	0.006 mg/L <sup>1</sup>
Arsenic	< 0.010 mg/L	0.010 mg/L <sup>1</sup>
Barium	< 1.0 mg/L	1.0 mg/L <sup>1</sup>
Boron	< 0.2 mg/L	5 mg/L <sup>1</sup>
Bromide	< 0.2 – 20 mg/L	-
Cadmium	≤ 0.005 mg/L	0.005 mg/L <sup>1</sup>
Calcium	< 50 – 200 mg/L	-
Chloride	< 250 – 1000 mg/L	< 250 mg/L <sup>2</sup>
Chromium	≤ 0.05 mg/L	0.05 mg/L <sup>1</sup>
Conductivity	< 1000 – 10000 µSIE/cm	-
Copper	< 0.1 – 1.0 mg/L	< 1.0 mg/L <sup>2</sup>
Fluoride	< 1.5 – >10 mg/L	1.5 mg/L <sup>1</sup>
Hardness	< 200 – 500 mg/L	-
Iron	< 0.3 – > 3.0 mg/L	< 0.3 mg/L <sup>2</sup>
Lead	< 0.010 mg/L	0.010 mg/L <sup>1</sup>
Magnesium	< 15 mg/L	-
Manganese	< 0.05 – 5.0 mg/L	< 0.05 mg/L <sup>2</sup>
Nitrate	< 1.0 – 10 mg/L	45 mg/L <sup>1</sup>
pH	< 6.5 – > 8.5	6.5 – 8.5 <sup>3</sup>
Potassium	< 2 – 20 mg/L	-
Selenium	< 0.01 – 0.1 mg/L	0.05 mg/L <sup>1</sup>
Sodium	< 200 – > 500 mg/L	< 200 mg/L <sup>2</sup>
Sulphate	< 100 mg/L	< 500 mg/L <sup>2</sup>
Thallium	< 0.001 - ≥ 0.001 mg/L	-
Uranium	< 0.02 mg/L	0.02 mg/L <sup>1</sup>
Zinc	< 0.05 – 5.0 mg/L	< 5.0 mg/L <sup>2</sup>

\* Reference: (New Brunswick Department of Environment and Local Government, 2016)

\*\* Reference: (Health Canada, 2015)

<sup>1</sup> Health based and listed as maximum acceptable concentrations (MAC)

<sup>2</sup> Based on aesthetic considerations and listed as aesthetic objectives (AO)

<sup>3</sup> Other Value

### 4.3.2 SURFACE WATER RESOURCES

The Project is located within the Shediac Bay watershed. This watershed covers 419.1 km<sup>2</sup> of land area with approximately 36 km of coastline. The Town of Shediac represents 2.5% of the total surface area of the watershed (C. Leblanc, 2009). The subject property is situated adjacent to Shediac Bay. The warm waters of Shediac Bay are due to its shallow bathymetry and weak tidal pattern. During the summer, water temperatures can climb to above 20°C (C. Leblanc, 2009). These warm waters are what attract thousands of tourists every year.

Two small water features were identified using the provinces online mapping (Service New Brunswick, 2016). Site visits conducted on July 25<sup>th</sup>, 2014 and September 1<sup>st</sup>, 2014, concluded that there are a small network of drainage ditches built in the past to support the removal of surface water runoff from Main Street, with drainage flow through the Site generally from south to north (Appendix B). Evidence to suggest this includes incised rectangular trenches with stockpiles of material (now grown over) off-casted to the side. During the site visits, the drainage ditches were observed to be either dry or marginally damp with no evidence of scouring. These drainage ditches were determined not to have a sufficient quantity of flowing water to be a significant surface water resource for fisheries habitat or human use purposes.

Concerns regarding Shediac Bay water quality are a regular media/social media topic, which has prompted considerable study over recent years. In 2015 and 2016, the Shediac Bay Watershed Association (SBWA) collected water samples to determine the presence of coliform, fecal coliform and *Escherichia coliform* (E. Coli) bacteria at several locations throughout the bay. The difference between fecal coliform and E. Coli is that E. Coli is specific to the bacterial strain, whereas, fecal coliform may include one or more bacterial strains. E. Coli is a type of fecal coliform bacteria commonly found in the intestines of animals and humans.

Coliform concentrations are typically identified using the “most probably number” (MPN) of coliform/fecal coliform bacteria per unit sample volume. MPN is determined using classical serial dilution testing methods to identify the concentration of a target microbe in a sample. Only viable organisms are enumerated by the MPN determination, which relies on the bacteria being separate and not clustered and distributed randomly within the sample. The essence of the MPN method is to dilute the sample to such a degree that inocula in the tubes will sometimes but not always contain viable organisms. In order to obtain estimates over a broad range of possible concentrations, microbiologists use serial dilutions to incubate tubes (or plates) at several dilution levels. Each tube (or plate, etc.) whose inoculum contains even one viable organism will produce detectable growth or change. The “outcome”, i.e., the number of tubes and the number of tubes with growth at each dilution implies an estimate of the original, undiluted concentration of bacteria in the sample (Blodgett, 2010)

One of the locations monitored by the SWWA was at the mouth of the small inlet/wetland near the walking trail bridge adjacent to Point-du-Chêne Road (617257E, 51209579N) where that inlet joins Shediac Bay immediately to the north/northeast of the subject Site. Highly variable results from the 2015 and 2016 monitoring showed fecal coliform bacteria counts ranging from 11 MPN/100mL to 350 MPN/100mL. The Health Canada guideline threshold for E. Coli for recreational marine water quality is 35 E. Coli/100mL. The guideline to control shellfish edibility/closures is 200 E. coli/100mL or 200 fecal coliforms/100mL (Weldon, 2016).

The SBWA also completed DNA testing to determine that the source of the E. Coli was from a fairly broad cross section of animals including human, ruminants, pig, horse, dog and gull (Weldon, 2016). There are no definitive conclusions regarding the source of coliforms in the marine environment of Shediac Bay. Some have suggested that leaking septic systems, municipal sewer overflows, direct flushing of boater toilets, pet waste, soil erosion, land application of manure, etc., combined with increased water discharges during significant weather events may contribute to these occurrences.

## 4.4 BIOLOGICAL ENVIRONMENT

The existing biological environment for the Project is characterized by an overview of the various regional and site habitat types. Wildlife species identified found during the 2014 field survey of the site is also reviewed. Habitat types include terrestrial, wetland and aquatic environments. Figure 5 in Appendix A illustrates the different habitat types identified with the Study Area using forest inventory mapping provided by the province.

The vegetation and wildlife described herein includes both common and species of conservation concern. Species of conservation of conservation concern are those listed as “Endangered”, “Threatened” and “Special Concern” under the federal *Species at Risk Act* (SARA) and provincial *Species at Risk Act* (NBSARA). Listed species may also include those identified by Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and species ranked by Atlantic Canada Conservation Data Centre (ACCDC) under its ranking system. ACCDC listed species includes those identified as S1 - Extremely Rare, S2- Rare and S3 - Uncommon. Species identified as species of conservation concern under the NBSARA system are those designated as “At risk”, “May be at risk” or “Sensitive” by the Canadian Endangered Species Conservation Council (CESCC).

### 4.4.1 TERRESTRIAL HABITAT

The Project is located in the Kouchibouguac Ecodistrict of the Eastern Lowlands Ecoregion. This area encompasses the eastern coastline from Miramichi Bay to Cape Tormentine. Terrestrial habitat types in this region include forests, farmlands, cliffs, dunes and beaches (C. Leblanc, 2009). Approximately 75% of the Kouchibouguac Ecodistrict is classified as forest while the majority of the remaining non-forested habitat area is dominated by agriculture (10.5%) (Zelazny, 2007). Due to the long history of human settlement in this ecodistrict, the forests present in this ecodistrict are dominated by early successional hardwood forests of trembling aspen, red maple and white birch (Zelazny, 2007). Later successional forests are considered to be dominated by coniferous or mixed stands, and are part of the Acadian forest region (C. Leblanc, 2009). Black spruce (*Picea mariana*) stands are common where poorly drained soils dominate the landscape (Zelazny, 2007).

WSP requested a data report from ACCDC for all rare and uncommon species recorded within proximity of the site. The ACCDC report provides an indication of potential rare and legally protected flora and fauna that may be anticipated within 5 km and 100 km of the Project Footprint. For the purposes of this EIA, WSP used the list of rare and legally protected flora and fauna within 5 km of the Project to guide the field survey. The data report returned records of eleven vascular flora, which are summarized in Table C.1 in Appendix C. Due to soil and vegetation characteristics of the PDA, only Canada serviceberry (*Amelanchier canadensis*) and bastard’s toadflax (*Comandra umbellata*) are likely to occur. Many of the other species identified in the ACCDC base list are likely to occur within the wetland area located to the north of the PDA and outside of the scope of this project due to the project being set back from the buffer.

On September 1, 2014, Theo Popma, M.Sc. conducted a vegetation survey of the site. The two main habitat types identified were old pasture and hardwood dominated mixed wood forest. The old pasture consisted of common grass species with narrow-leaved meadow sweet (*Spiraea alba*) and apple trees (*Malus pumila*) growing along the edge of the pasture and forest. The mixed wood forest habitat was observed to be dominated by red maple and trembling aspen, with minor amounts of white spruce and balsam fir. A total of 169 vascular plants were recorded at the Site, none of which were identified as a species of conservation concern.

The habitat type observed within the PDA is consistent with an early successional forest due to the long history of human settlement in this region. This is corroborated by a review of historical aerial imagery:

- 1944, Photo 194407326025 – land is occupied almost entirely by farm fields with clumps of bush evident in random locations.
- 1963, Photo 196306320239 – land is occupied by farm fields and small groupings of forested/shrubby areas.
- 1976 – Photo 197600510137 the sewage line and drainage ditches are evident, less farm fields and more forested/shrubby areas are apparent as natural encroachment occurs onto previously grazed lands.

#### 4.4.2 WETLAND HABITAT

Approximately 10% of the Kouchibouguac ecodistrict is dominated by wetland habitat (Zelazny, 2007). The two main types of wetland habitat described as occurring in the Shediac bay are bogs and salt marshes. The Shediac Bay watershed includes dozen of bog dominated landscapes, representing over 1,400 hectares of the inland surface area. Along the coastline salt marshes are the dominant wetland feature that tend to occur near the mouths of rivers, and in natural bays and inlets. Coastal wetlands within the study region show signs of degradation, and are threatened by ATV traffic and/or infilling for land development purposes (C. Leblanc, 2009).

To the north of the PDA, a large provincially mapped vegetated tidal coastal saltmarsh is identified on online provincial mapping (Service New Brunswick, 2016). Locally, this approximately 29 hectare wetland is called the Pointe-du-Chêne marsh. The SBWA has included this marsh in several of their biological and water quality studies.

A bird survey was conducted in the Pointe-du-Chêne marsh during the summer of 2016 by the SBWA. During this survey, habitat forms were completed at each of the sample points (three in total) located within the wetland. The Pointe-du-Chêne marsh is composed of interspersed vegetated and open water areas, and is influenced by the presence of dunes and residential homes. The vegetated portion of the wetland is dominated by herbaceous emergent vegetation (approximately 70%) with minor amounts of shrubby vegetation (30%). The herbaceous emergent vegetation is comprised mainly of halophytic vegetation such as salt-meadow cordgrass (*Spartina patens*), salt-water cord grass (*Spartina alterniflora*), and fresh-water cord grass (*Spartina pectinata*). The shrubby vegetation is dominated meadowsweet (*Spirea alba*), wild rose (*Rosa sp.*), bayberry (*Myrica gale*), alder (*Alnus incana*) and serviceberry (*Amelanchier sp.*). In the open water areas, the dominant floating plant is widgeon grass (*Ruppia maritima*). No floral species at risk were identified during the survey (Remi Donelle, 2016).

The mapped boundary of the Point-du-Chêne marsh falls 30 m outside of the PDA.

#### 4.4.3 AQUATIC HABITAT

The main aquatic habitats found within the Shediac Bay watershed are watercourses and mudflat areas. The most significant freshwater waterbodies are the Shediac River and Scoudouc River. These rivers discharge directly into Shediac Bay, creating two major estuarine habitats. There are also several other smaller streams along the coastline that drain directly into the bay (C. Leblanc, 2009).

As discussed in Section 4.3.2, two small water features were identified using the provinces online mapping (Service New Brunswick, 2016). Site visits conducted on July 25<sup>th</sup>, 2014 and September 1<sup>st</sup>, 2014, observed these features to be void of open water and the watercourse substrate soils were also dry or marginally damp. No fish were observed and no fish habitat data was recorded. Photographs of the dry channels and culvert crossings at the sewer trunk line are present in the Photographic Log, Appendix B. WSP was unable to observe a direct connection between these features and the coastal wetland. The lack of connection to the coastal wetland during the site survey is likely due to sandy soils of the site. Sandy



soils tend to allow percolation of surface water into the subsurface. Sandy soils also tend to dry more quickly during dry weather, causing substrate soils to be dry or damp.

Based on our observations, it is likely that these features are drainage ditches previously constructed to support the removal of surface water runoff from the site. Some of which likely came off of local streets, such as Main Street, before subsurface sewer drains were common in the area. These features were observed to be incised rectangular trenches with adjacent off-casted soil stockpiles evident on either side of the channel. These observations support the assertion that the drainage channels are anthropogenic in origin (i.e., manmade). The shallow and seasonal nature of these drainage channels restrict fish passage making them unlikely candidates to support fish or other aquatic species.

Shediac Bay is considered to be a 'shallow bay' with fine sand and mud with extensive eel grass. Sand and mudflat areas typical of Shediac Bay and its inlets are identified along the shore line near the Pointe-du-Chêne marsh (C. Leblanc, 2009).

#### 4.4.4 WILDLIFE

Fifty seven (57) native species of mammals (Dilworth, 1984), over three hundred and fifty (350) resident and migratory bird species (Squires, 1976), and approximately twenty five (25) species of reptiles and amphibians (herptiles) (Gorham, 1970) are known to inhabit New Brunswick. A variety of these species frequent the Shediac Bay watershed, including several species of mammals, birds, herptiles and invertebrates (C. Leblanc, 2009).

##### 4.4.4.1 MAMMALS

The forests of New Brunswick provides habitat for moose (*Alces alces*), black bear (*Ursus americanus*), red fox (*Vulpes vulpes*), porcupine (*Erthizon dorsatum*), striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*) and beaver (*Castor canadensis*) (C. Leblanc, 2009). The habitat located in the Project footprint, old pasture and hardwood dominated mixedwood forest provides suitable habitat for many common mammal species especially smaller mammal species such as rabbit, red squirrel, meadow voles and shrew species.

No species of conservation concern were identified with the ACCDC species list or during WSP's onsite surveys.

##### 4.4.4.2 AVIFAUNA

The coastal shores of the Shediac Bay watershed, which consist of tidal mudflats and salt marshes, provide a plethora of excellent breeding and foraging habitat for various coastal shorebirds and waterfowl. The forest and open areas in the region also provide upland bird species habitat. In addition to these natural features, the Bay also includes some man-made enhancements, such as the SBWA Common Tern nesting platform located to the north of the subject property. This nesting platform location was selected due to its proximity to the original Common Tern nesting area. The platform provides protection from high water and wave action, and was placed by the SBWA by permission of the Parish. During the summer of 2015, over 100 terns were observed using the platform. In addition, a total of 41 nests and 100 eggs were surveyed on the platform. It is believed that this project will allow the preservation of a tern colony in the Shediac Bay whose nesting habitat was recently destroyed (Donelle, Novembre 2015).

The tidal mudflats located near Pointe-du-Chene and Parlee Beach are known to provide important foraging habitat for species of plovers, sandpipers and dowitchers (C. Leblanc, 2009). In addition, salt marshes are considered to be an integral part of coastal ecosystems and provide critical nesting, foraging and shelter habitat for bird species of waterfowl, Willets (*Catoptrophorus semipalmatus*) and Nelson's Sharp-tailed Sparrow (*Ammodramus nelsoni*) (C. Leblanc, 2009). The 2016 bird survey conducted at the Pointe-du-

Chene marsh by SBWA identified the presence of Willets as well as Nelson's Sharp-tailed Sparrow using the wetland area. Other birds observed include the Belted Kingfisher (*Megaceryle alcyon*) and the American Black Duck (*Anas rubripes*), along with many common song birds.

The AC CDC data report returned records of 57 bird species which have been summarized in Table C.1 in Appendix C. Of these, species that frequent forested habitats and open fields are the most likely to be found at the site. These include: Canada Warbler, Eastern Wood-Pewee, Purple Martin, Northern Mockingbird, Great Crested Flycatcher, Red Crossbill, Turkey Vulture, Killdeer, Brown-headed Cowbird, Baltimore Oriole, and Eastern Kingbird. The majority of the other species identified could be found in the coastal wetland and/or mudflat areas found along the northern shore of the property. It should be noted that the Bald Eagle and the Peregrine Falcon, species identified by the province as "location sensitive", are known to occur within 5 km of the study site. It is unlikely that these species will find critical breeding and foraging habitat at the proposed site location.

A breeding bird survey and fall migratory bird survey was conducted on July 25<sup>th</sup> and September 1<sup>st</sup>, 2014 respectively. The bird surveys included ten (10) minute point counts from eight (8) locations conducted within 4 hours of sunrise. Area searches were conducted to opportunistically locate migratory birds while investigators were walking between bird point count locations, and during aquatic and plant surveys.

A total of 35 species of migratory birds were recorded (Appendix B) during the field surveys. No rare or uncommon migratory birds were observed, and none are listed on the New Brunswick Endangered Species List. The bird community was a mix of common species typically observed in mixed wood forests located nearby urban development.

#### 4.4.4.3 HERPTILES

The ACCDC data did not identify any potential herptile species of conservation concern within a 5 km radius of the subject property. However, several common varieties of reptiles and amphibians, such as the maritime garter snake, wood frog and American toad, may frequent the Site. Salamander species could potentially also be present in the damper areas, such as the drainage ditches and other low lying areas located throughout the subject property. During the 2014 site survey period, no herptile species were observed on the Site.

#### 4.4.4.4 INVERTEBRATES

Numerous species of invertebrates can be expected to occur within and around the subject property. In addition, the shallow bay adjacent to the site is known to provide habitat for multiple marine species including invertebrates such as shell fish and crustaceans (C. Leblanc, 2009).

The ACCDC data report returned records of three (3) invertebrates, as summarized in Table C.1 in Appendix C, all of which are butterflies. It is unlikely that any of the species identified in the ACCDC list would occur within the Project footprint. While Monarch butterflies utilize habitats such as meadows, wild fields, and watercourses during their breeding season, they tend to gravitate to areas where milkweed is present. However, no milkweed plants were observed during the field surveys, suggesting that the area is not prime Monarch territory. The other two invertebrate species; the Short-tailed Swallowtail and the Salt Marsh Copper, typically prefer coastal areas. While these species likely frequent the adjacent coastal wetland to the north of the property, it is unlikely that they would be found in the upland areas, such as the proposed site location. No invertebrate species of conservation concern were observed during the site surveys conducted in 2014.

#### 4.4.5 ENVIRONMENTALLY SENSITIVE AREAS OR PROTECTED AREAS

The Parlee Beach Provincial Park is located immediately east of the Project Area. Established in 1957, the park and beach received its name in 1959 in honour of T. Babbitt Parlee, the former Minister of Municipal Affairs under Premier Hugh John Flemming, who died in an airplane crash in 1957. The park extends south from the beach approximately 1 km to Main Street and has a campground located on its eastern boundary. The approximately 6,400 m<sup>2</sup> property is owned by the Government of New Brunswick and operated by the Department of Tourism and Parks (Wikipedia, 2016).

The Parlee Beach Provincial Park amenities include:

- 190 site campground;
- a restaurant;
- a canteen;
- showers;
- a day-use picnic area;
- change houses;
- washrooms;
- parking lots with a capacity for over 1,000 vehicles; and
- a playground.

The ACCDC Report returned the results of one Significant Natural Area within the Project Area. The Significantly Natural Area includes Shediac Island which is located approximately 2.9 km northwest of the Project across the Shediac Bay. This island has supported two Great Blue Heron colonies since at least 1974. The northern colony comprised 38 nests in 1981, while the larger the southern colony numbered 105 nests in 1984 (Tims, J. & Craig, N., 1995). The proposed project is unlikely to impact the Shediac Island natural area or its Great Blue Heron nesting population.

### 4.5 SOCIO-ECONOMIC SETTING

#### 4.5.1 LOCAL ECONOMY

According to the 2016 census the 7,184 people living in the Town of Shediac gave it a population density of 628.4 persons per square kilometre. This population density exceeds the provincial population density of 10.5 persons per square kilometer (Statistics Canada, 2016).

In 2016 Statistics Canada reported the median annual gross income for Shediac, NB to be approximately \$31,000 compared to the provincial average of approximately \$33,000. The current employment rate in Shediac is approximately 10.7% compared to that of New Brunswick of approximately 9.3% (Statistics Canada, 2017). The main sources of income include sales and service occupations; business, finance and administration occupations; and trades, transport and equipment operators and related occupations. The major industries for Shediac, NB include 'other services'; business services; manufacturing; retail trade; and health care and social services (Statistics Canada, 2007).

Within the past few years the Town of Shediac has experienced one of the strongest growths among all of the province of New Brunswick's municipalities. According to the 2016 Statistics Canada, the Town of Shediac increased its population by 10.1% since 2011, which is the second largest growth rate for New

Brunswick municipalities with more than 5,000 inhabitants. Large scale businesses such as Sobeys Shoppers Drug Mart, Canadian Tire and Kent Building Supplies have chosen Shediac to do business. There are currently over 135 businesses and offices in the Shediac Business Improvement Area, of which approximately fifteen are new companies that have settled in the downtown area of Shediac within the last year (Town of Shediac, n.d.).

In order for the Town of Shediac to support a high quality life for its residents, workforce and visitors the Town of Shediac has developed an Economic Development Vision. This vision includes:

1. Economic Growth and Innovation;
2. Effective Partnerships;
3. Regional Responsibility;
4. Infrastructure Investment and Renewal;
5. Encouraging and Promoting the Private Sector;
6. Informed and Involved People;
7. Safe and Accessible Neighbourhoods;
8. Cultural Diversity and Inclusiveness;
9. Economic, Environment and Social Responsibility; and
10. Fiscal Accountability and Sustainability (Town of Shediac, n.d.).

#### 4.5.2 EXISTING LAND USE

A 2014 Land Use map of Shediac identifies six (6) different land uses that include residential; mini home parks; commercial; parks; institutional services; and rural areas. The majority of the land use appears to be residential, commercial and rural areas. The lands proposed for the Shediac Camping Site is currently identified as commercial (Town of Shediac, 2014).

The Town of Shediac and approximately 14 km of coastline is serviced by a municipal wastewater collection and treatment system that is managed by the GSSC. The system accommodates 5,192 units which includes single-family and multi-family dwellings, commercial and industrial infrastructures and seasonal residences. The waste is processed at Cap-Brule consists of two-cell aerated lagoons and polishing pond. It is also equipped with a system of effluent disinfection by ultraviolet light during the months of May to October. From June 1 to October, the final effluent is chlorinated and discharged into Lac des Boudreau via a small stream. There are eighteen lift stations located throughout the Town of Shediac, Pointe-du-Chêne and the Cap Brule area (C. Leblanc, 2009).

A 2015 zoning map of Shediac includes thirteen (13) different zones including residential; medium density residential; high density residential; mini home; integrated development; central commercial; general commercial; commercial and manufacturing; institutional services; campground; parks; rural zone and intensive resource development. The proposed Shediac Campground is located in the campground zone (Town of Shediac, 2015).

#### 4.5.3 ROAD TRANSPORTATION

An exp Transportation Plan report (2013/14) states that the existing traffic conditions present traffic flow and congestion challenges. Heavy Main Street traffic during summer season and difficulty turning onto Main Street from side streets and driveways are sited as issues. Furthermore, they state that the lack of an alternative east-west route through the town puts substantial pressure and causes Main Street congestion

(exp., 2013). The exp Transportation Plan provided an Assessment of Major Upgrades, where they suggested the following actions to improve traffic flow within the Town:

- Breaux Bridges Street Extension
- Chesely Street extension to Breaux Bridges Street
- Develop a 3<sup>rd</sup> access route to Route 15

These improvements would improve traffic flow within the Town and would also have a positive impact on traffic flow relative to the proposed Shediac Camping development.

The Town of Shediac has also developed an Active Transportation Plan in 2013 and 2014. The Active Transportation Plan focuses on developing the active transportation network using on-road facilities and multi-use path facilities. The concept can be seen in as shown in Figure 6, Appendix A (Town of Shediac, n.d.). Improved pedestrian traffic management should increase pedestrian transportation usage, which would improve overall traffic congestion and also have positive effect on traffic issues as they relate to the proposed development by encouraging local and tourist population to choose active transportation options, thus reducing the number of cars on Town streets.

#### 4.5.4 FIRST NATIONS / ABORIGINAL COMMUNITIES

According to the 2006 Statistics Canada, there was a population of 45 identifying Aboriginal people living in Shediac, NB. There are four First Nation communities located within the general area of the Project. These communities include Elsipogtog, approximately 54 km away; Indian Island, approximately 56 km away; Buctouche, approximately 40 km away; and Fort Folly, approximately 40 km away (Government of New Brunswick, 2017). According to the 2006 Statistics Canada data, there was a population of 45 people living in Shediac, NB that self-identified as being Aboriginal.

#### 4.5.5 HERITAGE AND ARCHAEOLOGICAL RESOURCES

WSP contracted Archaeological Prospectors to complete an Archaeological Assessment for the Project (Archaeological Prospectors, 2014). The full report can be seen in Appendix D. The following is a brief summary of the report.

Archaeological Prospectors completed a background research on the PDA which included aerial photographs; research of documents found at Archaeological Services in Fredericton; published materials such as topographic and surficial geology maps and reports; and the New Brunswick Register of Historic Places. On November 1<sup>st</sup> and 2<sup>nd</sup>, 2014, an archaeological pedestrian survey took place at the proposed Shediac Camping development.

The aerial photographs (1944) indicated the majority of the PDA was once used for agricultural purposes. The archaeological pedestrian survey encountered a few sub-century garbage dumps and an abandoned concrete foundation that was also identified in the desktop survey in the 1982 aerial photograph as shown in Figure 7, Appendix A. There were no culturally significant or exposed features/artifacts identified.

Based on the results of the archaeological assessment, it is recommended that the development lands proposed for the Shediac Camping be released for development. If any change to the proposed footprint is anticipated, consultation with a permitted archaeologist should occur to ensure minimal damage to possible buried heritage.

# 5 ENVIRONMENTAL IMPACTS AND ASSOCIATED MITIGATION

## 5.1 ENVIRONMENTAL EFFECTS ASSESSMENT

As discussed in Section 2.2.2 Approach to Bounding, the temporal bounds for this Project is categorized into two phases: construction and operation. The spatial bounds for most of the identified VECs will include only the immediate environs of the Project Footprint and access routes. Other VECs will be bounded by the Project footprint as well as areas potentially affected by down-gradient movement of groundwater, surface water and air. For socio-economic components of the environment, bounding extends to communities that have a stake in the potential effects resulting from the proposed Project.

The assessment conducted follows the six-step process:

- describing the Project activities;
- identifying and describing the environmental component(s) that will be affected;
- describing the impact of any interaction between the environment and the Project;
- describing the mitigation measures;
- identifying any residual environmental effects after mitigation measures are applied; and
- determining the importance of effects after mitigation measures have been applied.

This process is followed in order to ensure that interactions between the Project components and the environment are adequately described, that the likely environmental effects are identified and properly assessed, and that the importance of any residual effect is determined.

## 5.2 MITIGATION

Where an adverse environmental effect was identified, mitigation is proposed. Where possible, mitigation measures are incorporated into the Project design and implemented in order to eliminate or reduce potential adverse effects. Mitigation at the receptor end is considered if avoidance and mitigation at the source of the effect was deemed not feasible or not sufficiently effective. In those instances where an adverse effect is unavoidable and cannot be mitigated to insignificant levels, options for remediation and/or compensation are investigated. For interactions where positive effects are anticipated, opportunities were determined for maximizing the positive effects.

## 5.3 RESIDUAL EFFECTS AND DETERMINATION OF SIGNIFICANCE

As discussed in Section 2.2.3, the significance of the residual environmental effects is determined after a consideration of the magnitude, geographic extent, duration/frequency, reversibility and ecological context. For magnitude a relative rating was established as:

- High: An environmental effect affecting a whole stock, population, habitat or ecosystem, outside the range of natural variation, such that communities do not return to pre-Project levels for multiple generations.

- Medium: An environmental effect affecting a portion of a population or habitat, or ecosystem, returns to pre- Project levels in one generation or less, rapid and unpredictable change, temporarily outside range of natural variability.
- Low: An environmental effect affecting a localized effect on specific group, habitat, or ecosystem, returns to pre-Project levels in one generation or less, within natural variation.
- Nil: No environmental effect.
- Unknown: An environmental effect affecting an unknown portion of a population or group or where the changes in a specific parameter are unknown.

The evaluation applied absolute values for the geographic extent, frequency, and duration. Geographic extent is broken into the following categories:

- <1 km<sup>2</sup>
- 1 – 10 km<sup>2</sup>
- 11 – 100 km<sup>2</sup>
- 101 – 1,000 km<sup>2</sup>
- 1,001 – 10,000 km<sup>2</sup>
- > 10,000 km<sup>2</sup>

Frequency is broken into the following categories:

- <11 events/year
- 11 – 50 events/year
- 50 – 100 events/year
- 101 – 200 events/year
- > 200 events/year
- continuous

Duration is broken into the following categories:

- <1 month
- 1 – 12 months
- 13 – 36 months
- 37 – 72 months
- > 72 months

Reversibility was considered as the ability of a VEC to return to an equal or improved condition once the interaction with the Project has ended. The judgment about the reversibility was based on previous experience and research and stated as “reversible” or “irreversible.”

For adverse residual effects, the evaluation for the individual criteria was combined into an overall rating of significance:

- Major: Potential impact could jeopardize the long term sustainability of the resource, such that the impact is considered sufficient in magnitude, aerial extent, duration, and frequency, as well as being considered irreversible. Additional research, monitoring, and/or recovery initiatives should be considered.
- Medium: Potential impact could result in a decline of a resource in terms of quality/quantity, such that the impact is considered moderate in its combination of magnitude, aerial extent, duration, and frequency, but does not affect the long term sustainability (that is, it is considered reversible). Additional research, monitoring, and/or recovery initiatives may be considered.
- Minor: Potential impact may result in a localized or short-term decline in a resource during the life of the Project. Typically, no additional research, monitoring, and/or recovery initiatives are considered.
- Minimal: Potential impact may result in a small, localized decline in a resource during the construction phase of the Project, and should be negligible to the overall baseline status of the resource.

An adverse impact was considered “significant” where its residual effects were classified as major; while they were considered “not significant” where residual effects were classified as medium, minor, or minimal.

Subsequently, those effects considered significant (i.e., “major”) would undergo an additional consideration of the likelihood of their occurrence and the level of confidence underlying the effects prediction.

## 5.4 SUMMARY OF ENVIRONMENTAL IMPACTS AND ASSOCIATED MITIGATIONS

A matrix presented in Table 5.1 identifies and describes potential project impacts, pathways, and the rationale for the inclusion/exclusion of each environmental component of concern identified for the construction and operation phases of the proposed project.

As a result of this analysis, the following VECs were selected:

- Topography and Drainage
- Air Quality
- Ambient Noise
- Groundwater Resources
- Wildlife, Migratory Birds and Species at Risk
- Local Economy
- Road Transportation Network
- Heritage and Archaeological Resources

These VECs and pathways were further analyzed against potential interactions with Project activities to determine potential environmental impacts. Table 5-2 identifies and describes potential project sources, impacts, applicable legislation, recommended mitigation measures as well as an evaluation of the residual environmental effect and predicted level of residual impact.

The results of the analysis indicate that with the application of the mitigation measures there should be no significant residual impact.



Table 5-1 Issues Scoping/Pathway Analysis Summary Matrix – Valued Environmental Components (VECs): Shediac Camp

Environmental Resources	Environmental Components of Concern	Pathway of Concern		Possible Pathway	VEC		Project Works		Rationale for Inclusion/Exclusion as VEC
		Yes	No		Yes	No	Construction	Operation	
Terrestrial Environment	Topography and Drainage	X		<ul style="list-style-type: none"> <li>Clearing and grubbing</li> <li>Excavation activities</li> </ul>	X		X		Included as VEC – Potential impacts to land topography and drainage.
	Surficial and Bedrock Geology		X	No possible pathway identified.		X			Excluded as a VEC – No pathway of concern identified.
Atmospheric Environment	Climate		X	No possible pathway identified.		X			Excluded as a VEC – No pathway of concern identified.
	Air Quality	X		<ul style="list-style-type: none"> <li>Overburden disturbance</li> <li>Stockpiles</li> <li>Equipment operation</li> <li>Accidental release of hazardous materials</li> </ul>	X		X		Included as VEC – Potential impacts to surrounding nearby residents as well as wildlife.
	Ambient Noise	X		<ul style="list-style-type: none"> <li>Equipment operation</li> </ul>	X		X		Included as VEC – Potential impacts to surrounding nearby residents as well as wildlife.
Aquatic Environment	Groundwater Resources	X		<ul style="list-style-type: none"> <li>Accidental release of hazardous materials</li> </ul>	X		X	X	Included as a VEC – Protected by statute/regulation.
	Surface Water Resources		X	No possible pathway identified.		X			Excluded as a VEC – Drainage features were identified within Project footprint, however are shallow and ephemeral. Determined to not be fish bearing or fish habitat. Mitigation measures described for topography and drainage would be applicable.
	Wetland Habitat	X		<ul style="list-style-type: none"> <li>Accidental release of hazardous materials</li> </ul>		X			Excluded as a VEC – Project footprint outside 30 metre buffer boundary of Pointe-du-Chêne wetland. Mitigation measures described for topography and drainage would be applicable to ensure its protection.
Biological Environment	Wildlife and Wildlife Habitat	X		<ul style="list-style-type: none"> <li>Clearing and grubbing</li> <li>Excavation activities</li> <li>Presence of people</li> <li>Accidental release of hazardous materials</li> </ul>	X		X	X	Included as a VEC – Protected by statute/regulation.
	Migratory Birds	X		<ul style="list-style-type: none"> <li>Clearing and grubbing</li> <li>Excavation activities</li> <li>Presence of people</li> <li>Accidental release of hazardous materials</li> </ul>	X		X	X	Included as a VEC – Protected by statute/regulation.
	Species at Risk	X		<ul style="list-style-type: none"> <li>Clearing and grubbing</li> <li>Excavation activities</li> <li>Presence of people</li> <li>Accidental release of hazardous materials</li> </ul>	X		X	X	Included as a VEC – Protected by statute/regulation.
Socio-Economic Setting	Local Economy	X		<ul style="list-style-type: none"> <li>Expenditures and Employment</li> </ul>	X		X	X	Included as a VEC – Potential benefits to local, regional and provincial economy.
	Existing Land Use		X	No possible pathway identified.		X			Excluded as a VEC – No pathway of concern identified.
	Road Transportation	X		<ul style="list-style-type: none"> <li>Construction traffic</li> <li>Operation generated traffic</li> </ul>	X		X	X	Included as a VEC – Potential impact to traffic in the Town of Shediac.
	Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons		X	No possible pathway identified.		X			Excluded as a VEC – Given that the Project is located entirely on private land, the Project is not expected to substantially affect current Aboriginal use of land and resources.
	Heritage and Archaeological Resources	X		<ul style="list-style-type: none"> <li>Excavation activities</li> </ul>	X		X		Included as a VEC – Although no heritage and archaeological resources were discovered during a desktop and field survey, there is always a potential for discovery during construction.

Table 5-2 Summary of Potential Environmental Effects: Shediac Camp

Valued Environmental Component	Possible Sources	Potential Impact	Applicable Legislation	Mitigation	Residual Environmental Effects	Level of Residual Impact
Topography and Drainage	<ul style="list-style-type: none"> <li>Improper landscaping</li> <li>Exposed soils</li> <li>Stockpiles</li> <li>Stormwater</li> <li>Accidental release of hazardous materials</li> </ul>	<ul style="list-style-type: none"> <li>Water pooling</li> <li>Degradation of adjacent wetland and Shediac Bay from sediment-laden runoff</li> </ul>	<ul style="list-style-type: none"> <li><i>Fisheries Act</i></li> <li><i>Species at Risk Act</i></li> <li><i>Canadian Environmental Protection Act</i></li> <li><i>Transportation of Dangerous Goods Act</i></li> <li><i>NB Clean Water Act</i></li> <li><i>NB Clean Environment Act</i></li> <li>NB Regulation 82-126 (Water Quality Regulation) of the <i>NB Clean Environment Act</i></li> <li>Regulation 95-66 (General Regulation) of the <i>NB Topsoil Preservation Act</i> (R.S.N.B. 2011, c.230)</li> </ul>	<p><b>Site wide:</b></p> <ul style="list-style-type: none"> <li>Prior to construction a Grading Plan, Storm Drainage Plan, and an Erosion and Sedimentation Control Plan will be developed and approved.</li> <li>Ensure all necessary permits and approvals are obtained and on-site;</li> <li>Comply with all applicable permits and approvals;</li> <li>Limit the work area to only that required for the Project footprint;</li> <li>Preserve existing vegetation to the extent possible;</li> <li>Implement Erosion and Sedimentation Control Plan;</li> <li>Erosion and sedimentation control measures including silt fence, straw bale check dams and diversion channels will be installed in accordance with standard designs detailed in the New Brunswick Watercourse Alteration Technical Guidelines;</li> <li>Any required erosion and sedimentation control measures shall be installed prior to work commencing at the site;</li> <li>Erosion and sedimentation control measures shall be inspected and maintained during construction;</li> <li>Remove silt and other accumulated debris from site drainage ditches in order to keep them free-flowing at all times. Dispose of removed sediment as per the Erosion and Sedimentation Control Plan detailed drawings;</li> <li>Additional sediment control and erosion control materials must be on-site and readily available in the event of a sudden and significant rainfall event or the forecast of such event;</li> <li>Weather forecasts shall be monitored several times per day, on a daily basis, during the construction period where exposed soils have not been fully stabilized, for warnings of heavy rainfall events or intense storm systems approaching;</li> <li>Reduce or halt construction activities during heavy precipitation events. Heavy precipitation events are those considered hindering access and clearing activities, causing significant rutting of the ground and those which may cause a threat of local flooding;</li> <li>A visual inspection of the worksite shall be conducted, during and after each significant rainfall event, for signs of erosion, and implement appropriate mitigation measures if required;</li> <li>Do not remove erosion and sedimentation control measures until the reinstatement has been well established, and there is unlikely to be further erosion;</li> <li>Materials including stumps, brush, concrete waste, packaging and material unsuitable for fill, grading or landscaping will be transported offsite to an approved facility; and</li> <li>Contaminated soils shall be placed in a containment cell and disposed of according to regulatory requirements.</li> </ul> <p><b>Exposed Soils:</b></p> <ul style="list-style-type: none"> <li>Schedule grading and construction to minimize the time of soil exposure;</li> <li>Minimize grading;</li> <li>Control grading so that the surface of the ground will be properly graded to prevent water from running into excavated areas;</li> <li>Minimize the length and steepness of slopes;</li> <li>Locate sources of clean gravel, cobble, and riprap, prior to construction and place them onsite for stabilization and restoration purposes; and</li> </ul>	No residual effects expected	Minimal

Valued Environmental Component	Possible Sources	Potential Impact	Applicable Legislation	Mitigation	Residual Environmental Effects	Level of Residual Impact
				<ul style="list-style-type: none"> <li>Install temporary berms on approach slopes to the watercourse immediately following clearing and grading.</li> </ul> <p><b>Stockpiles:</b></p> <ul style="list-style-type: none"> <li>Site stockpiles clear of watercourses, wetlands and flood prone area;</li> <li>Limit stockpile height (&lt;2 m) and slope;</li> <li>Cover stockpiles; and</li> <li>Install temporary silt fences (geotextiles or straw bales) with no gaps around stockpiles and at base of slopes leading to watercourses and wetlands to prevent sediment transport with run-off.</li> </ul> <p><b>Stormwater:</b></p> <ul style="list-style-type: none"> <li>Sediment control fencing to be installed around the perimeter of work site;</li> <li>Employ straw bales to filter sediment laden water;</li> <li>Divert runoff away from denuded areas;</li> <li>Prepare drainage channels and outlets to handle concentrated or increased runoff;</li> <li>Drainage channels to be directed away from Pointe-du-Chêne wetland;</li> <li>During backfilling, keep the trenches free of water and controlled to prevent surface water running into excavated areas;</li> <li>Use temporary diversion berms as required to regulate drainage from construction areas to prevent erosion and sedimentation;</li> <li>Ensure that ditches do not drain directly into a watercourse and/or wetland without proper sediment control devices (traps, straw bales, take-off ditches into vegetation, etc.);</li> <li>Use sediment traps to settle sediment from flowing water;</li> <li>Accumulated sediment will be removed once it reaches a depth of one-half the effective height of the control measure or a depth of 300 millimetres (mm) immediately upstream of the control measure;</li> <li>The sediment removed will be deposited in an approved area and will not result in erosion and runoff into a watercourse and/or wetland;</li> <li>Vegetate and mulch denuded areas;</li> <li>Revegetation of disturbed areas to be accomplished using a variety of non-invasive plant species native to the area as soon as the season permits; and</li> <li>Construction equipment to be cleaned and inspected for invasive species prior to transport from elsewhere to ensure that no matter is attached to the machinery (e.g., use of pressure water hose to clean vehicles prior to transport).</li> </ul> <p><b>Accidental Spills:</b></p> <ul style="list-style-type: none"> <li>Develop a Fuel and/or Hazardous Materials Spills Contingency Plan</li> <li>Store, handle, and transport all dangerous goods according to the NB Clean Environment Act and the Transportation of Dangerous Goods Act (TDG);</li> <li>Appropriately sized spill kits must be available on-site for clean-up efforts;</li> <li>All work-site activities are to be conducted in a manner that minimizes the potential for spills or leaks, including the regular inspection and maintenance of machinery and equipment, and providing spill containment structures for onsite fuel and oil storage;</li> <li>No fueling and servicing of equipment within 30 m of any watercourse or wetland; and</li> <li>In case of a spill, follow Fuel and/or Hazardous Materials Spills Contingency Plan.</li> </ul>		

Valued Environmental Component	Possible Sources	Potential Impact	Applicable Legislation	Mitigation	Residual Environmental Effects	Level of Residual Impact
Air Quality	<ul style="list-style-type: none"> <li>Overburden disturbance</li> <li>Stockpiles</li> <li>Construction equipment</li> <li>Vehicles</li> <li>Accidental release of hazardous materials</li> </ul>	<ul style="list-style-type: none"> <li>Fugitive dust</li> <li>Equipment/ vehicle emissions</li> </ul>	<ul style="list-style-type: none"> <li><i>Canadian Environmental Protection Act</i></li> <li><i>Transportation of Dangerous Goods Act</i></li> <li><i>NB Clean Environment Act</i></li> <li><i>NB Clean Air Act</i>, NB Air Quality Regulation (97-133),</li> <li><i>NB Forest Fires Act</i>.</li> </ul>	<p><b>Site wide:</b></p> <ul style="list-style-type: none"> <li>Ensure all necessary permits and approvals are obtained and on-site;</li> <li>Comply with all applicable permits and approvals;</li> <li>Conduct periodic inspections of all work areas particularly during dry and windy conditions;</li> <li>Locate dust-generating activities away from sensitive receptors;</li> <li>Stabilize clear and disturbed areas;</li> <li>Prohibit any form of burning on-site;</li> <li>Ensure appropriate fire-fighting equipment and supplies are available on-site during potential fire work (welding, flame cutting, spark generating);</li> <li>Control dust with the use of water;</li> <li>Should dust prove to be a concern on the project site, a water truck shall be employed to apply water to all work areas as required;</li> <li>Minimal amounts of water should be applied to control dust to minimize sediment runoff; and</li> <li>Waste oil or other petroleum products are not to be used for dust control under any circumstances</li> </ul> <p><b>Stockpiles:</b></p> <ul style="list-style-type: none"> <li>Materials including stumps, brush, concrete waste, packaging and material unsuitable for fill, grading or landscaping will be transported offsite to an approved facility;</li> <li>Surplus uncontaminated excavated soils shall be stockpiled on-site in an designated area for use as backfill;</li> <li>Contaminated soils shall be placed in a containment cell and disposed of according to regulatory requirements;</li> <li>Stockpiles are to be sited where it is protected from wind;</li> <li>Limit stockpile height (&lt; 2m) and slope; and</li> <li>Cover piles of soil to prevent particulate release.</li> </ul> <p><b>Equipment:</b></p> <ul style="list-style-type: none"> <li>Maintain equipment to limit particulate exhaust releases;</li> <li>Enforce speed limits for vehicles, and limit vehicle movement; and</li> <li>Equipment idling is to be minimized.</li> </ul> <p><b>Traffic:</b></p> <ul style="list-style-type: none"> <li>Haul truck loads will be covered and secured with tarps;</li> <li>Minimized drop heights for loading and unloading operations;</li> <li>Use paved roads to the extent possible;</li> <li>Enforce speed limits for vehicles, and limit vehicle movement;</li> <li>Operate and maintain vehicles within the manufacturer's specifications, including regular servicing of vehicles;</li> <li>Vehicle idling is to be minimized; and</li> <li>Warning notices and appropriate flagging as required will be placed on-site during construction.</li> </ul> <p><b>Accidental spills:</b></p> <ul style="list-style-type: none"> <li>Store, handle, and transport all dangerous goods according to the NB Clean Environment Act and the Transportation of Dangerous Goods Act (TDG);</li> <li>Appropriately sized spill kits must be available on-site for clean-up efforts;</li> <li>All work-site activities are to be conducted in a manner that minimizes the potential for spills or leaks, including the regular inspection and maintenance of machinery and equipment, and providing spill containment structures for onsite fuel and oil storage; and</li> </ul>	No residual effects expected	Minimal

Valued Environmental Component	Possible Sources	Potential Impact	Applicable Legislation	Mitigation	Residual Environmental Effects	Level of Residual Impact
				<ul style="list-style-type: none"> <li>In case of a spill, follow Fuel and/or Hazardous Materials Spills Contingency Plan.</li> </ul>		
Ambient Noise	<ul style="list-style-type: none"> <li>Equipment operation</li> </ul>	<ul style="list-style-type: none"> <li>Disturbance to local businesses and residences</li> <li>Disturbance to local wildlife</li> </ul>	<ul style="list-style-type: none"> <li><i>Migratory Birds Convention Act</i></li> <li><i>NB Clean Environment Act</i></li> </ul>	<p><b>Site wide:</b></p> <ul style="list-style-type: none"> <li>Ensure all necessary permits and approvals are obtained and on-site;</li> <li>Comply with all applicable permits and approvals;</li> <li>Minimize heavy truck traffic and associated noise where possible;</li> <li>All equipment to be designed for low noise emissions where feasible, such as rubber tired machinery, hydraulic or electric-controlled machines rather than diesel/gasoline engines and pneumatic units;</li> <li>Enclosures, piping insulation and silencers are to be used;</li> <li>Inspect mufflers and machine enclosures to make sure doors close properly against seals;</li> <li>Ensure that all equipment has appropriate noise-muffling equipment installed and are in good working order;</li> <li>A temporary noise barrier may need to be erected during construction activities;</li> <li>Dropping materials from a height is to be avoided;</li> <li>Reduce noise levels from piling hammers by placing resilient dollies in between pile and hammer, where practical. The hammer would be shrouded to minimize noise;</li> <li>Plan to conduct work activities that are likely to result in an increase in noise emissions during daytime hours (7am-7pm) wherever possible; and</li> <li>The local community should be notified of potential noise-generating work in advance. Information such as the duration of the work, time of day, work activities which are anticipated to be noisy and what measures are being put in place to alleviate noise concerns should be discussed.</li> </ul>		
Groundwater Resources	<ul style="list-style-type: none"> <li>Construction wastewater (concrete wash water, etc)</li> <li>Stormwater</li> <li>Accidental release of hazardous materials</li> </ul>	<ul style="list-style-type: none"> <li>Degradation of local groundwater resources below and down gradient of the Project footprint.</li> </ul>	<ul style="list-style-type: none"> <li><i>Canadian Environmental Protection Act</i></li> <li><i>Transportation of Dangerous Goods Act</i></li> <li><i>NB Clean Water Act</i></li> <li><i>NB Clean Environment Act</i></li> <li>NB Regulation 82-126 (Water Quality Regulation) of the <i>NB Clean Environment Act</i></li> </ul>	<p><b>Site wide:</b></p> <ul style="list-style-type: none"> <li>Ensure all necessary permits and approvals are obtained and on-site;</li> <li>Comply with all applicable permits and approvals;</li> <li>Limit the work area to only that required for the Project footprint;</li> <li>Ensure strict on-site control of controlled/hazardous products; and</li> <li>Conduct routine inspections to ensure accidental spill risks are minimized.</li> </ul> <p><b>Construction wastewater:</b></p> <ul style="list-style-type: none"> <li>Use off-site ready mixed batch plants for concrete when possible;</li> <li>Collect and retain all construction wastewater and solids in leak proof containers; and</li> <li>Recycle collected construction wastewater and solids.</li> </ul> <p><b>Stormwater:</b></p> <ul style="list-style-type: none"> <li>Employ straw bales to filter sediment laden water;</li> <li>Use sediment traps to settle sediment from flowing water;</li> <li>Divert runoff away from denuded areas;</li> <li>Prepare drainage channels and outlets to handle concentrated or increased runoff;</li> <li>Use temporary diversion berms as required to regulate drainage from construction areas to prevent erosion and sedimentation;</li> <li>Ensure that ditches do not drain directly into a watercourse and/or wetland without proper sediment control devices (traps, straw bales, take-off ditches into vegetation, etc.); and</li> <li>Vegetate and mulch denuded areas.</li> </ul>	No residual effects expected	Minimal

Valued Environmental Component	Possible Sources	Potential Impact	Applicable Legislation	Mitigation	Residual Environmental Effects	Level of Residual Impact
				<p><b>Accidental spills:</b></p> <ul style="list-style-type: none"> <li>Develop a Fuel and/or Hazardous Materials Spills Contingency Plan</li> <li>Store, handle, and transport all dangerous goods according to the NB Clean Environment Act and the Transportation of Dangerous Goods Act (TDG);</li> <li>All work-site activities are to be conducted in a manner that minimizes the potential for spills or leaks, including the regular inspection and maintenance of machinery and equipment, and providing spill containment structures for onsite fuel and oil storage;</li> <li>No fueling and servicing of equipment within 30 m of any watercourse or wetland; and</li> <li>In case of a spill, follow Fuel and/or Hazardous Materials Spills Contingency Plan.</li> </ul>		
Wildlife, Migratory Birds, and Species at Risk	<ul style="list-style-type: none"> <li>Clearing and grubbing activities</li> <li>Excavation activities</li> <li>Presence of people</li> <li>Accidental release of hazardous materials</li> </ul>	<ul style="list-style-type: none"> <li>Alteration/ displacement of habitat</li> <li>Physical disturbance of wildlife</li> <li>Behavioural changes</li> <li>Mortality</li> </ul>	<ul style="list-style-type: none"> <li><i>Migratory Birds Convention Act</i></li> <li><i>Species at Risk Act</i></li> <li><i>Transportation of Dangerous Goods Act</i></li> <li><i>NB Species at Risk Act</i></li> <li><i>NB Fish and Wildlife Act</i></li> </ul>	<p><b>Site wide:</b></p> <ul style="list-style-type: none"> <li>Ensure all necessary permits and approvals are obtained and on-site;</li> <li>Comply with all applicable permits and approvals;</li> <li>Abide by all relevant timing constraints for wildlife as identified by regulatory agencies;</li> <li>Schedule construction to occur during periods of lowest sensitivity to wildlife, birds and species at risk where practical;</li> <li>Dust-prevention measures and dust abatement measures shall be implemented;</li> <li>Enforce speed limits for vehicles, and limit vehicle movement;</li> <li>Equipment and vehicles will yield the right-of-way to wildlife;</li> <li>No on-site employees will harass wildlife;</li> <li>Adhere to <i>Migratory Bird Convention Act</i> stipulations</li> <li>Report the discovery of any ground nests</li> </ul> <p><b>Accidental spills:</b></p> <ul style="list-style-type: none"> <li>Develop a Fuel and/or Hazardous Materials Spills Contingency Plan</li> <li>Store, handle, and transport all dangerous goods according to the NB Clean Environment Act and the Transportation of Dangerous Goods Act (TDG);</li> <li>All work-site activities are to be conducted in a manner that minimizes the potential for spills or leaks, including the regular inspection and maintenance of machinery and equipment, and providing spill containment structures for onsite fuel and oil storage;</li> <li>No fueling and servicing of equipment within 30 m of any watercourse or wetland; and</li> <li>In case of a spill, follow Fuel and/or Hazardous Materials Spills Contingency Plan.</li> </ul>	No residual effects expected	Minimal
Local Economy	<ul style="list-style-type: none"> <li>Expenditures and Employment</li> </ul>	<ul style="list-style-type: none"> <li>Potential job opportunities during construction, operation and maintenance of the Project.</li> <li>Potential increased business opportunities for businesses located in close proximity to proposed Project (e.g gas stations) during operation</li> <li>Potential decreased business for other camp ground facilities in and</li> </ul>	<ul style="list-style-type: none"> <li>Town of Shediac General Policy 12-09 – Incentive Program as Regards Commercial Development</li> </ul>	<p><b>General:</b></p> <ul style="list-style-type: none"> <li>Inform local and regional business communities and labour organizations of the opportunities arising from the construction, operation and maintenance of the Project.</li> </ul>	No significant effects expected	Minimal

Valued Environmental Component	Possible Sources	Potential Impact	Applicable Legislation	Mitigation	Residual Environmental Effects	Level of Residual Impact
		around the Town of Shediac during operation				
Road Transportation	<ul style="list-style-type: none"> <li>Construction traffic</li> <li>Operation generated traffic</li> </ul>	<ul style="list-style-type: none"> <li>Congested traffic causing delays</li> </ul>	<ul style="list-style-type: none"> <li>Motor Vehicle Act</li> <li>Highway Act</li> <li>Town of Shediac By-Law No. 14-49 (Municipal Emergency Planning)</li> <li>Town of Shediac By-Law No. 15-28 (Traffic, parking, and use of streets and sidewalks)</li> </ul>	<p><b>Site wide:</b></p> <ul style="list-style-type: none"> <li>Develop a traffic management program for during construction and operation;</li> <li>Ensure Project activities follow applicable local and provincial traffic regulations;</li> <li>Traffic to and from site shall use the approved route;</li> <li>Construction Manager is to ensure that 'No Access' signage are installed for their construction traffic at designated areas;</li> <li>Construction Manager is to provide a detailed schedule, detailing the volume, timing and density of construction traffic;</li> <li>Construction Manager is to provide the historic traffic density for activities of deliveries to date;</li> <li>Road cones may have to be placed at designated areas and warning signs posted in the roadway in the vicinity of the Project site and on the Project site itself to ensure safety;</li> <li>Heavy goods vehicles shall not arrive or leave the site except between agreed hours. Any heavy goods vehicles movements' out-with the agreed hours shall be notified to the Construction Manager for prior approval; and</li> <li>During construction the approved traffic route is to be kept free of mud and debris resulting from the development. A wheel wash system will be provided on the internal access road to remove debris from delivery vehicles before they leave site. Any such deposits found on the local roads is to be removed regularly using road brushes and vacuum road sweepers.</li> </ul>	No significant effects expected	Minimal
Heritage and Archaeological Resources	<ul style="list-style-type: none"> <li>Excavation activities</li> </ul>	<ul style="list-style-type: none"> <li>Disturbance to heritage and archaeological resource that compromises the integrity of the resource</li> </ul>	<ul style="list-style-type: none"> <li>Canadian Environmental Assessment Act (2012)</li> <li>NB Heritage Conservation Act</li> <li>Historic Sites Protection Act</li> </ul>	<p><b>Site wide:</b></p> <ul style="list-style-type: none"> <li>Develop a Discovery of Unusual Features Contingency Plan;</li> <li>Ensure all necessary permits and approvals are obtained and on-site;</li> <li>Comply with all applicable permits and approvals; and</li> <li>Implement the Discovery of Unusual Features Contingency Plan upon the discovery of any unusual features at the site (including illegal activity, suspected human remains, etc.).</li> </ul>	No residual effects expected	Minimal

## 6 EFFECTS OF THE ENVIRONMENT ON THE PROJECT

Several environmental factors could have adverse effects on the Project. The two main concerns identified for this Project are extreme weather events and sea level rise both of which can be due to global climate change. The Intergovernmental Panel on Climate Change (IPCC) is an international organization of the world's leading climate scientists, and is affiliated with the United Nations. According to the IPCC, the average global temperature is expected to rise by 1.1 – 6.4 °C over the next century with a sea level rise of 0.18 to 0.59 m (Intergovernmental Panel on Climate Change, 2007).

In Canada, our temperature is rising more quickly than the global average resulting in the widespread melting of arctic sea ice, changing precipitation patterns, as well as changes in frequency and intensity of extreme events. Over the period of 1948 to 2009, a warming trend of +1.4 °C was identified. The increases are predicted to differ depending on the region, with the highest increases expected in the northern regions and south-central Prairies (Fritzsche, 2015).

The increase in average temperatures is projected to be accompanied by an increase in severe weather events, as well as rise in sea levels. Severe weather events include flood, drought and storms, and the rise in sea levels will increase the number and severity (height) of storm surges, the wave energy and erosion (D.S. Lemmen, 2008).

These effects have been considered during the Project design phase. A significant effect on the environment on the Project would be one that results in:

- a long term delay in Project schedule during construction;
- a long term interruption in service during operation;
- damage to camping infrastructure such that human health and safety is at risk; or
- damage to camping infrastructure that would not be technically or economically feasible to repair.

Minor effects of the environment on the Project would be ones that result in a short term delay in construction schedule, frequent short-term disruptions in service, and increased operating or maintenance costs.

### 6.1 EXTREME WEATHER

As discussed in Section 4.2.1.1 - Climate, New Brunswick receives a variety of inclement weather types. In general, New Brunswick can experience anywhere between 10 to 20 days of severe weather events with the more severe events occur during the winter months. These winter storm events pack strong winds with rain, freezing rain, snow as well as a mixture of the aforementioned precipitation types (Environment Canada, 1990).

In the last decade, New Brunswick appears to be experiencing more and more extreme weather events. Future trends predict total precipitation increasing; mostly in the form of rain. This combined, will result in more frequent flooding of low-lying areas, increased soil erosion and water contamination, increased risks of forest fire, as well as increased risk for new pests and invasive species to become established (New Brunswick Department of Environment and Local Government, 2014).



Heavy rain can result in stoppages of outdoor work, particularly during construction. If unusual wet periods or excessive rain do occur, this can result in Project delays and an associated delay in completion and additional cost. Heavy rainfall events may also cause work-site erosion during the construction phase. A potential exists for failure of erosion and sediment control structures due to such precipitation events. Such a failure could result in the release of a large quantity of sediment-laden runoff to receiving Bay with potential adverse environmental effects on fish and fish habitat. Local flooding may occur at work sites during extreme precipitation events.

Severe snowfall can affect winter construction or contribute to unusual flooding during snowmelt. It has the potential to increase structural loadings on facility and temporary buildings. Exceptional early snowfall could delay construction and result in additional work for snow clearing and removal. This could increase construction costs. Early snow cover can minimize or prevent ground freezing and this may also affect winter construction intended at improving work progress and accessibility. Freezing rain, hail, ice and snow can interfere with the operation of vehicles on the highway, as it can cause slippery driving conditions and limit visibility.

An environmental management plan will be developed by the contractor to ensure mitigation measures are in place to ensure the protection of the environment and minimize delays. Contingency plans will be included in case of extreme weather events.

## 6.2 SEA LEVEL RISE

A long-term rise in sea level is occurring in Atlantic Canada and is projected to accelerate due to climate change. Coastal areas are the most sensitive to sea level rises. The Atlantic Coastal Zone Information Steering Committee (ACZISC) have an online map which shows the sensitivity of the coastlines of Atlantic Canada. Sensitivity in the context of this map refers to the degree to which a coastline may experience physical change. Examples of physical change include flooding, erosion, beach migration, and coastal dune stabilization. This sensitivity is measured by an index that is obtained by manipulating score of 1 to 5 on seven variables: relief, geology, coastal landform, sea-level tendency, shoreline displacement, tidal range and wave height. The coastline along the shores of Shediac Bay show a High (15 and up) coastal sensitivity to sea level rise (Atlantic Coastal Zone Information Steering Committee, 2016).

New Brunswick's coastline is seeing more and more extreme weather events resulting in significant economic losses. In January 2001, a coastal storm surge along the Northumberland Strait resulted in an increase in sea level of 4.2 metres above normal low tides causing extensive flooding at Pointe-du-Chêne. To date this is the largest storm surge reported in Atlantic Canada (New Brunswick Department of Environment and Local Government, 2016). It is estimated that storm surges in southeastern New Brunswick that currently have a 1% chance of occurring in a given year will be 20 times more common in the future (Daigle, 2014).

Similar to impacts from severe weather events, rising sea levels can result in stoppages of outdoor work, particularly during construction. Extensive flooding can result in Project delays and an associated delay in completion as well as additional cost. There is also the potential of erosion control issues which could result in the release of a large quantity of sediment-laden runoff to the receiving Bay with potential adverse environmental effects on fish and fish habitat.

The concerns regarding sea level rise and increased storm surge events has been integrated into the Project's design. The proposed campground is a staunch proponent for the protection of the Pointe-du-Chêne wetland. Not only is this wetland a vital part of the environment providing habitat for a multitude of species, this wetland also naturally provides a significant barrier to help attenuate flood waters and minimize impacts to the camping property. In addition, to minimize impacts to the wetland and minimize impacts of floodwaters as a result of storm surges on the camp ground, the temporary camping areas are to

be located in the lower portions of the property closest to the Pointe-du-Chêne wetland. The more permanent camping lots are to be located more inland and on higher ground. The Project will also maintain as much vegetation as possible in the form of trees, shrubs in grasses as well as plant additional trees and vegetation as required to further promote water uptake, assist in water flow attenuation and decrease flash flooding.

Other design features that will be incorporated into the Project are the grading and stormwater management plans to control floodwaters. This design will ensure that flood waters are collected and retained until they can be safely discharged. The Project is to be serviced by municipal water and sewer, this will by effect greatly diminish the potential for release of sewage from the campground facilities into the environment including the Bay.

An environmental management plan will be developed by the contractor to ensure mitigation measures are in place to ensure the protection of the environment and minimize delays. Contingency plans will be included in case of extreme weather events.

## 7 CUMULATIVE EFFECTS ASSESSMENT

Concerns are often raised about the long-term changes that may occur not only as a result of a single action but the combined effects of each successive action on the environment. These changes are often classified as a cumulative effect which can be defined as:

- the summation of effects over time which can be attributed to the operation of the Project itself; and
- the overall effects on the ecosystem of the Project Area that can be attributed to the Project and other existing and planned future projects.

This definition is derived from the Cumulative Effects Assessment Practitioners Guide (Hegmann, 1999) developed by the Canadian Environmental Assessment Agency. An assessment of cumulative effects is often recommended for Projects where there is a potential for significant impact of a VEC to occur as a result of the presence of several projects putting pressure on that environmental or socio-economic component. Based on discussions with the proponent and other stakeholders there is concern regarding the potential cumulative effect the addition of this Project may have on the Town of Shediac.

The spatial boundaries for cumulative effects on each VEC are the same as those identified in Section 2.2.2. The temporal boundaries are extended to include past, current, and known planned or reasonably foreseeable projects.

### 7.1 OTHER PROJECTS IN THE AREA

The proposed Project is located in a very active area of Shediac with many local businesses located along Main Street. Directly to the south of the proposed Project footprint there are several restaurants such as Goji's, Dairy Queen Pizza Shack and Bangkok Thai Bistro, gas stations (Esso and Ultramar) as well as hotels (Four Seas Beach and Domaine Parlee Beach). The Shediac Bay Watershed Association is also located along this stretch of Main Street.

#### 7.1.1 EXISTING

With respect to other camping businesses in the area, to the east of the proposed Project there is the Ocean RV Park and Camping as well as the Horizon Trailer Park located off Belliveau Beach Road. To the west, there is the Wishing Star Campground and Camping Parasol located off Main Street.

##### **Ocean Surf RV Park and Camping**

The Ocean Surf RV Park and Camping offers overnight, caravan and seasonal camping. The campground is equipped with new, large full hookup sites equipped with 30 or 50 amps specially designed for the largest RVs. The campground can accommodate up to 50 RVs. The campground offers multiple amenities including:

- A new heated salt water pool;
- Beach in walking distance;
- Showers and washrooms;
- Accredited potable water system;
- Complimentary WIFI;
- Laundromats;

- Playground;
- Small convenience store;
- A beach volleyball court;
- An activity centre – surf hut; and
- A dock for launching kayaks and canoes. (Ocean Surf RV Park, 2006)

#### **Horizon Trailer Park**

The Horizon Trailer Park can accommodate 150 seasonal campers. There is a recreation hall onsite that provides various activities for the tenants (Vacation Village Cottage, n.d.).

#### **Wishing Star Campground**

The Wishing Star Campground is equipped with 130 sites either with service or without service. The campground has many amenities including:

- Emptying station;
- Toilets;
- Showers;
- Utility room;
- Public telephone;
- Playground;
- Ice;
- Internet connection;
- Cable TV included;
- Recreation room; and
- Swimming (Wishing Star Camping, 2017).

#### **Camping Parasol**

The Camping Parasol has been in business since 1997 and offers 90 sites for trailers and campers and 10 sites for tents. The campground offers amenities including:

- 30 x 45 ft camping sites;
- Pull through hookups;
- Water, electric (30 amp), and sewer hookups;
- Washrooms and showers;
- Free cable TV and WIFI;
- Large community tent for events and activities;
- Laundry facilities;
- Children's play area;
- Washer toss boards;
- Ice and firewood for sale;
- Close to bike trails;

- Small boat launch; and
- A dumping station. (Camping Parasol, n.d.)

### 7.1.2 FUTURE

A search of the provinces EIA registry identified one similar project proposed in the same area: Shediac Camping Resort Ltd. This proposed campground is in no way affiliated with this Project. The proposed campground located in Pointe-du-Chêne will span a total area of approximately 9.7 hectares. The proposed campground will be equipped to accommodate 210 fully serviced seasonal lots and 10 rental cottages. The campground will see several buildings (office and comfort stations), a pool and playground area in addition to the associated roads, water and sanitary sewer systems and electrical utility lines. Once the campground is completed, it will operate on a seasonal basis from May 1 to October 14 (J.R. Daigle Engineering Ltd., 2016).

The water supply for the campground will come from one existing well and two proposed additional wells. According to the Southeast Regional Service Commission, the GSSC has confirmed the existing sanitary sewer line has the capacity to accommodate any sewage associated with the campground and its activities (J.R. Daigle Engineering Ltd., 2016).

## 7.2 CUMMULATIVE EFFECTS ASSESSMENT

The cumulative effects assessment will be based on the identified “residual effects on the environment” (i.e. effects after mitigation measures have been put in place) combined with the potential environmental effects of past, present and future projects and activities. Also, a combination of different individual environmental effects of the project acting on the same environmental component can result in cumulative effects. The examination of cumulative effects will focus on projects within an approximate 10 km radius of the Study Area.

### 7.2.1 POTENTIAL CUMULATIVE EFFECTS

The ten (10) VECs presented in Section 5 have been examined alongside other past, present and future projects for potential adverse cumulative effects. Of those VECs identified, two (2) were selected for cumulative effects analysis. Table 7.1 indicates the potential cumulative effects VECs and the rationale for inclusion/exclusion.

**Table 7-1 Potential Cumulative Effects for VECs and Rationale for Inclusion**

VEC	POTENTIAL FOR CUMULATIVE EFFECT	RATIONALE FOR INCLUSION/EXCLUSION	LEVEL OF CUMULATIVE EFFECT
Topography and Drainage	No	Minimal effects as operational topography and drainage will be based on approved grading and storm drainage plans.	Not Applicable (NA)
Air Quality	No	Effect localized and limited to construction phase.	NA
Ambient Noise	No	Effect localized and limited to construction phase.	NA
Groundwater Resources	No	Minimal effect as operational water will be obtained by existing municipal infrastructure.	NA

VEC	POTENTIAL FOR CUMULATIVE EFFECT	RATIONALE FOR INCLUSION/EXCLUSION	LEVEL OF CUMULATIVE EFFECT
Wildlife	No	Effect localized. Property already exists within city limits and no critical or limiting habitat was identified within Project footprint.	NA
Migratory Birds	No	Effect localized. Property already exists within city limits and no critical or limiting habitat was identified within Project footprint.	NA
Species at Risk	No	Effect localized. Property already exists within city limits and no critical or limiting habitat was identified within Project footprint. No species at risk were identified on property.	NA
Local Economy	Yes	Anticipate positive impact to most local businesses. May reduce occupancy rates of other similar enterprises in the area. There may be an increase in the number of tourists visiting the area resulting in higher numbers of individuals visiting Parlee Beach.	Minimal
Road Transportation Network	Yes	Traffic concerns not limited to construction. Potential for ongoing/cumulative congestion issues.	Low
Heritage and Archaeological Resources	No	Effect localized and limited to construction phase	NA

## 7.2.2 LOCAL ECONOMY

The Project is anticipated to provide a positive impact to the local economy through the creation of employment opportunities for local and regional businesses during construction as well as the creation of permanent employment during the operation of the facility. The number of seasonal jobs anticipated to be created is approximately 15 individuals.

In addition to the direct positive economic impacts, during operation indirect positive impacts include increased visitation of local gas stations, restaurants and boutiques in the area. The presence of more businesses has a cumulative effect of creating more opportunities for growth of local businesses and/or the creation of new businesses, which in turns increases employment opportunities in the area.

However, not all economic growth generated by the campground may be seen as positive in the area. There is a potential to reduce occupancy rates at the other existing camp grounds in the area. That being said, the focus of this campground is to tap into a niche market that is interested in 4 star eco-friendly campground accommodations. The hope is to attract new users and limit the removal of existing visitors to the usage of the other campground areas.

The attraction of new users is positive in many ways but may also be of concern to the existing users and residents of some of the attractions in the region. One notable example is Parlee Beach. Residents are concerned with the number of tourists that currently frequent the area and its impact on the environment. There is concern that the construction and operation of more facilities such as this proposed Project will attract more new users which will exacerbate what is already seen as a population problem at the beach. The playground, pool, water features and other recreational opportunities are intended for use by campers as an alternative to the beach. This will be especially attractive to families with small children for safety reasons and to minimize travel time to the beach, etc. Pre-teens and teens will be attracted to the volleyball and basketball courts as well. The campground facilities may be available to the public for a nominal charge and the community will be encouraged to participate in campground activities such as concerts and other shows at the community recreation center.

Other practical mitigation measures that could be applied to alleviate the perceived population problem at Parlee Beach would be controlled by the New Brunswick Department of Tourism, Heritage and Culture. An evaluation is currently underway by the provincial government to address this concern. A News Release dated February 6<sup>th</sup>, 2017 (New Brunswick Department of Health, Department of Tourism, Heritage and Culture, and Department of Environment and Local Government, 2017) specifies that an evaluation is currently underway to:

“improve the current water quality testing and rating system, which dates back to 2001, and to update it in time for the 2017 beach season. As part of these efforts, recommendations for enhanced public communication about water quality results, including posting results online and increasing on-site signage, will be evaluated. In addition, the government is collaborating with academic and private sector experts to identify sources of contamination throughout the watershed. This should provide a clearer picture for government to address and mitigate, the contamination.”

### 7.2.3 LOCAL TRAFFIC

The Town of Shediac is considered to be densely populated as its population density of 628.4 persons per square kilometre exceeds the provincial population density of 10.5 persons per square kilometer (Statistics Canada, 2016). This is even more so during the summer months. The local attractions draw tens of thousands of people every year. There is heavy Main Street traffic during the summer season and it is often difficult to turn onto Main Street from the side streets and driveways. As well there is a lack of an alternative east-west route through town which exacerbates the congestion issues on Main Street (exp., 2013).

In order to minimize backlog issues, the main entrance off of Main Street will have several holding lands for vehicles and RV's to park while getting checked in. There will be a secondary exit/entrance onto the Pointe-du-Chêne Road.

The Town of Shediac is also looking at ways of improving circulation. exp provided the Town of Shediac a Transportation Plan which suggested the following actions to improve traffic flow within the Town:

- Breaux Bridges Street Extension
- Chesely Street extension to Breaux Bridges Street
- Develop a 3<sup>rd</sup> access route to Route 15

These improvements would improve traffic flow within the Town and would also have a positive impact on traffic flow relative to the proposed Shediac Camping development.

The Town of Shediac has also developed an Active Transportation Plan in 2013 and 2014. The Active Transportation Plan focuses on developing the active transportation network using on-road facilities and multi-use path facilities. The concept can be seen in as shown in Figure 6, Appendix A (Town of Shediac, n.d.). Improved pedestrian traffic management should increase pedestrian transportation usage, which

would improve overall traffic congestion and also have positive effect on traffic issues as they relate to the proposed development by encouraging local and tourist population to choose active transportation options, thus reducing the number of cars on Town streets.

Many of the suggested recommendations have already been implemented or anticipated to be completed in the near future prior to the operation of the proposed campground (Town of Shediac, 2017). In addition, as indicated in Section 3.2.1, the Project site access road will include a four lane holding lane area that will be controlled to reflect the variation in inflow and exiting of traffic during peak traffic periods, such as Friday night and Sunday morning. During peak registration periods (intake) there will be at least two inflow lanes open and the holding lanes will allow guests to park inside of the facility boundaries while registering without interfering with traffic on Main Street. During peak exit times (check out) there will be one inflow lane and two exit lanes to facilitate traffic flow onto Main Street, the holding lanes will provide wait space for exiting campers while other guests sign out of the campground during peak hours. The customer queue/holding lanes, as indicated in Figure 2, Appendix A, are each approximately 120 to 140 m long, providing a minimum of 360 m of waiting space. Based on an average vehicle/trailer train length of 12 m, this will provide queuing space for approximately 30 to 40 units.



## 8 PUBLIC INVOLVEMENT

### 8.1 PUBLIC ENGAGEMENT TO DATE

Stakeholders, interest groups and public engagement /input are integral components in the EIA process. Engagement activities have been undertaken through personal communication with provincial and local government representatives, non-Government organizations (NGOs), meetings with key stakeholders, in addition to three public consultation opportunities.

This project has been in the works for several years now. A rezoning was required and in early 2014 discussions were held with the Town of Shediac. The following is a list of the public engagement activities conducted to date.

Zoning for half of the land in question.

- February 24, 2014 (Shediac Town Hall)
- April 14, 2014 (Shediac Town Hall) \*\*\*Public consultation
- April 28, 2014 (Shediac Town Hall)

Zoning for the second half of the land in question.

- December 01, 2014 (Shediac Town Hall) \*\*\* Public Consultation
- December 08, 2014 (Shediac Town Hall)

Zoning extension request.

- July 25, 2016 (Shediac Town Hall)
- August 22, 2016 (Shediac Town Hall) \*\*\*Public Consultation
- August 29, 2016 (Shediac Town Hall)

The April 14, 2014, December 01, 2014 and the August 22, 2016 meetings invited the public to voice their questions and concerns on the zoning request and zoning extensions. The main concerns arising from the public consultations are as follows:

- Traffic congestion on the Pointe-du-Chene Road – Emergency vehicles not being able to adequately respond to calls because of traffic;
- Source of water and septic system management;
- Increased pedestrian and cyclist traffic / public safety;
- Congested beach and wharf;
- Relocation of the trail;
- Destruction of adjacent wetland and other sensitive ecosystem/habitat/only greenspace in Shediac;
- Light, noise and smoke pollution from the campground;
- Decreased property value with increased taxes;

- Infrastructure not being able to support campground;
- Negatively impacted quality of life for residents and tourists;
- Flooding;
- Other campground owners;
- Project is politically driven; and
- Who will pay to have the site returned to its natural condition if the project falls through or developers run out of money.

Based on the concerns raised during those meetings, the Project design/layout has been modified to address those items.

## 8.2 PROPOSED PUBLIC PROJECT NOTIFICATION

The Proponent is committed to ongoing stakeholder consultation as well as community and public engagement. Upon registration, the Proponent will provide written notification to local elected officials (i.e. the MLA and mayor), identified stakeholders, and First Nations communities as appropriate by letter.

A copy of the EIA Registration document will be made available at the regional office of the New Brunswick Department of Environment and Local Government for public viewing. In addition, a copy of the EIA Registration document will be made available in at least two locations local to the project area. The availability of this EIA for review will be advertised in the Times & Transcript, the local newspaper L'Etoile Shediac, and posted in public areas. As per Appendix C of the "Guide to Environmental Impact Assessment in New Brunswick", the Public Notice of Registration will include:

- a brief description of the proposed Project;
- information on how to view the Registration Document;
- a description of the Project's location;
- the status of the Provincial approvals process for the Project;
- a statement indicating that people can ask questions or raise concerns with the proponent regarding the environmental impacts;
- proponent contact information (name, address, phone number, email); and
- the date by which comments must be received.

The Proponent will work with NBDELG to determine the appropriate publications and timing.

## 9 OTHER APPROVALS REQUIRED

This Project footprint was rezoned by the Town of Shediac on December 8, 2014 with by-law no# Z-14-44-3Z, to Campground (CA) Zone in order to allow the construction of a campground with approximately 650 sites, pursuant to Section 39 of the *Community Planning Act*. By-law No. Z-14-44-11Z was recently enacted to amend by-law Z-14-44-1Z by striking out “within two (2) years of the date this rezoning comes into effect” and substituting “within three (3) years of the date by-law Z-14-44-11Z comes into effect.

Additional permits, licenses, approvals, and other forms of authorization required for this Project includes:

- Permit required for removal of topsoil from a site from NBDELG
- Building permit from the Town of Shediac
- Water and sewer connection permits from the Town of Shediac

## 10 CLOSING REMARKS

Based on the results of the review of the potential Project impacts to the environment, impacts of the environment on the Project and a cumulative effects assessment, WSP is of the opinion that, with the use of the mitigation measures described in this report and adjustments to the detailed design plan, there will be no significant residual impact to the environment. In addition, it is believe that the Project will be beneficial to the Town of Shediac, region and the Province of New Brunswick as a leading example of a top-tier, eco-friendly premier campground.

This report has been completed for the sole benefit of the Anglican Parish of Shediac. Any use that a third party makes of this report, or any reliance on or decisions made based on it, is the sole responsibility of the third party. WSP accepts no responsibility for damages, if any, suffered by any third party as a result of the decisions made or actions conducted based on this report.

The conclusions presented in this report represent the best judgment of the assessor based on the current environmental standards and land use. The assessor is unable to certify against undiscovered environmental liabilities due to the nature of the investigation and the limited data available. In evaluating the property, WSP has relied in good faith upon representation and information supplied by individuals noted in the report with respect to existing property conditions. Accordingly, WSP accepts no responsibility for any deficiency or inaccuracy in this report as a result of omissions, misstatements or misinterpretations of the persons involved. In addition, WSP will not accept liability for loss, injury, claim or damage arising from any use or reliance on this report as a result of misrepresentation or fraudulent information.

This report was prepared from information collected during site visits by WSP employees and sub-consultants, and review of available environmental online information. This report has been prepared by Christina LaFlamme, M.Sc., EP, and reviewed by W. R. (Bill) MacMillan, P.Eng., M. Sc.

Yours truly,  
**WSP Canada Inc.**



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# Appendix A

FIGURES





-  Project Footprint
-  Highway
-  Major Road
-  Local road

0 200 400 800 m  
 1 : 20 000  
 Projection: NAD83, New Brunswick Stereographic



**ANGLICAN PARISH OF SHEDIAC** | **SHEDIAC CAMPING EIA**  
 Shediac, NB

**Figure 1**  
**Project Location**

**Sources :**  
 Maps: - ESRI World Imagery (Extract from DigitalGlobe 9/27/2012)  
 - ESRI World topographic Map  
 Provincial Limits: SNB.ca  
 Road: SNB.ca

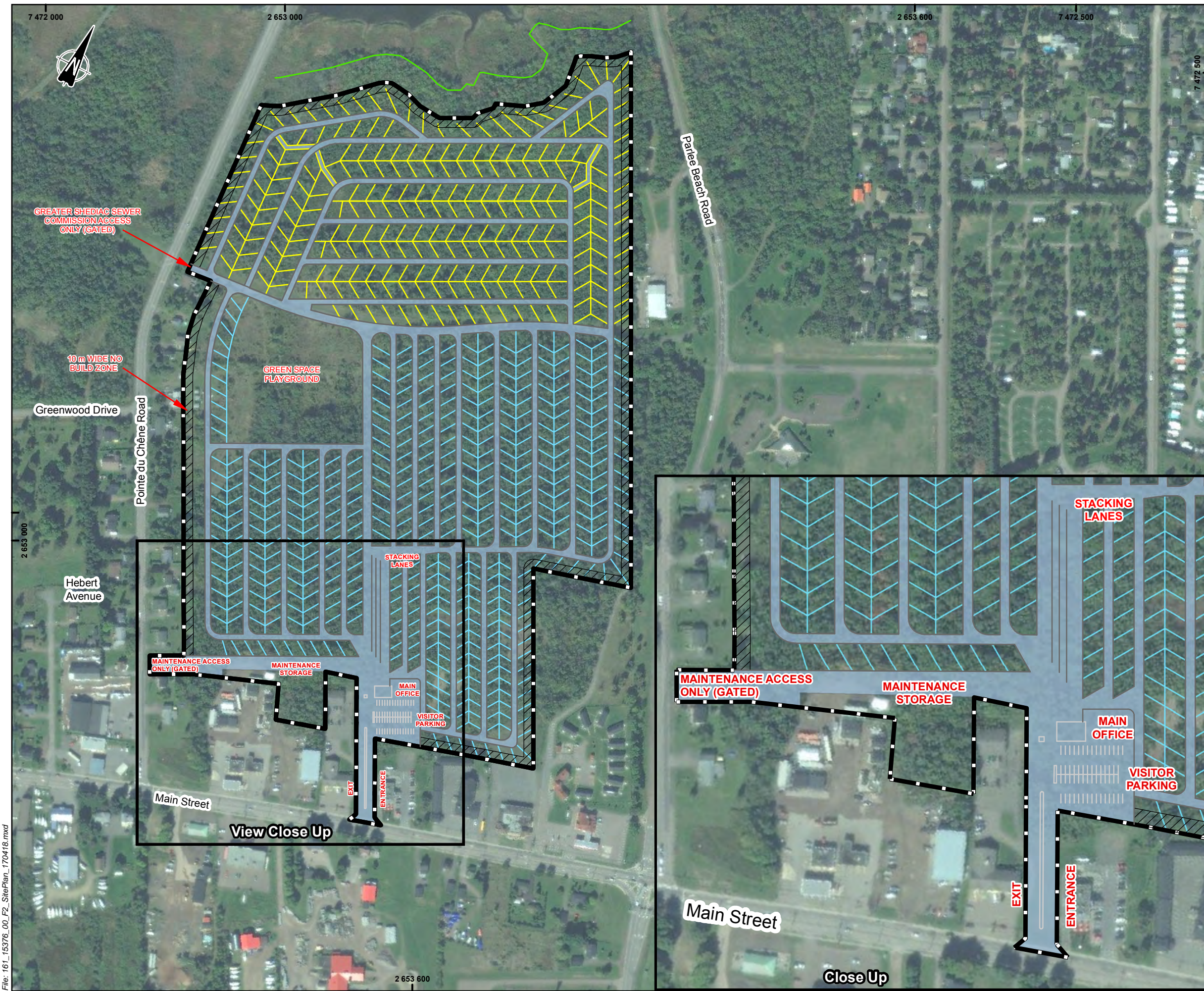
Preparation: C. Landry  
 Drawing: C. Landry  
 Verification: C. LaFlamme

**WSP**

April 19<sup>th</sup>, 2017 | 161-15376-00

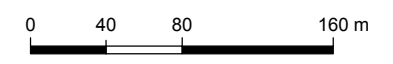
File: 161\_15376\_00\_F1\_Location\_170223.mxd





- Project Footprint
- Camping Site**
- Site Roads
- 10 m Wide No Build Zone
- Permanent Lots
- Temporary Lots
- Wetland Boundary Line

Note:  
 Site Roads – All roadways are to be constructed of permeable granular materials with the exception of main entrance road, reception area parking lot, maintenance access road, GSSC sewer trunk access road, and parking area associated with the main recreation area/playground area.  
 Permanent and Temporary Lots – There is to be a minimum 3 metre treed buffer area between lots. In addition, some of the areas indicated as being either a permanent or temporary lot will be used as a green space.



1 : 4 000  
 Projection: NAD83, New Brunswick Stereographic



**ANGELICAN PARISH OF SHEDIAC**  
**SHEDIAC CAMPING EIA**  
 Shediac Cape, NB

**Figure 2**  
**Conceptual Site Plan**

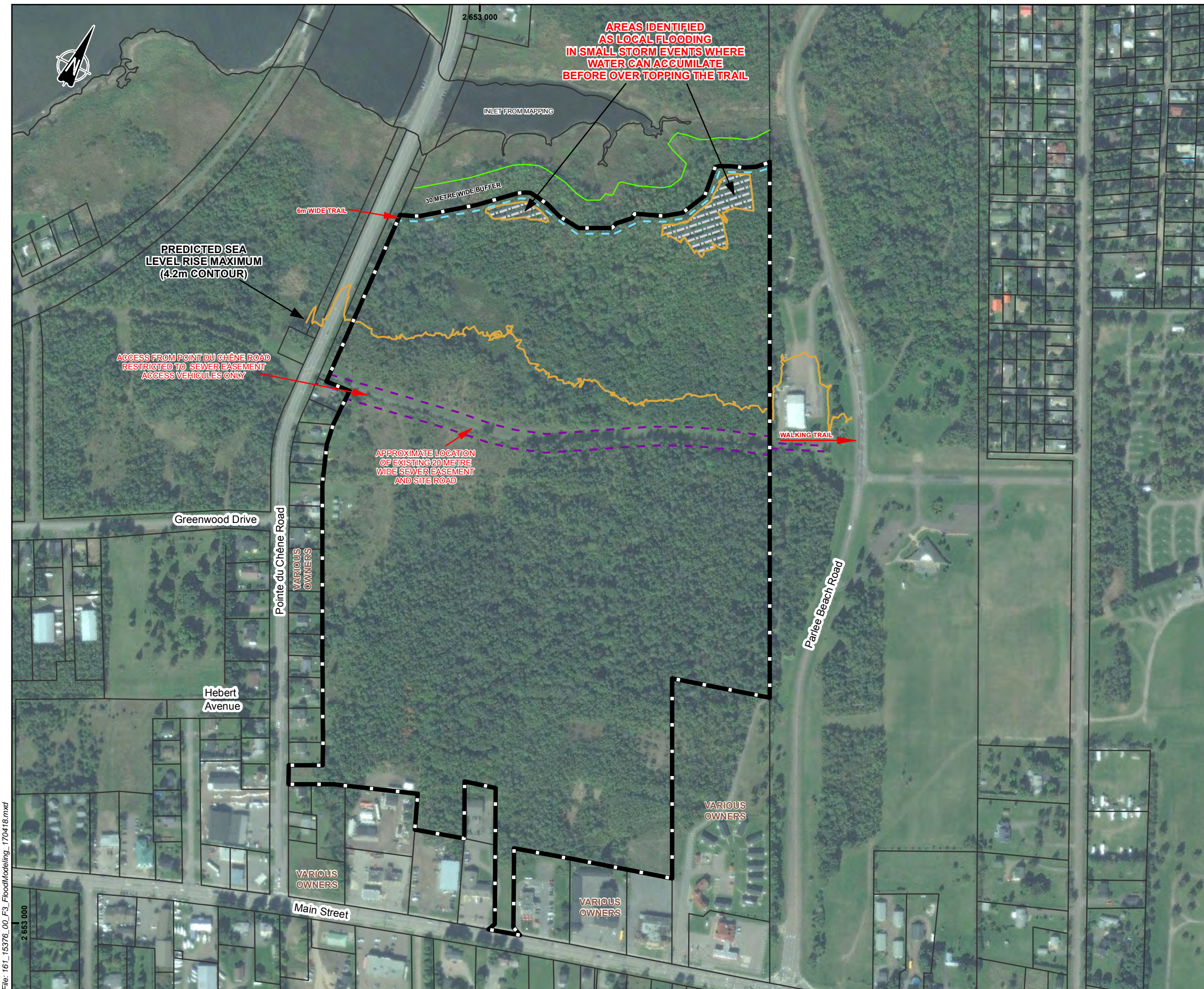
**Sources :**  
 CAD: Spitfire Design co, 2014  
 Maps: - ESRI World Imagery (Extract from DigitalGlobe 9/27/2012)  
 - ESRI World topographic Map  
 Provincial Limits: SNB.ca

Preparation: C. Landry  
 Drawing: C. Landry  
 Verification: C. LaFlamme

**WSP**

April 28<sup>th</sup>, 2017      161-15376-00





File: 161\_15376\_00\_F3\_FloodModeling\_170418.mxd

- Project Footprint
- Local Flooding (1 to 2 year event)
- Elevation
- Lots
- Sewer Easement and Site Road
- Walking Trail
- Wetland Boundary Line

0 40 80 160 m

1 : 4 000

Projection: NAD83, New Brunswick Stereographic

ANGLICAN PARISH OF SHEDIAC

SHEDIAC CAMPING EIA

Shediac Cape, NB

**Figure 3**

**Flood Modeling Results**

**Sources :**

Maps: - ESRI World Imagery (Extract from DigitalGlobe 9/27/2012)

- ESRI World topographic Map

Provincial Limits: SNB.ca

Road: SNB.ca

Preparation: C. Landry

Drawing: C. Landry

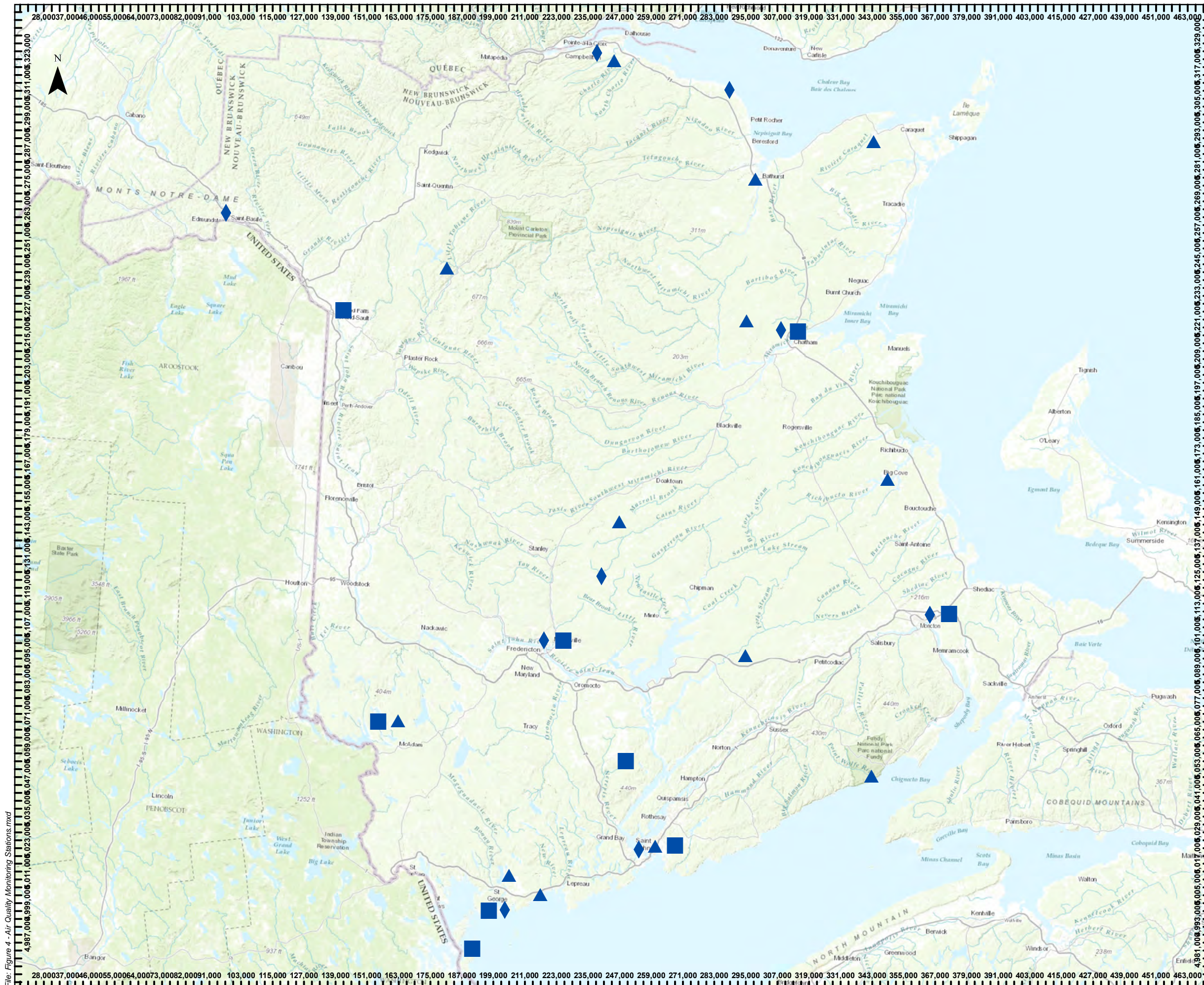
Verification: C. LaFlamme

April 25<sup>th</sup>, 2017

161-15376-00

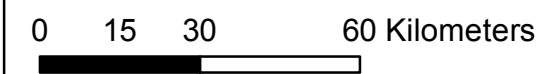






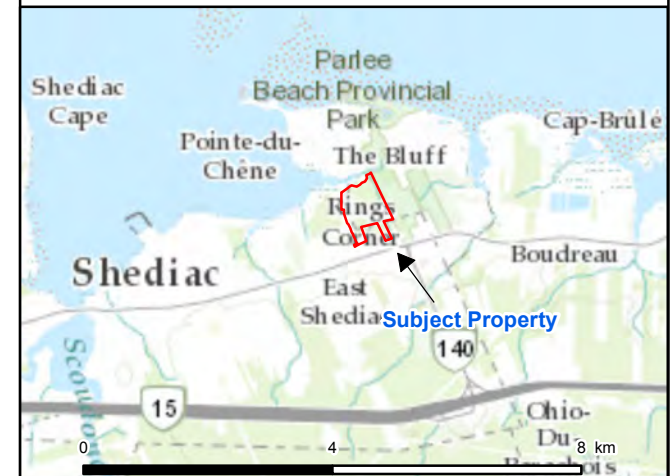
### Legend

- ▲ Acid Rain
- Ozone
- ◆ Other Contaminants



1 : 1,419,478

Projection: NAD83, UTM zone 20N



**SHEDIAC CAMPING EIA**

**CLIENT**

**ANGLICAN PARISH OF SHEDIAC**

### FIGURE 4 AIR QUALITY MONITORING STATIONS IN NEW BRUNSWICK

**Sources :**  
 Maps - ESRI World Imagery  
 - ESRI World topographic Map  
 Monitoring Stations: gnb.ca

Preparation: J.McIntyre  
 Drawing: J.McIntyre  
 Verification: C. LaFlamme

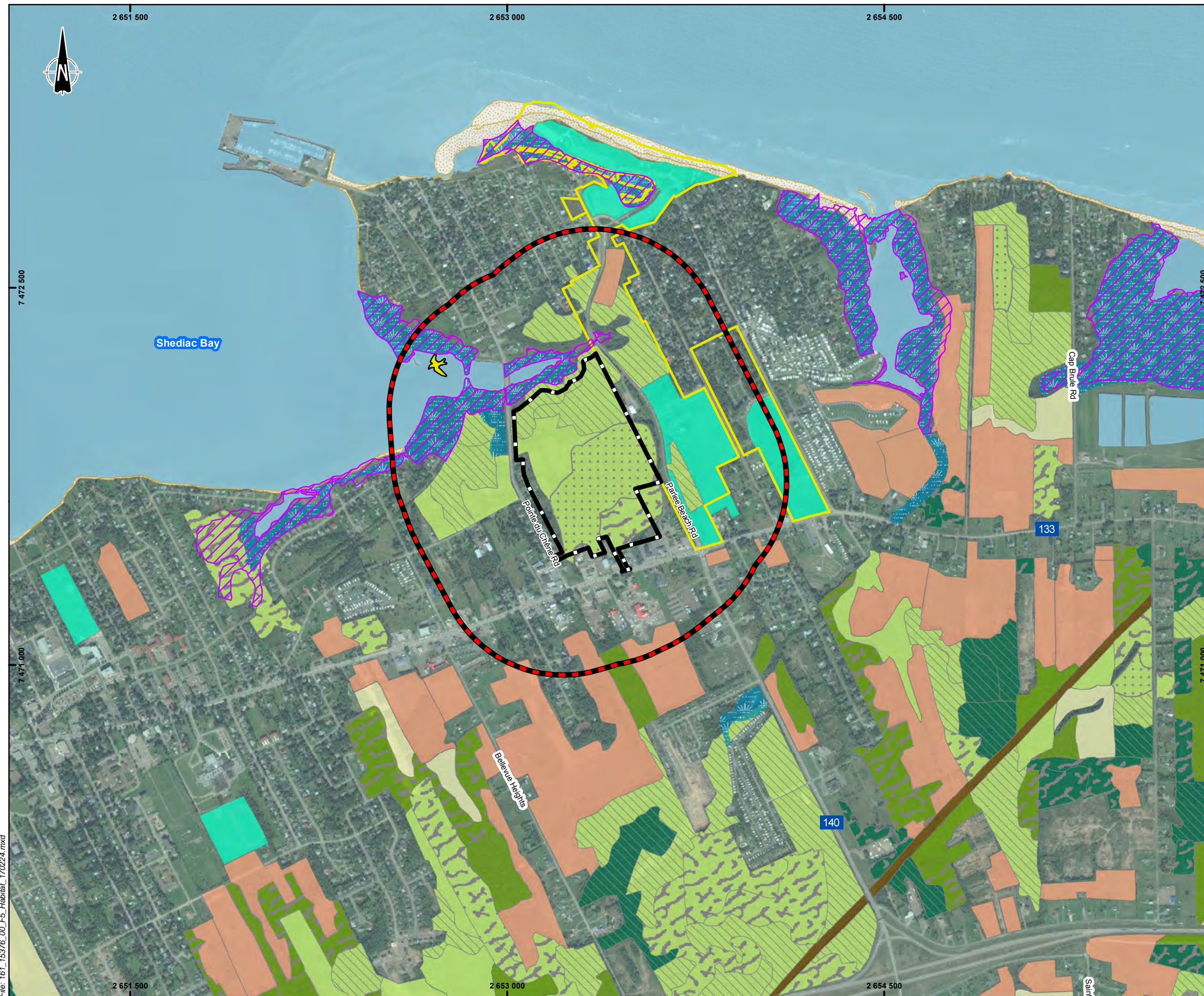


February 21, 2017

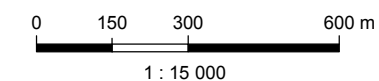
161-15376-00

File: Figure 4 - Air Quality Monitoring Stations.mxd





- Project Footprint
  - Study Area
  - Nesting Platform for Common Terns (*Sterna hirundo*)
  - Waterbody
  - Wetland
  - Provincially Significant Wetland
- | Forest Type |                   | Forest Stand Age |            |
|-------------|-------------------|------------------|------------|
|             | Shrubland         |                  | Young      |
|             | Deciduous Forest  |                  | Immature   |
|             | Mixedwood Forest  |                  | Mature     |
|             | Coniferous Forest |                  | Overmature |
- Non-Forest Cover**
  - Agriculture
  - Recreation Area
  - Transmission Lines
  - Provincial Park
  - Sand



Projection: NAD83, New Brunswick Stereographic



**ANGELICAN PARISH OF SHEDIAC**

**SHEDIAC CAMPING EIA**

Shediac, NB

**Figure 5**  
**Habitat Mapping**

**Sources :**  
 Maps: - ESRI World Imagery (Extract from DigitalGlobe 9/27/2012)  
 - ESRI World topographic Map  
 Provincial Limits, Road, Hydrologique Network, Wetland, Forest and Non Forest territory: SNB.ca

Preparation: C. Landry  
 Drawing: C. Landry  
 Verification: C. LaFlamme

April 19<sup>th</sup>, 2017      161-15376-00







## Legend

- Property Line
- Town Boundary
- Primary Route (On-Road Facility)
- Primary Route (Multi-Use Path Facility)
- Secondary Route (On-Road Facility)
- Secondary at Route (Multi-Use Path Facility)
- Study Area

- 1- Town Hall
- 2- Downtown
- 3- Marina
- 4- Festival Area
- 5- MGR F. Bourgeois School (K-8)
- 6- Louis J. Robichaud School (9-12)
- 7- Pascal Poirier Park

0 125 250 500 m

1 : 12,594

Projection: NAD83, UTM zone 20N



CLIENT

SHEDIAC CAMPING EIA

ANGLICAN PARISH OF SHEDIAC

### FIGURE 6

## TOWN OF SHEDIAC ACTIVE TRANSPORTATION PLAN

**Sources :**  
 Maps: - ESRI World Imagery  
 - ESRI World topographic Map  
 Active Transport Plan: Town of Shediac (2013)

Preparation: J. McIntyre  
 Drawing: J. McIntyre  
 Verification: C. LaFlamme

February 23, 2017

161-15376-00





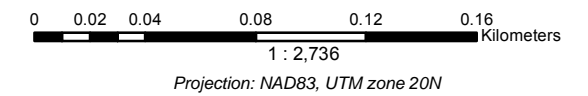


### Legend

- Study Area
- Foundation Remnants



Abandoned foundation from air photo 1982 (sortie 500, image 175).



**CLIENT**  
**SLEDIAC CAMPING EIA**  
**ANGLICAN PARISH OF SHEDIAC**

### FIGURE 7 ARCHAEOLOGICAL SURVEY

**Sources :**  
 Maps: - ESRI World Imagery  
 - ESRI World topographic Map

Preparation: J. McIntyre  
 Drawing: J. McIntyre  
 Verification: C. LaFlamme

File: Figure 9 - Archaeological Survey.mxd





# Appendix B

ENVIRONMENTAL FIELD REPORT, 2014



# ENVIRONMENTAL FIELD REPORT

## SHEDIAC CAMPING, LTD.

SEPTEMBER 29, 2014



**SHEDIAC CAMPING – SHEDIAC, NEW BRUNSWICK –**

WSP  
55 Driscoll Crescent  
Moncton, NB E1E 4C8

Phone 506-857-1675  
Fax 506-857-1679  
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<b>2.2</b>	<b>Aquatic Resources</b>	<b>2</b>
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**APPENDIX C**  
**APPENDIX D**

**FIGURES**  
**PLANT LIST**  
**MIGRATORY BIRD LIST**  
**PHOTOGRAPHIC LOG**



# 1 INTRODUCTION

WSP Canada (WSP) was retained by Camping Shediac Camping Ltee/Ltd. (the Company) to complete environmental field work including a rare plant survey, aquatic resources inventory, and migratory bird surveys on an area (the Site) located off Main Street in Shediac, NB (Figure 1, Appendix A). The Site is bounded by Main Street in Shediac to the south, by Pointe-du-Chêne Road to the west and the Parlee Beach access road to the east. WSP understands that the Company is conducting this environmental work in support of future development plans at the Site.

The majority of the Site is forested, and a provincially significant wetland (PSW) cuts across the northern portion. A portion of the Site also contains old field/pasture habitat, especially to the east of the houses along Point-du-Chêne Road. A sewer trunk line provides a pedestrian/bicycle trail access across the Site from the Parlee Beach Park to the Pointe-du-Chêne area. The site is bounded by an area of retail development including a propane refilling station, recycling depot southwest from the Site. The southern boundary of the Site is bounded by retail and commercial buildings along Main Street. The east side of the Site is bounded by a number of residences along the Point-du-Chêne Road.

On July 25, 2014 Virgil Grecian, M.Sc. of WSP completed a site inspection in support of a Phase I ESA, during which visual observations were made of the Subject Property and on September 1, 2014, Virgil Grecian returned to the Subject Property to conduct Migratory Bird Surveys and conduct an aquatic habitat assessment. On the same date, Theo Popma, M.Sc. conducted a rare plant survey for the Subject Property. The results of these surveys are presented in Section 3 of this report. Biographical information for Mr. Grecian and Mr. Popma are included in Section 4.

# 2 METHODOLOGY

## 2.1 RARE PLANTS

Vegetation surveys will incorporate all terrestrial habitats within the Site. A plant list of all vascular terrestrial plants encountered will be recorded. The General Status Rank (s-Rank) for each species will also be reported and any rare or uncommon flora will be marked in the field with a GPS point. Basic habitat descriptions will also be recorded during the vegetation survey.

## 2.2 AQUATIC RESOURCES

Based on a review of existing information collected during the July Site visit, it is inferred that the watercourses mapped by the provincial GeoNB web mapper (<http://geonb.snb.ca/geonb/>) are drainage ditches built in the past to support the removal of surface water runoff from Main Street. Evidence to suggest this includes incised rectangular trenches with stockpiles of material (now grown over) off-casted to the side. WSP will seek to substantiate any available aquatic fish habitat and the presence of fish species at the Site. The existing aquatic habitat, if any, will be assessed using the NBDNR/DFO Stream Habitat Assessment method and forms. The presence of fish will be assessed by visual observations and with the use of live release minnow traps. All fish species encountered will be recorded.

## 2.3 MIGRATORY BIRDS

Existing information was used to identify potential migratory bird habitat within the Site. Incidental observations of migratory birds were also documented during the July 25 Site visit and will be added to the results of current surveys.

Migratory bird surveys will include ten (10) minute point counts from eight (8) locations and will be conducted within 4 hours of sunrise. Area searches are surveys that opportunistically locate migratory birds during random passage through the Site. Area searches will be conducted throughout the Site while investigators are walking between point count locations, and opportunistically during aquatic assessments. All migratory bird species encountered will be recorded.

## 2.4 ENVIRONMENTAL SCIENTISTS

**Virgil Grecian, M.Sc.** Mr. Grecian's experience spans more than 11 years and is based primarily in the areas of project management, wildlife biology, ornithology, wetlands, GIS, phased Environmental Site Assessments and hazardous materials surveys or re-assessments. Virgil has been working as an environmental consultant since 1999. He has both theoretical knowledge and practical experience in terrestrial and marine ecology in boreal, aquatic and marine ecosystems. Virgil has worked for both Provincial and Federal wildlife agencies where he acquired skills in species at risk management, wildlife management, and direct field biology experience. Virgil received his Master's degree in Biology from the University of New Brunswick, where he studied the habitat and ecology of seabird breeding on offshore islands. While there, he acquired skills in statistical design and analysis, habitat and wildlife management, and the use of geographic information systems. His undergraduate degree from Memorial University of Newfoundland focused on the ecology of terrestrial and aquatic environments.

**Theo Popma, M.Sc.** Mr. Popma is a senior level botanist who has worked in the environmental industry for more than 12 years. He has conducted rare plant surveys for land development projects throughout the Atlantic Region. Theo received his Master's degree in Botany from the University of British Columbia

and an undergrad degree from Dalhousie University in Biology. Theo's extensive experience conducting rare plant surveys include a wide range of projects throughout Atlantic Canada such as NBDTI highway projects (Route 95, Route 8, Route 11 (Shediac), Route 11 (Pokemouche to Janeville) Route 1, Route 7, Route 1, Route 385, and Route 126), oil and gas projects (Brunswick Pipeline, Mainline Pipeline, Enbridge Gas laterals), and numerous linear transmission line projects (Kent Hills and New Denmark).



# 3 RESULTS

The weather was ideal for environmental surveys at the Site during both July 25 and September 1, 2014. A photographic log of the Site visits appears in Appendix D.

## 3.1 RARE PLANTS

On September 1, 2014, Theo Popma, M.Sc. conducted a vegetation survey of the Site. Figure 2 shows the geographical extent of the vegetation survey and as shown, the Site was well covered by survey effort. Two habitats dominated the Site: old pasture and hardwood dominated mixedwood forest. The old pasture contained typical grasses and narrow-leaved meadow sweet (*Spiraea alba*) and apple trees (*Malus pumila*) were growing in from the edges bordering the forest. The forest is dominated by hardwood species such as red maple (*Acer rubrum*) and trembling aspen (*Populus tremuloides*) with white spruce (*Picea glauca*) and balsam fir (*Abies balsamea*) mixed in. Both old pasture and forested habitats were surveyed for rare plants.

A total of 169 vascular plants were recorded (Table 1, Appendix B).

### 3.1.1 RARE OR UNCOMMON FLORA

Within the scientific community, a ranking system has been devised by Conservation Data Centres and NatureServe for ranking species rarity or conservation status. Ranks (s-Ranks) identify gaps in knowledge for species for which element occurrence data are maintained; typically information is maintained for species ranked extremely rare (S1) to uncommon (S3) in given jurisdictions. The Atlantic CDC in Sackville, NB tracks all species found in New Brunswick and regularly reviews their provincial ranking as new information is discovered. The CDC work with provincial and federal partners to develop rarity ranks for species.

Factors considered when ranking include: number of element occurrences, distribution, population size, abundance trends, and threats. A description of the ranks is as follows:

- S1 - Extremely rare: May be especially vulnerable to extirpation (typically 5 or fewer occurrences or very few remaining individuals).
- S2 - Rare: May be vulnerable to extirpation due to rarity or other factors (6 to 20 occurrences or few remaining individuals).
- S3 - Uncommon, or found only in a restricted range, even if abundant at some locations (21 to 100 occurrences).
- S4 - Usually widespread, fairly common, and apparently secure with many occurrences, but of longer-term concern (e.g., watch list) (100+ occurrences).
- S5 - Widespread, abundant, and secure, under present conditions.
- S#S# - Numeric range rank: A range between two consecutive ranks for a species/community. Denotes uncertainty about the exact rarity (e.g., S1S2).
- SH - Historical: Previously occurred in the province but may have been overlooked during the past 20-70 years. Presence is suspected and will likely be rediscovered; depending on species/community.

The provincial status rank (S-Rank) for each of the species identified during the vegetation survey is recorded in Table 1. No rare or uncommon flora were recorded during the Site survey for rare plants.

### **3.2 AQUATIC RESOURCES**

On September 1, 2014, each of the drainage features shown on Figure 2 (Appendix A) were walked to assess potential aquatic habitat and fish presence. Similarly to the July 25 Site visit, all drainage features were dry, or marginally damp on the date of the survey. No habitat data could be recorded, and no fish were observed.

No direct connection between the drainage features and the coastal wetland could be established. It is unlikely that fish persist in these drainage features due to the lack of fish passage and the non-permanence of the water in the drainage features.

Photographs of the dry drainage channels and culvert crossings at the sewer trunk line are present in the Photographic Log, Appendix D.

### **3.3 MIGRATORY BIRDS**

There were 35 species recorded on July 25 and September 1, 2014 (Table 1, Appendix C). No migratory birds recorded are considered rare or uncommon, and none are listed on the New Brunswick Endangered Species List. The bird community was a mix of species, typically observed in mixedwood forests with nearby human development (ie. lawns, fields, etc).

# 4 SUMMARY

This report has been completed for the sole benefit of Shediac Camping. Any use that a third party makes of this report, or any reliance on data or decisions made based on it, is the sole responsibility of the third party. WSP accepts no responsibility for damages, if any, suffered by any third party as a result of the decisions made or actions based on this report.

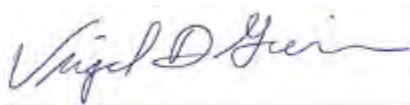
The conclusions presented in this report represent the best judgment of the assessors based on the current environmental standards and environmental conditions at the time of the Site visits. The assessors are unable to certify against undiscovered rare plants or migratory birds due to the nature of the investigation and the limited data available. In evaluating the property, WSP has relied in good faith upon representation and information collected in the existing Site conditions. Accordingly, WSP accepts no responsibility for any deficiency or inaccuracy in this report as a result of omissions, misstatements or misinterpretations of the data collected.

This report was prepared from information collected during two site visits by credible environmental scientists and review of available environmental information, and the professional judgment of the assessors. This report was written by Virgil Grecian. The results in this report rely on the conditions identified at this time.

Should additional information become available, WSP requests that this information be brought to our attention immediately so that we can re-assess the conclusions presented in this report.

Yours truly,

WSP Canada Inc.

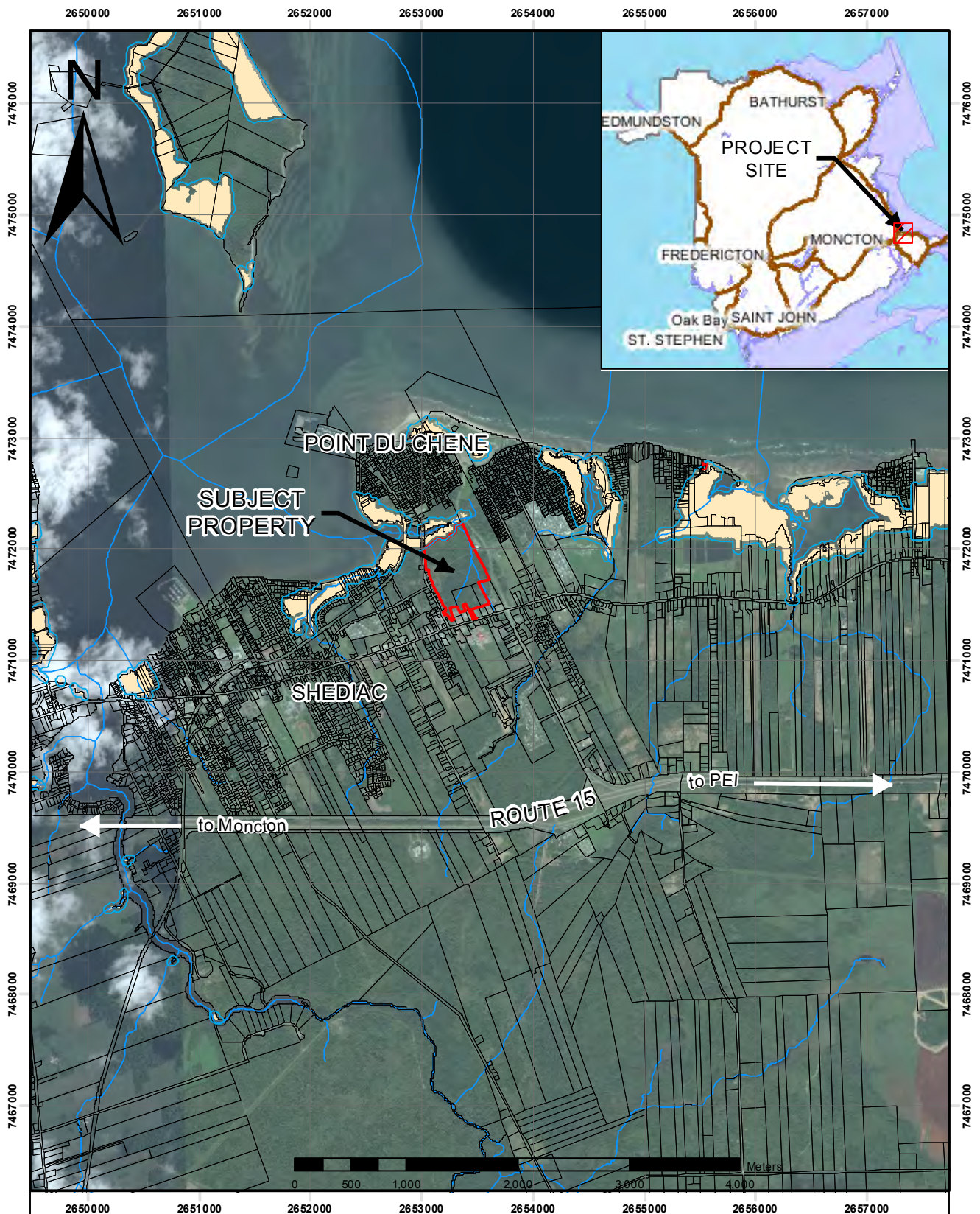


Virgil D. Grecian, M.Sc.  
Site Assessor

# Appendix A

## Figures





Date: September 29, 2014  
 Scale: 1:50,000  
 Project No.: 141-20231  
 Drawn: VDG  
 DATUM: NB STEREOGRAPHIC

NOTES:

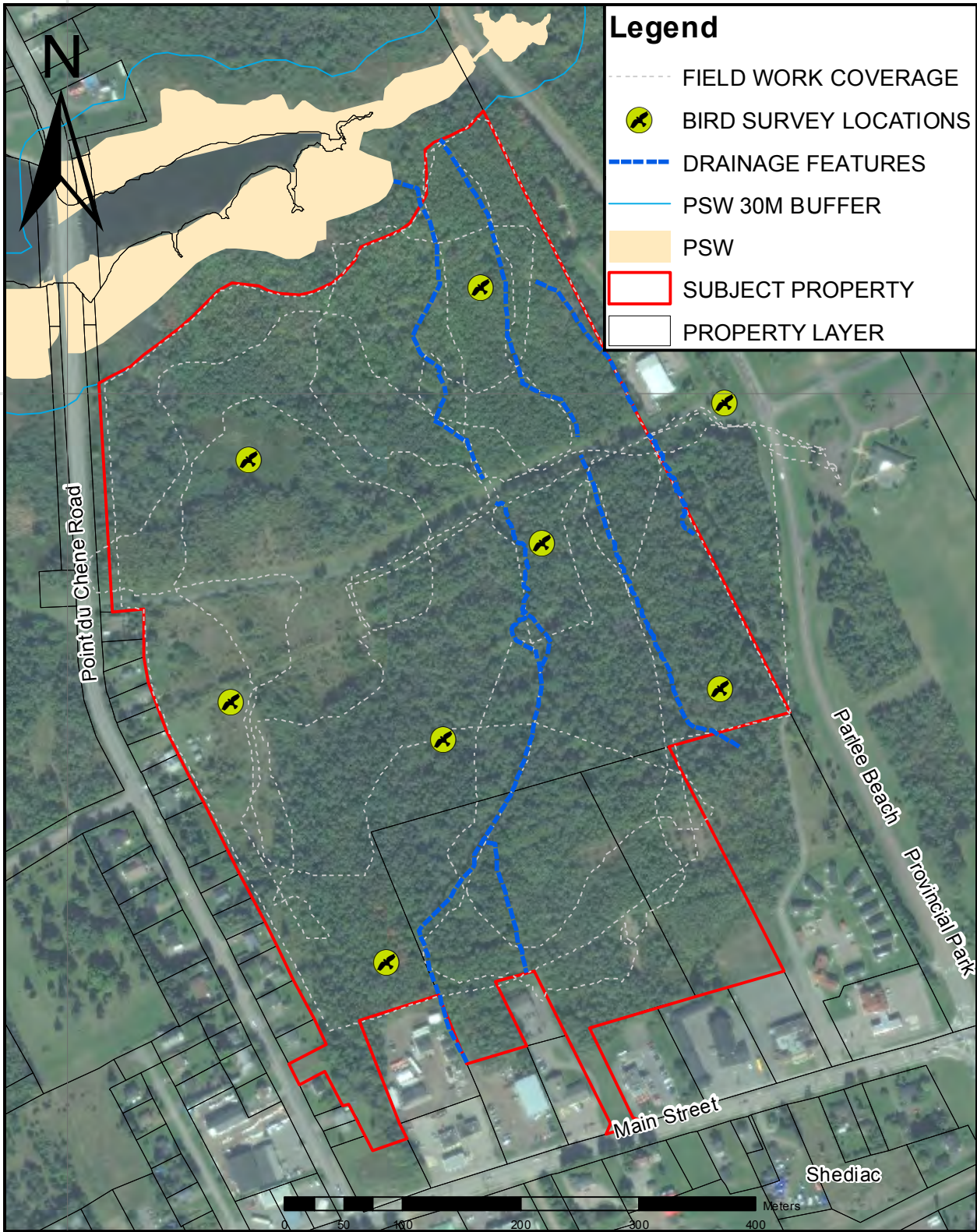
Property data SNB, Aerial Imagery from <http://services.arcgisonline.com> and  
 Esri, I-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP,  
 and the GIS User Community

**FIGURE 1**  
 PROJECT LOCATION  
 ENVIRONMENTAL FIELD WORK  
 MAIN STREET, SHEDIAC, NB





2653000



2653000

Date: September 29, 2014  
 Scale: 1:50,000  
 Project No.: 141-20231  
 Drawn: VDG  
 DATUM: NB STEREOGRAPHIC

**FIGURE 2**  
 PROJECT LOCATION  
 ENVIRONMENTAL FIELD WORK COVERAGE  
 MAIN STREET, SHEDIAC, NB

NOTES:

Property data SNB, Aerial Imagery from <http://services.arcgisonline.com> and Esri, I-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community







# Appendix B Plant List

WSP  
No 141-20231-00



# Shediac Camping Plant List



Scientific Name	Common Name	Srank	GSrank	grank	nrank	ngrank	Cosewic	SARprov
<i>Circaea lutetiana</i>	Southern Broadleaf Enchanter's N	S4	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Cornus rugosa</i>	Roundleaf Dogwood	S4	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Tilia americana</i>	American Basswood	S4	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Maianthemum stellatum</i>	Starflower Solomon's-Plume	S4S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Abies balsamea</i>	Balsam Fir	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Acer rubrum</i>	Red Maple	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Acer spicatum</i>	Mountain Maple	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Achillea millefolium</i>	Common Yarrow	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Agrostis perennans</i>	Perennial Bentgrass	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Alnus incana</i>	Speckled Alder	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Ambrosia artemisiifolia</i>	Annual Ragweed	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Amelanchier bartramiana</i>	Bartram Shadbush	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Amelanchier stolonifera</i>	Running Serviceberry	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Antennaria howellii</i>	Small Pussy-Toes	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Aralia nudicaulis</i>	Wild Sarsaparilla	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Argentina anserina</i>	Silverweed	S5	4 Secure	G5	N4N5	4 Secure	0	Not Listed
<i>Arisaema triphyllum</i>	Swamp Jack-In-The-Pulpit	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Athyrium filix-femina</i>	Lady-Fern	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Betula papyrifera</i>	Paper Birch	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Betula populifolia</i>	Gray Birch	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Bidens cernua</i>	Nodding Beggar-Ticks	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Calamagrostis canadensis</i>	Blue-Joint Reedgrass	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Calystegia sepium</i>	Hedge Bindweed	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Carex arctata</i>	Black Sedge	S5	4 Secure	G5?	NNR	4 Secure	0	Not Listed
<i>Carex brunnescens</i>	Brownish Sedge	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Carex crinita</i>	Fringed Sedge	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Carex intumescens</i>	Bladder Sedge	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Carex novae-angliae</i>	New England Sedge	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Carex stipata</i>	Stalk-Grain Sedge	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Chelone glabra</i>	White Turtlehead	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Chimaphila umbellata</i>	Common Wintergreen	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Chrysosplenium americanum</i>	American Golden-Saxifrage	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Cicuta bulbifera</i>	Bulb-Bearing Water-Hemlock	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Cinna latifolia</i>	Slender Wood Reedgrass	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Cirsium muticum</i>	Swamp Thistle	S5	4 Secure	G5	N5?	4 Secure	0	Not Listed
<i>Conyza canadensis</i>	Canada Horseweed	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Cornus canadensis</i>	Dwarf Dogwood	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Cornus sericea</i>	Silky Dogwood	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Corylus cornuta</i>	Beaked Hazelnut	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Danthonia spicata</i>	Poverty Oat-Grass	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Dennstaedtia punctilobula</i>	Eastern Hay-Scented Fern	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Deschampsia flexuosa</i>	Crinkled Hairgrass	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Dichanthelium acuminatum</i>	Panic Grass	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Doellingeria umbellata</i>	Parasol White-Top	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Dryopteris cristata</i>	Crested Shield-Fern	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Dryopteris intermedia</i>	Evergreen Woodfern	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Echinocystis lobata</i>	Wild Mock-Cucumber	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Elymus virginicus</i>	Virginia Wild-Rye	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Epilobium ciliatum</i>	Hairy Willow-Herb	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Equisetum arvense</i>	Field Horsetail	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Equisetum sylvaticum</i>	Woodland Horsetail	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Erigeron strigosus</i>	Daisy Fleabane	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Eupatorium maculatum</i>	Spotted Joe-Pye Weed	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Euthamia graminifolia</i>	Flat-Top Fragrant-Golden-Rod	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Festuca rubra</i>	Red Fescue	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Fragaria virginiana</i>	Virginia Strawberry	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Fraxinus americana</i>	White Ash	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Galium asprellum</i>	Rough Bedstraw	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Geum canadense</i>	White Avens	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Geum macrophyllum</i>	Large-Leaved Avens	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Glyceria borealis</i>	Small Floating Manna-Grass	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Glyceria melicaria</i>	Slender Manna Grass	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed

Scientific Name	Common Name	Srank	GSrank	grank	nrank	ngrank	Cosewic	SARprov
<i>Glyceria striata</i>	Fowl Manna-Grass	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Hieracium canadense</i>	Canada Hawkweed	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Hypericum boreale</i>	Northern St. John's-Wort	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Hypericum canadense</i>	Canadian St. John's-Wort	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Hypericum ellipticum</i>	Pale St. John's-Wort	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Ilex verticillata</i>	Black Holly	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Impatiens capensis</i>	Spotted Jewel-Weed	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Iris versicolor</i>	Blueflag	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Juncus effusus</i>	Soft Rush	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Juncus tenuis</i>	Slender Rush	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Lactuca canadensis</i>	Canada Lettuce	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Larix laricina</i>	American Larch	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Ledum groenlandicum</i>	Common Labrador Tea	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Lonicera canadensis</i>	American Fly-Honeysuckle	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Luzula multiflora</i>	Common Woodrush	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Lycopus uniflorus</i>	Northern Bugleweed	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Lysimachia terrestris</i>	Swamp Loosestrife	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Maianthemum canadense</i>	Wild Lily-of-The-Valley	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Mitchella repens</i>	Partridge-Berry	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Myrica gale</i>	Sweet Bayberry	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Oclemena acuminata</i>	Whorled Aster	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Oenothera parviflora</i>	Northern Evening-Primrose	S5	4 Secure	G4?	N4?	4 Secure	0	Not Listed
<i>Onoclea sensibilis</i>	Sensitive Fern	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Osmunda cinnamomea</i>	Cinnamon Fern	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Osmunda regalis</i>	Royal Fern	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Oxalis stricta</i>	Upright Yellow Wood-Sorrel	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Panicum capillare</i>	Old Witch Panic-Grass	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Picea glauca</i>	White Spruce	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Pinus strobus</i>	Eastern White Pine	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Polygonum cilinode</i>	Fringed Black Bindweed	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Polygonum sagittatum</i>	Arrow-Leaved Tearthumb	S5	4 Secure	G5	N4N5	4 Secure	0	Not Listed
<i>Populus tremuloides</i>	Quaking Aspen	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Potentilla simplex</i>	Old-Field Cinquefoil	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Prunus virginiana</i>	Choke Cherry	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Pyrola elliptica</i>	Shinleaf	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Quercus rubra</i>	Northern Red Oak	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Rhinanthus minor</i>	Little Yellow-Rattle	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Ribes hirtellum</i>	Smooth Gooseberry	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Ribes triste</i>	Swamp Red Currant	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Rosa virginiana</i>	Virginia Rose	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Rubus canadensis</i>	Smooth Blackberry	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Rubus idaeus</i>	Red Raspberry	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Rubus pubescens</i>	Dwarf Red Raspberry	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Rumex orbiculatus</i>	Water Dock	S5	4 Secure	G5	N3N5	4 Secure	0	Not Listed
<i>Salix discolor</i>	Pussy Willow	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Salix eriocephala</i>	Heart-Leaved Willow	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Salix lucida</i>	Shining Willow	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Salix petiolaris</i>	Meadow Willow	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Sambucus racemosa</i>	Red Elderberry	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Scirpus cyperinus</i>	Cottongrass Bulrush	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Scutellaria lateriflora</i>	Mad Dog Skullcap	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Solidago canadensis</i>	Canada Goldenrod	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Solidago juncea</i>	Early Goldenrod	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Solidago rugosa</i>	Rough-Leaf Goldenrod	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Sorbus americana</i>	American Mountain-Ash	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Spiraea alba</i>	Narrow-Leaved Meadow-Sweet	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Streptopus lanceolatus</i>	Rosy Twistedstalk	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Symphyotrichum lateriflorum</i>	Farewell-Summer	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Symphyotrichum novi-belgii</i>	New Belgium American-Aster	S5	4 Secure	G5	N3N5	4 Secure	0	Not Listed
<i>Symphyotrichum puniceum</i>	Swamp Aster	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Taxus canadensis</i>	Canadian Yew	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Thalictrum pubescens</i>	Tall Meadow-Rue	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed
<i>Thuja occidentalis</i>	Northern White Cedar	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Toxicodendron rydbergii</i>	Northern Poison Oak	S5	4 Secure	G5	N5	4 Secure	0	Not Listed
<i>Trientalis borealis</i>	Northern Starflower	S5	4 Secure	G5	NNR	4 Secure	0	Not Listed





Poorly Drained Red Maple Forest:



Dominant Species:

<b>Scientific Name</b>	<b>Common Name</b>	<b>Srank</b>	<b>GSrank</b>
<i>Abies balsamea</i>	Balsam Fir	S5	4 Secure
<i>Acer rubrum</i>	Red Maple	S5	4 Secure
<i>Alnus incana</i>	Speckled Alder	S5	4 Secure
<i>Carex crinita</i>	Fringed Sedge	S5	4 Secure
<i>Ilex verticillata</i>	Black Holly	S5	4 Secure
<i>Impatiens capensis</i>	Spotted Jewel-Weed	S5	4 Secure
<i>Onoclea sensibilis</i>	Sensitive Fern	S5	4 Secure
<i>Osmunda cinnamomea</i>	Cinnamon Fern	S5	4 Secure
<i>Thuja occidentalis</i>	Northern White Cedar	S5	4 Secure
<i>Solanum dulcamara</i>	Climbing Nightshade	SNA	7 Exotic

This habitat was defined by saturated soils, standing water, streams and dried stream beds. Red Maple dominated the canopy but Northern White Cedar and Balsam Fir were also present.



Mixed Hardwood Forest:



Dominant Vascular Plant Species:

<b>Scientific Name</b>	<b>Common Name</b>	<b>Srank</b>	<b>GSrank</b>
<i>Tilia americana</i>	American Basswood	S4	4 Secure
<i>Acer rubrum</i>	Red Maple	S5	4 Secure
<i>Betula papyrifera</i>	Paper Birch	S5	4 Secure
<i>Betula populifolia</i>	Gray Birch	S5	4 Secure
<i>Cornus canadensis</i>	Dwarf Dogwood	S5	4 Secure
<i>Corylus cornuta</i>	Beaked Hazelnut	S5	4 Secure
<i>Picea glauca</i>	White Spruce	S5	4 Secure
<i>Populus tremuloides</i>	Quaking Aspen	S5	4 Secure
<i>Pyrola elliptica</i>	Shinleaf	S5	4 Secure
<i>Quercus rubra</i>	Northern Red Oak	S5	4 Secure
<i>Rubus canadensis</i>	Smooth Blackberry	S5	4 Secure
<i>Sorbus americana</i>	American Mountain-Ash	S5	4 Secure
<i>Viburnum nudum</i>	Possum-Haw Viburnum	S5	4 Secure

This forest is dominated by several hardwood species of various ages. Exotic species are present but not dominant in the open understory. Disturbances include excavation and dumping.



# **Appendix C**

## **Migratory Bird List**





Table 2, Appendix C - Migratory Bird Data

Common Name	Scientific Name	S-Rank	NBDNR Status	COSEWIC Status	NBESA Status
Alder Flycatcher	<i>Empidonax alnorum</i>	S5	Secure		Not Listed
American Crow	<i>Corvus brachyrhynchos</i>	S5	Secure		Not Listed
American Goldfinch	<i>Spinus tristis</i>	S5	Secure		Not Listed
American Redstart	<i>Setophaga ruticilla</i>	S5	Secure		Not Listed
American Robin	<i>Turdus migratorius</i>	S5	Secure		Not Listed
Black-and-white Warbler	<i>Mniotilta varia</i>	S5	Secure		Not Listed
Black-capped Chickadee	<i>Poecile atricapillus</i>	S5	Secure		Not Listed
Black-throated Green Warbler	<i>Dendroica virens</i>	S5	Secure		Not Listed
Blue Jay	<i>Cyanocitta cristata</i>	S5	Secure		Not Listed
Blue-headed Vireo	<i>Vireo solitarius</i>	S5	Secure		Not Listed
Cedar Waxwing	<i>Bombycilla cedrorum</i>	S5	Secure		Not Listed
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>	S5	Secure		Not Listed
Chipping Sparrow	<i>Spizella passerina</i>	S5	Secure		Not Listed
Common Grackle	<i>Quiscalus quiscula</i>	S5	Secure		Not Listed
Common Raven	<i>Corvus corax</i>	S5	Secure		Not Listed
Common Yellowthroat	<i>Geothlypis trichas</i>	S5	Secure		Not Listed
Dark-eyed Junco	<i>Junco hyemalis</i>	S5	Secure		Not Listed
Grey Catbird	<i>Dumetella carolinensis</i>	S4	Secure		Not Listed
Golden-crowned Kinglet	<i>Regulus satrapa</i>	S5	Secure		Not Listed
Hairy Woodpecker	<i>Picoides villosus</i>	S5	Secure		Not Listed
Hermit Thrush	<i>Catharus guttatus</i>	S5	Secure		Not Listed
Mourning Dove	<i>Zenaidura macroura</i>	S5	Secure		Not Listed
Northern Flicker	<i>Colaptes auratus</i>	S5	Secure		Not Listed
Northern Parula	<i>Parula americana</i>	S5	Secure		Not Listed
Red-breasted Nuthatch	<i>Sitta canadensis</i>	S5	Secure		Not Listed
Red-eyed Vireo	<i>Vireo olivaceus</i>	S5	Secure		Not Listed
Ruby-crowned Kinglet	<i>Regulus calendula</i>	S4S5	Secure		Not Listed
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	S5	Secure		Not Listed
Song Sparrow	<i>Melospiza melodia</i>	S5	Secure		Not Listed
Swainson's Thrush	<i>Catharus ustulatus</i>	S5	Secure		Not Listed
White-throated Sparrow	<i>Zonotrichia albicollis</i>	S5	Secure		Not Listed
Winter Wren	<i>Troglodytes troglodytes</i>	S5	Secure		Not Listed
Yellow Warbler	<i>Dendroica petechia</i>	S5	Secure		Not Listed
Yellow-bellied Flycatcher	<i>Empidonax flaviventris</i>	S4S5	Secure		Not Listed
Yellow-rumped Warbler	<i>Dendroica coronata</i>	S5	Secure		Not Listed





# Appendix D Photographic Log





Photo 1 – Old Field habitat.



Photo 2 – Old field habitat near trunk line.





Photo 3 – Old field habitat near trunk line with apple trees and shrubs growing in to grassed areas.



Photo 4 – Hardwood dominated forest.



Photo 5 – Trail in the mixed wood forest near old field habitat.



Photo 6 – Forest community in the eastern portion of the Site.



Photo 7 – Dry drainage channel in forest shows signs of water passage, but intermittent only.



Photo 8 – Sandy terrain crossed by intermittent water flow.



Photo 9 – Dry upstream side of culverts crossing trunk line.



Photo 10 – Dry drainage feature in forest.



Photo 11 – Dry upstream side of culvert in the eastern part of the Site.

# Appendix C

ACCDC REPORT, 2016



# APPENDIX A-1

## ACCDC SUMMARY TABLE

Table C-1 ACCDC Summary Table

Scientific Name	Common Name	National Protection Status (COSWEIC)	National Protection Status-Species at Risk	s-Rank	NB Provincial Status Rank	Habitat Preference	Potentially Present In Footprint
<b>Flora*</b>							
<i>Stellaria crassifolia</i>	Fleshy Stitchwort			S1	2 May Be At Risk	Wet banks, marshes and similar cold, wet places often near the coast	N
<i>Arabis hirsuta</i> var. <i>pycnocarpa</i>	Western Hairy Rockcress			S3	4 Secure	Calcareous ledges and gravels	N
<i>Stellaria humifusa</i>	Saltmarsh Starwort			S3	4 Secure	Along the coast in salt marshes and meadows	N
<i>Samolus valerandi</i> ssp. <i>parviflorus</i>	Seaside Brookweed			S3	4 Secure	Tidal estuaries above high tide	N
<i>Amelanchier canadensis</i>	Canada Serviceberry			S3	4 Secure	Borders of swamps and streams	Y
<i>Comandra umbellata</i>	Bastard's Toadflax			S3	4 Secure	Dry sandy soils in open or partly shaded areas	Y
<i>Suaeda calceoliformis</i>	Horned Sea-blite			S3S4	4 Secure	Salt marshes	N
<i>Rumex maritimus</i>	Sea-Side Dock			S3S4	4 Secure	Salt marshes and along coastal shores	N
<i>Calamagrostis stricta</i>	Slim-stemmed Reed Grass			S3S4	4 Secure	Wet meadows and the landward edges of saltmarshes	N
<i>Distichlis spicata</i>	Salt Grass			S3S4	4 Secure	Salt marshes, brackish sands and salt springs	N
<i>Montia fontana</i>	Water Blinks			SH	2 May Be At Risk	Springy, usually coastal shores and wet ledge crevices	N
<b>Fauna**</b>							
<i>Charadrius melodus melodus</i>	Piping Plover melodus ssp	Endangered	Endangered	S1B,S1M	1 At Risk	Inter-tidal portions of beaches and mudflats	N



Scientific Name	Common Name	National Protection Status (COSWEIC)	National Protection Status-Species at Risk	s-Rank	NB Provincial Status Rank	Habitat Preference	Potentially Present In Footprint
<i>Calidris canutus rufa</i>	Red Knot rufa ssp	Endangered		S2M	1 At Risk	Areas near wetlands or lakes	N
<i>Riparia riparia</i>	Bank Swallow	Threatened		S2S3B,S2S3M	3 Sensitive	Open areas near water and banks	N
<i>Hirundo rustica</i>	Barn Swallow	Threatened		S3S4B	3 Sensitive	Open areas near water and buildings	N
<i>Dolichonyx oryzivorus</i>	Bobolink	Threatened		S3B,S3M	3 Sensitive	Tall grass areas, hayfields	N
<i>Wilsonia canadensis</i>	Canada Warbler	Threatened	Threatened	S3S4B,S3S4M	1 At Risk	Variable habitat, prefer cool, damp, mixed deciduous-coniferous forests with well-developed shrub layers	Y
<i>Bucephala islandica (Eastern pop.)</i>	Barrow's Goldeneye - Eastern pop.	Special Concern	Special Concern	S2M,S2N	3 Sensitive	Wooded lakes and ponds	N
<i>Contopus virens</i>	Eastern Wood-Pewee	Special Concern		S4B,S4M	4 Secure	Mixed forests	Y
<i>Podiceps auritus</i>	Horned Grebe	Special Concern		S4N,S4M	4 Secure	Marshes, ponds and lakes	N
<i>Bubo scandiacus</i>	Snowy Owl	Not At Risk		S1N,S2S3M	4 Secure	Tundra	N
<i>Sterna hirundo</i>	Common Tern	Not At Risk		S3B,SUM	3 Sensitive	Seacoasts, estuaries, bays, lakes and rivers	N
<i>Podiceps grisegena</i>	Red-necked Grebe	Not At Risk		S3M,S2N	3 Sensitive	Seacoasts, estuaries, bays, lakes and rivers	N
<i>Tringa melanoleuca</i>	Greater Yellowlegs			S1?B,S5M	4 Secure	Marshes, ponds and lakes	N
<i>Grus canadensis</i>	Sandhill Crane			S1B,S1M	8 Accidental	Open grassland and marshes	N
<i>Progne subis</i>	Purple Martin			S1B,S1M	2 May Be At Risk	Open areas near water	Y
<i>Oxyura jamaicensis</i>	Ruddy Duck			S1B,S2S3M	4 Secure	Marshes, lakes and coastal areas	N
<i>Aythya affinis</i>	Lesser Scaup			S1B,S4M	4 Secure	Marshes, ponds and small lakes	N
<i>Aythya marila</i>	Greater Scaup			S1B,S4M,S2N	4 Secure	Bays, estuaries, lakes and rivers	N
<i>Branta bernicla</i>	Brant			S1N, S2S3M	4 Secure	Marine environments	N

Scientific Name	Common Name	National Protection Status (COSWEIC)	National Protection Status-Species at Risk	s-Rank	NB Provincial Status Rank	Habitat Preference	Potentially Present In Footprint
<i>Chroicocephalus ridibundus</i>	Black-headed Gull			S1N,S2M	3 Sensitive	Lakes, rivers, bogs and coastal marshes	N
<i>Nycticorax nycticorax</i>	Black-crowned Night-heron			S1S2B,S1S2M	3 Sensitive	Marshes, swamps and wooded streams	N
<i>Calidris bairdii</i>	Baird's Sandpiper			S1S2M	3 Sensitive	Mudflats, estuaries and grassy marshes	N
<i>Mimus polyglottos</i>	Northern Mockingbird			S2B,S2M	3 Sensitive	Partly open areas or forest edges	Y
<i>Anas strepera</i>	Gadwall			S2B,S3M	4 Secure	Lakes, ponds, rivers and marshes	N
<i>Tringa solitaria</i>	Solitary Sandpiper			S2B,S5M	4 Secure	Swampy coniferous forest	N
<i>Chen caerulescens</i>	Snow Goose			S2M	4 Secure	Freshwater and coastal wetlands	N
<i>Phalacrocorax carbo</i>	Great Cormorant			S2N,S2M	4 Secure	Lakes, rivers and seacoasts	N
<i>Somateria spectabilis</i>	King Eider			S2N,S2M	4 Secure	Seacoasts and large river valleys	N
<i>Larus hyperboreus</i>	Glaucous Gull			S2N,S2M	4 Secure	Coastal waters	N
<i>Anas clypeata</i>	Northern Shoveler			S2S3B,S2S3M	4 Secure	Shallow, muddy, fresh-water areas	N
<i>Myiarchus crinitus</i>	Great Crested Flycatcher			S2S3B,S2S3M	3 Sensitive	Deciduous, mixed forest	Y
<i>Petrochelidon pyrrhonota</i>	Cliff Swallow			S2S3B,S2S3M	3 Sensitive	Semi wooded habitat, cliffs and canyons	N
<i>Pluvialis dominica</i>	American Golden-Plover			S2S3M	3 Sensitive	Pastures, golf courses and mudflats	N
<i>Calcarius lapponicus</i>	Lapland Longspur			S2S3N,SUM	3 Sensitive	Wet meadows, grassy tussocks and scrub	N
<i>Loxia curvirostra</i>	Red Crossbill			S3	4 Secure	Coniferous and mixed forests	Y
<i>Cathartes aura</i>	Turkey Vulture			S3B,S3M	4 Secure	Forested and open areas	Y
<i>Charadrius vociferus</i>	Killdeer			S3B,S3M	3 Sensitive	Fields, meadows and pastures	Y
<i>Tringa semipalmata</i>	Willet			S3B,S3M	3 Sensitive	Marshes, tidal mudflats and beaches	N
<i>Molothrus ater</i>	Brown-headed Cowbird			S3B,S3M	2 May Be At Risk	Woodland, city parks and suburban gardens	Y

Scientific Name	Common Name	National Protection Status (COSWEIC)	National Protection Status-Species at Risk	s-Rank	NB Provincial Status Rank	Habitat Preference	Potentially Present In Footprint
<i>Icterus galbula</i>	Baltimore Oriole			S3B,S3M	4 Secure	Open woodland and riparian woodland	Y
<i>Somateria mollissima</i>	Common Eider			S3B,S4M,S3N	4 Secure	Rocky seacoasts, bays and estuaries	N
<i>Anas acuta</i>	Northern Pintail			S3B,S5M	3 Sensitive	Lakes, rivers, marshes and ponds	N
<i>Mergus serrator</i>	Red-breasted Merganser			S3B,S5M,S4S5N	4 Secure	Rivers, ponds, lakes and coastal areas	N
<i>Arenaria interpres</i>	Ruddy Turnstone			S3M	4 Secure	Rocky, sandy beaches and mudflats	N
<i>Melanitta nigra</i>	Black Scoter			S3M,S1S2N	3 Sensitive	Coastal waters	N
<i>Bucephala albeola</i>	Bufflehead			S3M,S2N	3 Sensitive	Lakes, ponds, rivers and seacoasts	N
<i>Calidris maritima</i>	Purple Sandpiper			S3M,S3N	4 Secure	Rocky seacoasts and jetties	N
<i>Tyrannus tyrannus</i>	Eastern Kingbird			S3S4B,S3S4M	3 Sensitive	Forest edges and open areas with scattered shrubs	Y
<i>Actitis macularius</i>	Spotted Sandpiper			S3S4B,S5M	4 Secure	Seacoasts, lakes and ponds	N
<i>Gallinago delicata</i>	Wilson's Snipe			S3S4B,S5M	4 Secure	Wet grassy or marshy areas	N
<i>Larus delawarensis</i>	Ring-billed Gull			S3S4B,S5M	4 Secure	Bays, estuaries, rivers, lakes and ponds	N
<i>Pluvialis squatarola</i>	Black-bellied Plover			S3S4M	4 Secure	Wet tundra	N
<i>Limosa haemastica</i>	Hudsonian Godwit			S3S4M	4 Secure	Grassy tundra near water	N
<i>Calidris pusilla</i>	Semipalmated Sandpiper			S3S4M	4 Secure	Mudflats, sandy beaches and wet meadows	N
<i>Calidris melanotos</i>	Pectoral Sandpiper			S3S4M	4 Secure	Wet meadows, mudflats and flooded fields	N
<i>Calidris alba</i>	Sanderling			S3S4M,S1N	3 Sensitive	Sandy beaches	N
<i>Morus bassanus</i>	Northern Gannet			SHB,S5M	4 Secure	Coastal waters	N
<b>Invertebrates</b>							
<i>Danaus plexippus</i>	Monarch	Special Concern	Special Concern	S3B,S3M	3 Sensitive	All patches of milkweed	Y

Scientific Name	Common Name	National Protection Status (COSWEIC)	National Protection Status-Species at Risk	s-Rank	NB Provincial Status Rank	Habitat Preference	Potentially Present In Footprint
<i>Papilio brevicauda bretonensis</i>	Short-tailed Swallowtail			S3	4 Secure	Coastal areas and gardens	N
<i>Lycaena dospassosi</i>	Salt Marsh Copper			S3	4 Secure	Salt marshes	N

\* Reference: Hinds, Harold R., 2000. Flora of New Brunswick – Second Edition. UNB, Fredericton NB, 699 pages

\*\* Reference:



# DATA REPORT 5724: Moncton, NB

Prepared 4 January 2017  
by J. Churchill, Data Manager

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Map 1. A 100 km buffer around the study area

## 1.0 PREFACE

The Atlantic Canada Conservation Data Centre (ACCDC) is part of a network of NatureServe data centres and heritage programs serving 50 states in the U.S.A, 10 provinces and 1 territory in Canada, plus several Central and South American countries. The NatureServe network is more than 30 years old and shares a common conservation data methodology. The ACCDC was founded in 1997, and maintains data for the jurisdictions of New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland and Labrador. Although a non-governmental agency, the ACCDC is supported by 6 federal agencies and 4 provincial governments, as well as through outside grants and data processing fees. URL: [www.ACCDC.com](http://www.ACCDC.com).

Upon request and for a fee, the ACCDC queries its database and produces customized reports of the rare and endangered flora and fauna known to occur in or near a specified study area. As a supplement to that data, the ACCDC includes locations of managed areas with some level of protection, and known sites of ecological interest or sensitivity.

### 1.1 DATA LIST

Included datasets:

Filename	Contents
MonctonNB_5724ob.xls	All Rare and legally protected <i>Flora and Fauna</i> within 5 km of your study area
MonctonNB_5724ob100km.xls	A list of Rare and legally protected <i>Flora and Fauna</i> within 100 km of your study area
MonctonNB_5724ma.xls	All <i>Managed Areas</i> in your study area
MonctonNB_5724sa.xls	All <i>Significant Natural Areas</i> in your study area
MonctonNB_5724bc.xls	Rare and common <i>Colonial Birds</i> in your study area

## 1.2 RESTRICTIONS

The ACCDC makes a strong effort to verify the accuracy of all the data that it manages, but it shall not be held responsible for any inaccuracies in data that it provides. By accepting ACCDC data, recipients assent to the following limits of use:

- a) Data is restricted to use by trained personnel who are sensitive to landowner interests and to potential threats to rare and/or endangered flora and fauna posed by the information provided.
- b) Data is restricted to use by the specified Data User; any third party requiring data must make its own data request.
- c) The ACCDC requires Data Users to cease using and delete data 12 months after receipt, and to make a new request for updated data if necessary at that time.
- d) ACCDC data responses are restricted to the data in our Data System at the time of the data request.
- e) Each record has an estimate of locational uncertainty, which must be referenced in order to understand the record's relevance to a particular location. Please see attached Data Dictionary for details.
- f) ACCDC data responses are not to be construed as exhaustive inventories of taxa in an area.
- g) The absence of a taxon cannot be inferred by its absence in an ACCDC data response.

## 1.3 ADDITIONAL INFORMATION

The attached file DataDictionary 2.1.pdf provides metadata for the data provided.

Please direct any additional questions about ACCDC data to the following individuals:

### Plants, Lichens, Ranking Methods, All other Inquiries

Sean Blaney, Senior Scientist, Executive Director

Tel: (506) 364-2658

[sblaney@mta.ca](mailto:sblaney@mta.ca)

### Animals (Fauna)

John Klymko, Zoologist

Tel: (506) 364-2660

[jklymko@mta.ca](mailto:jklymko@mta.ca)

### Plant Communities

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### Data Management, GIS

James Churchill, Data Manager

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Questions on the biology of Federal Species at Risk can be directed to ACCDC: (506) 364-2658, with questions on Species at Risk regulations to: Samara Eaton, Canadian Wildlife Service (NB and PE): (506) 364-5060 or Julie McKnight, Canadian Wildlife Service (NS): (902) 426-4196.

For provincial information about rare taxa and protected areas, or information about game animals, deer yards, old growth forests, archeological sites, fish habitat etc., in New Brunswick, please contact Stewart Lusk, Natural Resources: (506) 453-7110.

For provincial information about rare taxa and protected areas, or information about game animals, deer yards, old growth forests, archeological sites, fish habitat etc., in Nova Scotia, please contact Sherman Boates, NSDNR: (902) 679-6146. To determine if location-sensitive species (section 4.3) occur near your study site please contact a NSDNR Regional Biologist:

**Western:** Duncan Bayne

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For provincial information about rare taxa and protected areas, or information about game animals, fish habitat etc., in Prince Edward Island, please contact Garry Gregory, PEI Dept. of Communities, Land and Environment: (902) 569-7595.

## 2.0 RARE AND ENDANGERED SPECIES

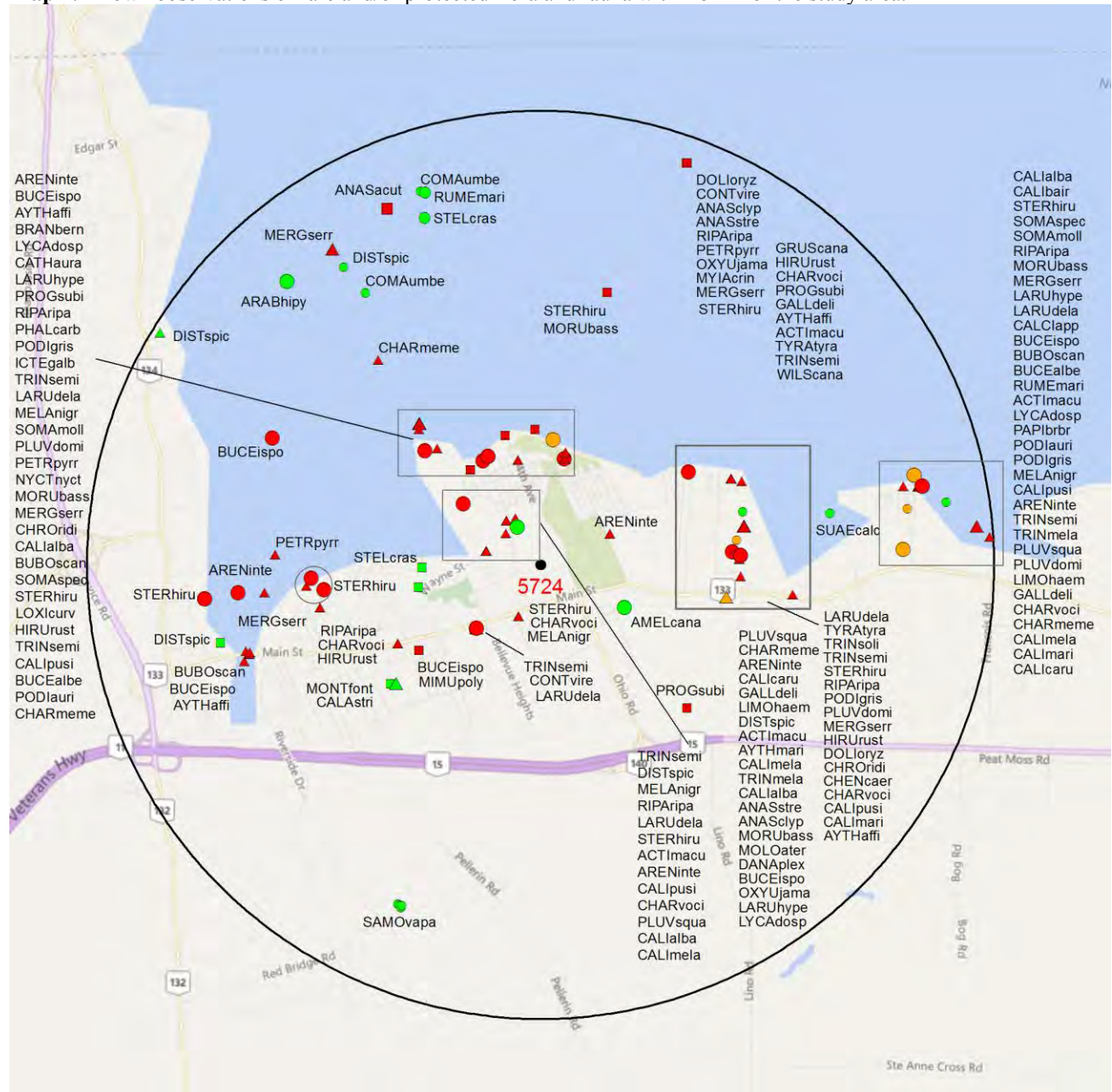
### 2.1 FLORA

A 5 km buffer around the study area contains 22 records of 11 vascular, no records of nonvascular flora (Map 2 and attached: \*ob.xls).

### 2.2 FAUNA

A 5 km buffer around the study area contains 1083 records of 57 vertebrate, 10 records of 3 invertebrate fauna (Map 2 and attached data files - see 1.1 Data List). Please see section 4.3 to determine if 'location-sensitive' species occur near your study site.

**Map 2:** Known observations of rare and/or protected flora and fauna within 5 km of the study area.



- RESOLUTION**
- 4.7 within 50s of kilometers
  - 4.0 within 10s of kilometers
  - 3.7 within 5s of kilometers
  - △ 3.0 within kilometers
  - △ 2.7 within 500s of meters
  - ◇ 2.0 within 100s of meters
  - ◇ 1.7 within 10s of meters

- HIGHER TAXON**
- vertebrate fauna
  - invertebrate fauna
  - vascular flora
  - nonvascular flora



### 3.0 SPECIAL AREAS

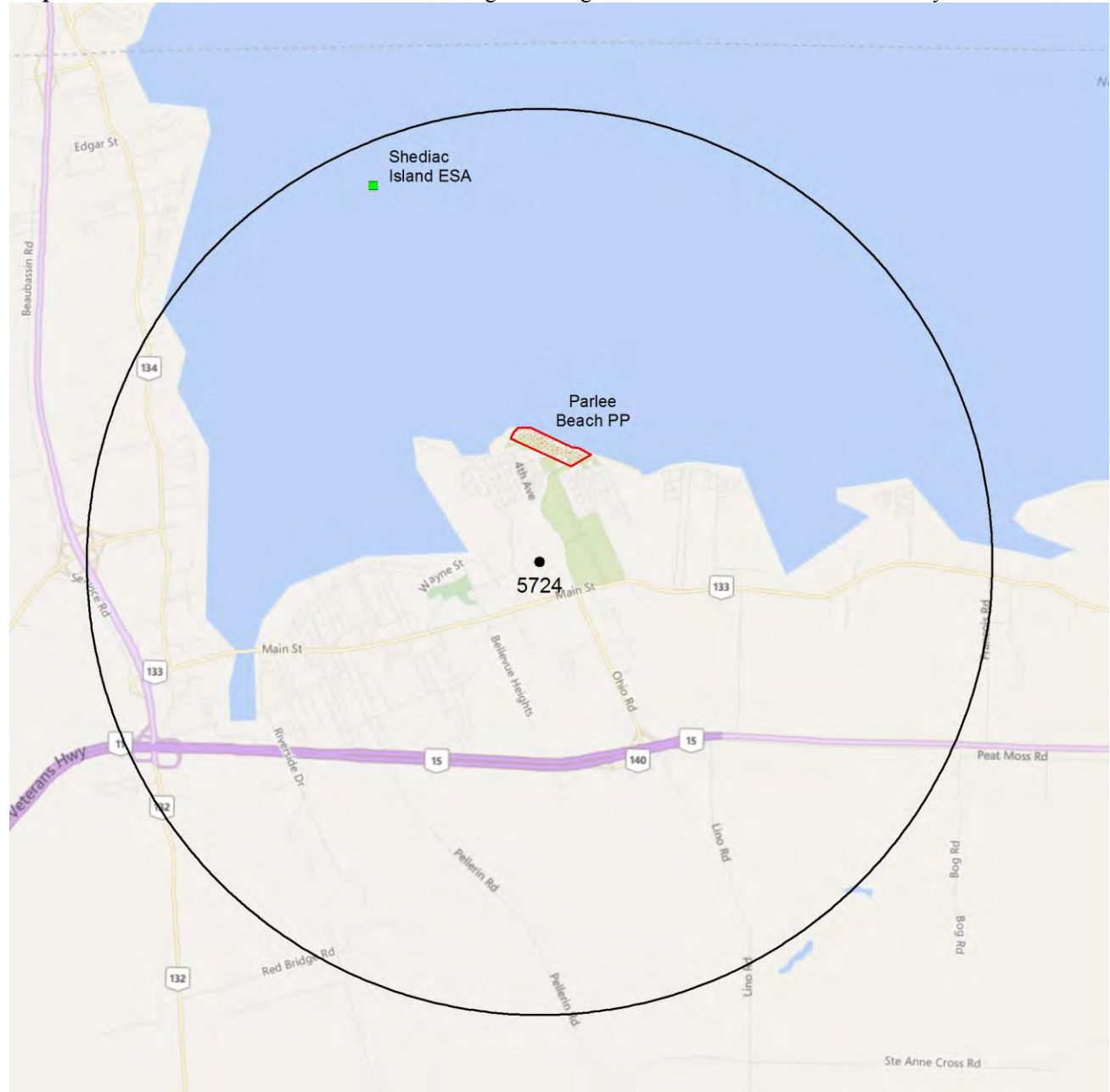
#### 3.1 MANAGED AREAS

The GIS scan identified 1 managed area in the vicinity of the study area (Map 3 and attached file: \*ma\*.xls)

#### 3.2 SIGNIFICANT AREAS

The GIS scan identified 1 biologically significant site in the vicinity of the study area (Map 3 and attached file: \*sa\*.xls)

**Map 3:** Boundaries and/or locations of known Managed and Significant Areas within 5 km of the study area.



#### MANAGED AREAS SIGNIFIANT AREAS

-  boundary
-  approximate
-  boundary
-  approximate
-  point location

#### NATIONAL DEFENSE FIRST NATIONS

-  boundary
-  approximate
-  point location
-  boundary
-  approximate

## 4.0 RARE SPECIES LISTS

Rare and/or endangered taxa (excluding “location-sensitive” species, section 4.3) within the 5 km-buffered area listed in order of concern, beginning with legally listed taxa, with the number of observations per taxon and the distance in kilometers from study area centroid to the closest observation ( $\pm$  the precision, in km, of the record). [P] = vascular plant, [N] = nonvascular plant, [A] = vertebrate animal, [I] = invertebrate animal, [C] = community. Note: records are from attached files \*ob.xls/\*ob.shp only.

### 4.1 FLORA

	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)
P	<i>Stellaria crassifolia</i>	Fleshy Stitchwort				S1	2 May Be At Risk	2	1.4 $\pm$ 5.0
P	<i>Arabis hirsuta</i> var. <i>pycnocarpa</i>	Western Hairy Rockcress				S3	4 Secure	1	4.2 $\pm$ 0.0
P	<i>Stellaria humifusa</i>	Saltmarsh Starwort				S3	4 Secure	1	1.3 $\pm$ 5.0
P	<i>Samolus valerandi</i> ssp. <i>parviflorus</i>	Seaside Brookweed				S3	4 Secure	4	4.1 $\pm$ 0.0
P	<i>Amelanchier canadensis</i>	Canada Serviceberry				S3	4 Secure	1	1.0 $\pm$ 0.0
P	<i>Comandra umbellata</i>	Bastard's Toadflax				S3	4 Secure	2	3.6 $\pm$ 0.0
P	<i>Suaeda calceoliformis</i>	Horned Sea-blite				S3S4	4 Secure	1	3.2 $\pm$ 0.0
P	<i>Rumex maritimus</i>	Sea-Side Dock				S3S4	4 Secure	3	4.3 $\pm$ 0.0
P	<i>Calamagrostis stricta</i>	Slim-stemmed Reed Grass				S3S4	4 Secure	1	2.1 $\pm$ 2.0
P	<i>Distichlis spicata</i>	Salt Grass				S3S4	4 Secure	5	0.5 $\pm$ 0.0
P	<i>Montia fontana</i>	Water Blinks				SH	2 May Be At Risk	1	2.1 $\pm$ 1.0

### 4.2 FAUNA

	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)
A	<i>Charadrius melodus melodus</i>	Piping Plover melodus ssp	Endangered	Endangered	Endangered	S1B,S1M	1 At Risk	17	1.3 $\pm$ 0.0
A	<i>Calidris canutus rufa</i>	Red Knot rufa ssp	Endangered		Endangered	S2M	1 At Risk	2	2.3 $\pm$ 0.0
A	<i>Riparia riparia</i>	Bank Swallow	Threatened			S2S3B,S2S3M	3 Sensitive	15	0.6 $\pm$ 0.0
A	<i>Hirundo rustica</i>	Barn Swallow	Threatened		Threatened	S3B,S3M	3 Sensitive	6	1.2 $\pm$ 0.0
A	<i>Dolichonyx oryzivorus</i>	Bobolink	Threatened		Threatened	S3B,S3M	3 Sensitive	5	2.3 $\pm$ 1.0
A	<i>Wilsonia canadensis</i>	Canada Warbler	Threatened	Threatened	Threatened	S3S4B,S3S4M	1 At Risk	1	4.7 $\pm$ 7.0
A	<i>Bucephala islandica</i> (Eastern pop.)	Barrow's Goldeneye - Eastern pop.	Special Concern	Special Concern	Special Concern	S2M,S2N	3 Sensitive	43	1.6 $\pm$ 5.0
A	<i>Contopus virens</i>	Eastern Wood-Pewee	Special Concern		Special Concern	S4B,S4M	4 Secure	3	1.0 $\pm$ 0.0
A	<i>Podiceps auritus</i>	Horned Grebe	Special Concern		Special Concern	S4N,S4M	4 Secure	21	1.2 $\pm$ 0.0
A	<i>Bubo scandiacus</i>	Snowy Owl	Not At Risk			S1N,S2S3M	4 Secure	12	1.2 $\pm$ 0.0
A	<i>Sterna hirundo</i>	Common Tern	Not At Risk			S3B,SUM	3 Sensitive	60	0.6 $\pm$ 0.0
A	<i>Podiceps grisegena</i>	Red-necked Grebe	Not At Risk			S3M,S2N	3 Sensitive	24	2.0 $\pm$ 1.0
A	<i>Tringa melanoleuca</i>	Greater Yellowlegs				S1?B,S5M	4 Secure	67	0.6 $\pm$ 0.0
A	<i>Grus canadensis</i>	Sandhill Crane				S1B,S1M	8 Accidental	1	4.7 $\pm$ 7.0
A	<i>Progne subis</i>	Purple Martin				S1B,S1M	2 May Be At Risk	6	1.3 $\pm$ 0.0
A	<i>Oxyura jamaicensis</i>	Ruddy Duck				S1B,S2S3M	4 Secure	16	2.2 $\pm$ 0.0
A	<i>Aythya affinis</i>	Lesser Scaup				S1B,S4M	4 Secure	49	2.0 $\pm$ 1.0
A	<i>Aythya marila</i>	Greater Scaup				S1B,S4M,S2N	4 Secure	2	2.3 $\pm$ 1.0
A	<i>Branta bernicla</i>	Brant				S1N, S2S3M	4 Secure	3	2.0 $\pm$ 1.0
A	<i>Chroicocephalus ridibundus</i>	Black-headed Gull				S1N,S2M	3 Sensitive	3	1.3 $\pm$ 0.0
A	<i>Nycticorax nycticorax</i>	Black-crowned Night-heron				S1S2B,S1S2M	3 Sensitive	1	1.3 $\pm$ 0.0
A	<i>Calidris bairdii</i>	Baird's Sandpiper				S1S2M	3 Sensitive	1	4.3 $\pm$ 0.0
A	<i>Mimus polyglottos</i>	Northern Mockingbird				S2B,S2M	3 Sensitive	1	1.6 $\pm$ 5.0
A	<i>Anas strepera</i>	Gadwall				S2B,S3M	4 Secure	3	2.3 $\pm$ 1.0
A	<i>Tringa solitaria</i>	Solitary Sandpiper				S2B,S5M	4 Secure	4	2.3 $\pm$ 0.0
A	<i>Chen caerulescens</i>	Snow Goose				S2M	4 Secure	2	2.3 $\pm$ 1.0
A	<i>Phalacrocorax carbo</i>	Great Cormorant				S2N,S2M	4 Secure	1	2.0 $\pm$ 1.0
A	<i>Somateria spectabilis</i>	King Eider				S2N,S2M	4 Secure	2	1.3 $\pm$ 0.0
A	<i>Larus hyperboreus</i>	Glaucous Gull				S2N,S2M	4 Secure	5	2.0 $\pm$ 1.0
A	<i>Anas clypeata</i>	Northern Shoveler				S2S3B,S2S3M	4 Secure	4	2.3 $\pm$ 1.0

	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)
A	<i>Myiarchus crinitus</i>	Great Crested Flycatcher				S2S3B,S2S3M	3 Sensitive	1	4.7 ± 7.0
A	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow				S2S3B,S2S3M	3 Sensitive	4	1.3 ± 0.0
A	<i>Pluvialis dominica</i>	American Golden-Plover				S2S3M	3 Sensitive	18	1.3 ± 0.0
A	<i>Calcarius lapponicus</i>	Lapland Longspur				S2S3N,SUM	3 Sensitive	1	4.3 ± 1.0
A	<i>Loxia curvirostra</i>	Red Crossbill				S3	4 Secure	1	1.2 ± 0.0
A	<i>Cathartes aura</i>	Turkey Vulture				S3B,S3M	4 Secure	1	2.0 ± 1.0
A	<i>Charadrius vociferus</i>	Killdeer				S3B,S3M	3 Sensitive	25	0.6 ± 0.0
A	<i>Tringa semipalmata</i>	Willet				S3B,S3M	3 Sensitive	109	0.6 ± 0.0
A	<i>Molothrus ater</i>	Brown-headed Cowbird				S3B,S3M	2 May Be At Risk	1	2.3 ± 1.0
A	<i>Icterus galbula</i>	Baltimore Oriole				S3B,S3M	4 Secure	1	2.0 ± 1.0
A	<i>Somateria mollissima</i>	Common Eider				S3B,S4M,S3N	4 Secure	8	1.3 ± 0.0
A	<i>Anas acuta</i>	Northern Pintail				S3B,S5M	3 Sensitive	1	4.3 ± 10.0
A	<i>Mergus serrator</i>	Red-breasted Merganser				S3B,S5M,S4S5N	4 Secure	15	1.3 ± 0.0
A	<i>Arenaria interpres</i>	Ruddy Turnstone				S3M	4 Secure	49	0.6 ± 0.0
A	<i>Melanitta nigra</i>	Black Scoter				S3M,S1S2N	3 Sensitive	69	0.5 ± 0.0
A	<i>Bucephala albeola</i>	Bufflehead				S3M,S2N	3 Sensitive	21	1.3 ± 0.0
A	<i>Calidris maritima</i>	Purple Sandpiper				S3M,S3N	4 Secure	7	2.3 ± 1.0
A	<i>Tyrannus tyrannus</i>	Eastern Kingbird				S3S4B,S3S4M	3 Sensitive	5	2.3 ± 1.0
A	<i>Actitis macularius</i>	Spotted Sandpiper				S3S4B,S5M	4 Secure	47	0.6 ± 0.0
A	<i>Gallinago delicata</i>	Wilson's Snipe				S3S4B,S5M	4 Secure	6	2.3 ± 0.0
A	<i>Larus delawarensis</i>	Ring-billed Gull				S3S4B,S5M	4 Secure	57	0.6 ± 0.0
A	<i>Pluvialis squatarola</i>	Black-bellied Plover				S3S4M	4 Secure	62	0.6 ± 0.0
A	<i>Limosa haemastica</i>	Hudsonian Godwit				S3S4M	4 Secure	28	2.3 ± 0.0
A	<i>Calidris pusilla</i>	Semipalmated Sandpiper				S3S4M	4 Secure	74	0.6 ± 0.0
A	<i>Calidris melanotos</i>	Pectoral Sandpiper				S3S4M	4 Secure	18	0.6 ± 0.0
A	<i>Calidris alba</i>	Sanderling				S3S4M,S1N	3 Sensitive	43	0.6 ± 0.0
A	<i>Morus bassanus</i>	Northern Gannet				SHB,S5M	4 Secure	31	1.3 ± 0.0
I	<i>Danaus plexippus</i>	Monarch	Special Concern	Special Concern	Special Concern	S3B,S3M	3 Sensitive	1	2.1 ± 1.0
I	<i>Papilio brevicauda bretonensis</i>	Short-tailed Swallowtail				S3	4 Secure	1	4.2 ± 0.0
I	<i>Lycaena dospassosi</i>	Salt Marsh Copper				S3	4 Secure	8	1.4 ± 0.0

### 4.3 LOCATION SENSITIVE SPECIES

The Department of Natural Resources in each Maritimes province considers a number of species “location sensitive”. Concern about exploitation of location-sensitive species precludes inclusion of precise coordinates in this report. Those intersecting a 5 km buffer of your study area are indicated below with “YES”.

#### New Brunswick

Scientific Name	Common Name	SARA	Prov Legal Prot	Known within 5 km of Study Site?
<i>Chrysemys picta picta</i>	Eastern Painted Turtle			No
<i>Chelydra serpentina</i>	Snapping Turtle	Special Concern	Special Concern	No
<i>Glyptemys insculpta</i>	Wood Turtle	Threatened	Threatened	No
<b><i>Haliaeetus leucocephalus</i></b>	<b>Bald Eagle</b>		<b>Endangered</b>	<b>YES</b>
<b><i>Falco peregrinus pop. 1</i></b>	<b>Peregrine Falcon - anatum/tundrius pop.</b>	<b>Special Concern</b>	<b>Endangered</b>	<b>YES</b>
<i>Cicindela marginipennis</i>	Cobblestone Tiger Beetle	Endangered	Endangered	No
<i>Coenonympha nipsisiquit</i>	Maritime Ringlet	Endangered	Endangered	No
<i>Bat Hibernaculum</i>		[Endangered] <sup>1</sup>	[Endangered] <sup>1</sup>	No

<sup>1</sup> *Myotis lucifugus* (Little Brown Myotis), *Myotis septentrionalis* (Long-eared Myotis), and *Perimyotis subflavus* (Tri-colored Bat or Eastern Pipistrelle) are all Endangered under the Federal Species at Risk Act and the NB Species at Risk Act.

#### 4.4 SOURCE BIBLIOGRAPHY

The recipient of these data shall acknowledge the ACCDC and the data sources listed below in any documents, reports, publications or presentations, in which this dataset makes a significant contribution.

# recs	CITATION
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## 5.0 RARE SPECIES WITHIN 100 KM

A 100 km buffer around the study area contains 31511 records of 129 vertebrate and 584 records of 56 invertebrate fauna; 4729 records of 273 vascular, 588 records of 170 nonvascular flora (attached: \*ob100km.xls).

Taxa within 100 km of the study site that are rare and/or endangered in the province in which the study site occurs. All ranks correspond to the province in which the study site falls, even for out-of-province records. Taxa are listed in order of concern, beginning with legally listed taxa, with the number of observations per taxon and the distance in kilometers from study area centroid to the closest observation ( $\pm$  the precision, in km, of the record).

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
A	<i>Myotis lucifugus</i>	Little Brown Myotis	Endangered	Endangered	Endangered	S1	1 At Risk	46	34.5 $\pm$ 1.0	NB
A	<i>Myotis septentrionalis</i>	Northern Long-eared Myotis	Endangered	Endangered	Endangered	S1	1 At Risk	59	34.5 $\pm$ 1.0	NB
A	<i>Perimyotis subflavus</i>	Eastern Pipistrelle	Endangered	Endangered	Endangered	S1	1 At Risk	12	38.9 $\pm$ 0.0	NB
A	<i>Charadrius melodus melodus</i>	Piping Plover melodus ssp	Endangered	Endangered	Endangered	S1B,S1M	1 At Risk	2290	1.3 $\pm$ 0.0	NB
A	<i>Dermochelys coriacea</i> (Atlantic pop.)	Leatherback Sea Turtle - Atlantic pop.	Endangered	Endangered	Endangered	S1S2N	1 At Risk	5	26.8 $\pm$ 1.0	NB
A	<i>Salmo salar</i> pop. 1	Atlantic Salmon - Inner Bay of Fundy pop.	Endangered	Endangered	Endangered	S2	2 May Be At Risk	37	53.9 $\pm$ 0.0	NS
A	<i>Calidris canutus rufa</i>	Red Knot rufa ssp	Endangered		Endangered	S2M	1 At Risk	772	2.3 $\pm$ 0.0	NB
A	<i>Rangifer tarandus</i> pop. 2	Woodland Caribou (Atlantic-Gasp) -rsie pop.)	Endangered	Endangered	Extirpated	SX	0.1 Extirpated	2	42.8 $\pm$ 1.0	NB
A	<i>Sturnella magna</i>	Eastern Meadowlark	Threatened		Threatened	S1B,S1M	2 May Be At Risk	32	24.8 $\pm$ 0.0	NB
A	<i>Ixobrychus exilis</i>	Least Bittern	Threatened	Threatened	Threatened	S1S2B,S1S2M	1 At Risk	13	31.7 $\pm$ 0.0	NB
A	<i>Hylocichla mustelina</i>	Wood Thrush	Threatened		Threatened	S1S2B,S1S2M	2 May Be At Risk	53	12.9 $\pm$ 7.0	NB
A	<i>Caprimulgus vociferus</i>	Whip-Poor-Will	Threatened	Threatened	Threatened	S2B,S2M	1 At Risk	22	22.9 $\pm$ 7.0	NB
A	<i>Catharus bicknelli</i>	Bicknell's Thrush	Threatened	Special Concern	Threatened	S2B,S2M	1 At Risk	9	20.7 $\pm$ 2.0	NB
A	<i>Glyptemys insculpta</i>	Wood Turtle	Threatened	Threatened	Threatened	S2S3	1 At Risk	552	12.9 $\pm$ 0.0	NB
A	<i>Chaetura pelagica</i>	Chimney Swift	Threatened	Threatened	Threatened	S2S3B,S2M	1 At Risk	136	19.4 $\pm$ 7.0	NB
A	<i>Riparia riparia</i>	Bank Swallow	Threatened		Threatened	S2S3B,S2S3M	3 Sensitive	722	0.6 $\pm$ 0.0	NB
A	<i>Acipenser oxyrinchus</i>	Atlantic Sturgeon	Threatened		Threatened	S3	4 Secure	1	45.3 $\pm$ 1.0	NB
A	<i>Hirundo rustica</i>	Barn Swallow	Threatened		Threatened	S3B,S3M	3 Sensitive	1090	1.2 $\pm$ 0.0	NB
A	<i>Dolichonyx oryzivorus</i>	Bobolink	Threatened		Threatened	S3B,S3M	3 Sensitive	1061	2.3 $\pm$ 1.0	NB
A	<i>Chordeiles minor</i>	Common Nighthawk	Threatened	Threatened	Threatened	S3B,S4M	1 At Risk	182	15.8 $\pm$ 0.0	NB
A	<i>Contopus cooperi</i>	Olive-sided Flycatcher	Threatened	Threatened	Threatened	S3S4B,S3S4M	1 At Risk	462	5.8 $\pm$ 7.0	NB
A	<i>Wilsonia canadensis</i>	Canada Warbler	Threatened	Threatened	Threatened	S3S4B,S3S4M	1 At Risk	476	4.7 $\pm$ 7.0	NB
A	<i>Anguilla rostrata</i>	American Eel	Threatened		Threatened	S4	4 Secure	78	28.0 $\pm$ 1.0	NB
A	<i>Coturnicops noveboracensis</i>	Yellow Rail	Special Concern	Special Concern	Special Concern	S1?B,SUM	2 May Be At Risk	5	33.2 $\pm$ 0.0	NB
A	<i>Falco peregrinus</i> pop. 1	Peregrine Falcon - anatum/tundrius	Special Concern	Special Concern	Endangered	S1B,S3M	1 At Risk	274	2.3 $\pm$ 1.0	NB
A	<i>Asio flammeus</i>	Short-eared Owl	Special Concern	Special Concern	Special Concern	S2B,S2M	3 Sensitive	46	22.3 $\pm$ 64.0	NB
A	<i>Bucephala islandica</i> (Eastern pop.)	Barrow's Goldeneye - Eastern pop.	Special Concern	Special Concern	Special Concern	S2M,S2N	3 Sensitive	108	1.6 $\pm$ 5.0	NB
A	<i>Balaenoptera physalus</i>	Fin Whale - Atlantic pop.	Special Concern	Special Concern	Special Concern	S2S3		1	71.6 $\pm$ 1.0	NB
A	<i>Euphagus carolinus</i>	Rusty Blackbird	Special Concern	Special Concern	Special Concern	S3B,S3M	2 May Be At Risk	86	25.9 $\pm$ 0.0	NB
A	<i>Phalaropus lobatus</i>	Red-necked Phalarope	Special Concern		Special Concern	S3M	3 Sensitive	20	18.5 $\pm$ 0.0	NB
A	<i>Contopus virens</i>	Eastern Wood-Pewee	Special Concern		Special Concern	S4B,S4M	4 Secure	554	1.0 $\pm$ 0.0	NB
A	<i>Podiceps auritus</i>	Horned Grebe	Special Concern		Special Concern	S4N,S4M	4 Secure	50	1.2 $\pm$ 0.0	NB
A	<i>Hemidactylium scutatum</i>	Four-toed Salamander	Not At Risk			S1?	5 Undetermined	4	85.7 $\pm$ 0.0	NB
A	<i>Bubo scandiacus</i>	Snowy Owl	Not At Risk			S1N,S2S3M	4 Secure	51	1.2 $\pm$ 0.0	NB
A	<i>Accipiter cooperii</i>	Cooper's Hawk	Not At Risk			S1S2B,S1S2M	2 May Be At Risk	3	13.7 $\pm$ 5.0	NB
A	<i>Fulica americana</i>	American Coot	Not At Risk			S1S2B,S1S2M	3 Sensitive	57	25.5 $\pm$ 7.0	NB
A	<i>Aegolius funereus</i>	Boreal Owl	Not At Risk			S1S2B,SUM	2 May Be At Risk	11	31.2 $\pm$ 0.0	NB
A	<i>Sorex dispar</i>	Long-tailed Shrew	Not At Risk	Special Concern		S2	3 Sensitive	3	51.6 $\pm$ 1.0	NB

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
A	<i>Buteo lineatus</i>	Red-shouldered Hawk	Not At Risk	Special Concern		S2B,S2M	2 May Be At Risk	12	25.9 ± 0.0	NB
A	<i>Chlidonias niger</i>	Black Tern	Not At Risk			S2B,S2M	3 Sensitive	44	28.1 ± 7.0	NB
A	<i>Lynx canadensis</i>	Canadian Lynx	Not At Risk		Endangered	S3	1 At Risk	18	40.7 ± 10.0	NB
A	<i>Desmognathus fuscus</i>	Northern Dusky Salamander	Not At Risk			S3	3 Sensitive	1	80.5 ± 0.0	NB
A	<i>Sterna hirundo</i>	Common Tern	Not At Risk			S3B,SUM	3 Sensitive	612	0.6 ± 0.0	NB
A	<i>Podiceps grisegena</i>	Red-necked Grebe	Not At Risk			S3M,S2N	3 Sensitive	50	2.0 ± 1.0	NB
A	<i>Lagenorhynchus acutus</i>	Atlantic White-sided Dolphin	Not At Risk			S3S4		2	42.2 ± 1.0	NB
A	<i>Haliaeetus leucocephalus</i>	Bald Eagle	Not At Risk		Endangered	S4	1 At Risk	1055	0.6 ± 0.0	NB
A	<i>Canis lupus</i>	Gray Wolf	Not At Risk		Extirpated	SX	0.1 Extirpated	2	73.1 ± 100.0	NB
A	<i>Puma concolor pop. 1</i>	Cougar - Eastern pop.	Data Deficient		Endangered	SU	5 Undetermined	114	14.5 ± 1.0	NB
A	<i>Morone saxatilis</i>	Striped Bass	E,E,SC			S3	2 May Be At Risk	39	45.3 ± 0.0	NB
A	<i>Salvelinus alpinus</i>	Arctic Char				S1	3 Sensitive	3	92.3 ± 1.0	NB
A	<i>Tringa melanoleuca</i>	Greater Yellowlegs				S1?B,S5M	4 Secure	2030	0.6 ± 0.0	NB
A	<i>Gallinula chloropus</i>	Common Moorhen				S1B,S1M	3 Sensitive	30	35.9 ± 0.0	NB
A	<i>Bartramia longicauda</i>	Upland Sandpiper				S1B,S1M	3 Sensitive	42	17.7 ± 7.0	NB
A	<i>Phalaropus tricolor</i>	Wilson's Phalarope				S1B,S1M	3 Sensitive	27	28.1 ± 0.0	NB
A	<i>Leucophaeus atricilla</i>	Laughing Gull				S1B,S1M	3 Sensitive	9	9.6 ± 0.0	NB
A	<i>Progne subis</i>	Purple Martin				S1B,S1M	2 May Be At Risk	79	1.3 ± 0.0	NB
A	<i>Oxyura jamaicensis</i>	Ruddy Duck				S1B,S2S3M	4 Secure	103	2.2 ± 0.0	NB
A	<i>Aythya affinis</i>	Lesser Scaup				S1B,S4M	4 Secure	164	2.0 ± 1.0	NB
A	<i>Aythya marila</i>	Greater Scaup				S1B,S4M,S2N	4 Secure	9	2.3 ± 1.0	NB
A	<i>Eremophila alpestris</i>	Horned Lark				S1B,S4N,S5M	2 May Be At Risk	63	22.9 ± 7.0	NB
A	<i>Sterna paradisaea</i>	Arctic Tern				S1B,SUM	2 May Be At Risk	32	9.5 ± 7.0	NB
A	<i>Fratercula arctica</i>	Atlantic Puffin				S1B,SUN,SUM	3 Sensitive	3	63.0 ± 0.0	NB
A	<i>Branta bernicla</i>	Brant				S1N, S2S3M	4 Secure	34	2.0 ± 1.0	NB
A	<i>Chroicocephalus ridibundus</i>	Black-headed Gull				S1N,S2M	3 Sensitive	13	1.3 ± 0.0	NB
A	<i>Butorides virescens</i>	Green Heron				S1S2B,S1S2M	3 Sensitive	5	32.4 ± 7.0	NB
A	<i>Nycticorax nycticorax</i>	Black-crowned Night-heron				S1S2B,S1S2M	3 Sensitive	5	1.3 ± 0.0	NB
A	<i>Empidonax traillii</i>	Willow Flycatcher				S1S2B,S1S2M	3 Sensitive	54	22.2 ± 2.0	NB
A	<i>Stelgidopteryx serripennis</i>	Northern Rough-winged Swallow				S1S2B,S1S2M	2 May Be At Risk	4	59.6 ± 0.0	NS
A	<i>Troglodytes aedon</i>	House Wren				S1S2B,S1S2M	5 Undetermined	11	9.5 ± 7.0	NB
A	<i>Rissa tridactyla</i>	Black-legged Kittiwake				S1S2B,S4N,S5M	4 Secure	2	22.1 ± 0.0	NB
A	<i>Calidris bairdii</i>	Baird's Sandpiper				S1S2M	3 Sensitive	48	4.3 ± 0.0	NB
A	<i>Cistothorus palustris</i>	Marsh Wren				S2B,S2M	3 Sensitive	43	27.3 ± 1.0	NB
A	<i>Mimus polyglottos</i>	Northern Mockingbird				S2B,S2M	3 Sensitive	136	1.6 ± 5.0	NB
A	<i>Toxostoma rufum</i>	Brown Thrasher				S2B,S2M	3 Sensitive	23	15.7 ± 7.0	NB
A	<i>Poocetes gramineus</i>	Vesper Sparrow				S2B,S2M	2 May Be At Risk	112	12.1 ± 0.0	NB
A	<i>Anas strepera</i>	Gadwall				S2B,S3M	4 Secure	239	2.3 ± 1.0	NB
A	<i>Pinicola enucleator</i>	Pine Grosbeak				S2B,S4S5N,S4S5M	3 Sensitive	29	9.5 ± 7.0	NB
A	<i>Tringa solitaria</i>	Solitary Sandpiper				S2B,S5M	4 Secure	151	2.3 ± 1.0	NB
A	<i>Oceanodroma leucorhoa</i>	Leach's Storm-Petrel				S2B,SUM	3 Sensitive	1	10.1 ± 0.0	NB
A	<i>Chen caerulescens</i>	Snow Goose				S2M	4 Secure	22	2.3 ± 1.0	NB
A	<i>Phalacrocorax carbo</i>	Great Cormorant				S2N,S2M	4 Secure	75	2.0 ± 1.0	NB
A	<i>Somateria spectabilis</i>	King Eider				S2N,S2M	4 Secure	4	1.3 ± 0.0	NB
A	<i>Larus hyperboreus</i>	Glaucous Gull				S2N,S2M	4 Secure	92	2.0 ± 1.0	NB
A	<i>Asio otus</i>	Long-eared Owl				S2S3	5 Undetermined	29	22.5 ± 0.0	NB
A	<i>Picoides dorsalis</i>	American Three-toed Woodpecker				S2S3	3 Sensitive	18	50.8 ± 7.0	NB
A	<i>Salmo salar</i>	Atlantic Salmon				S2S3	2 May Be At Risk	59	28.0 ± 1.0	NB
A	<i>Anas clypeata</i>	Northern Shoveler				S2S3B,S2S3M	4 Secure	271	2.3 ± 1.0	NB
A	<i>Myiarchus crinitus</i>	Great Crested Flycatcher				S2S3B,S2S3M	3 Sensitive	35	4.7 ± 7.0	NB
A	<i>Petrochelidon</i>	Cliff Swallow				S2S3B,S2S3M	3 Sensitive	442	1.3 ± 0.0	NB

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
A	<i>pyrrhonota</i>									
A	<i>Pluvialis dominica</i>	American Golden-Plover				S2S3M	3 Sensitive	209	1.3 ± 0.0	NB
A	<i>Calcarius lapponicus</i>	Lapland Longspur				S2S3N,SUM	3 Sensitive	42	4.3 ± 1.0	NB
A	<i>Cephus grylle</i>	Black Guillemot				S3	4 Secure	51	34.7 ± 7.0	PE
A	<i>Loxia curvirostra</i>	Red Crossbill				S3	4 Secure	107	1.2 ± 0.0	NB
A	<i>Carduelis pinus</i>	Pine Siskin				S3	4 Secure	295	9.5 ± 7.0	NB
A	<i>Sorex maritimensis</i>	Maritime Shrew				S3	4 Secure	144	38.4 ± 1.0	NB
A	<i>Eptesicus fuscus</i>	Big Brown Bat				S3	3 Sensitive	6	25.4 ± 1.0	NB
A	<i>Cathartes aura</i>	Turkey Vulture				S3B,S3M	4 Secure	114	2.0 ± 1.0	NB
A	<i>Rallus limicola</i>	Virginia Rail				S3B,S3M	3 Sensitive	88	15.4 ± 0.0	NB
A	<i>Charadrius vociferus</i>	Killdeer				S3B,S3M	3 Sensitive	845	0.6 ± 0.0	NB
A	<i>Tringa semipalmata</i>	Willet				S3B,S3M	3 Sensitive	846	0.6 ± 0.0	NB
A	<i>Coccyzus erythrophthalmus</i>	Black-billed Cuckoo				S3B,S3M	4 Secure	108	9.5 ± 7.0	NB
A	<i>Vireo gilvus</i>	Warbling Vireo				S3B,S3M	4 Secure	44	24.1 ± 7.0	NB
A	<i>Piranga olivacea</i>	Scarlet Tanager				S3B,S3M	4 Secure	40	24.1 ± 7.0	NB
A	<i>Passerina cyanea</i>	Indigo Bunting				S3B,S3M	4 Secure	24	28.9 ± 7.0	NB
A	<i>Molothrus ater</i>	Brown-headed Cowbird				S3B,S3M	2 May Be At Risk	244	2.3 ± 1.0	NB
A	<i>Icterus galbula</i>	Baltimore Oriole				S3B,S3M	4 Secure	81	2.0 ± 1.0	NB
A	<i>Coccothraustes vespertinus</i>	Evening Grosbeak				S3B,S3S4N,SUM	3 Sensitive	229	10.1 ± 7.0	NB
A	<i>Somateria mollissima</i>	Common Eider				S3B,S4M,S3N	4 Secure	183	1.3 ± 0.0	NB
A	<i>Dendroica tigrina</i>	Cape May Warbler				S3B,S4S5M	4 Secure	243	5.8 ± 7.0	NB
A	<i>Anas acuta</i>	Northern Pintail				S3B,S5M	3 Sensitive	136	4.3 ± 10.0	NB
A	<i>Mergus serrator</i>	Red-breasted Merganser				S3B,S5M,S4S5N	4 Secure	290	1.3 ± 0.0	NB
A	<i>Arenaria interpres</i>	Ruddy Turnstone				S3M	4 Secure	1144	0.6 ± 0.0	NB
A	<i>Phalaropus fulicarius</i>	Red Phalarope				S3M	3 Sensitive	5	42.5 ± 0.0	NB
A	<i>Melanitta nigra</i>	Black Scoter				S3M,S1S2N	3 Sensitive	262	0.5 ± 0.0	NB
A	<i>Bucephala albeola</i>	Bufflehead				S3M,S2N	3 Sensitive	106	1.3 ± 0.0	NB
A	<i>Calidris maritima</i>	Purple Sandpiper				S3M,S3N	4 Secure	66	2.3 ± 1.0	NB
A	<i>Synaptomys cooperi</i>	Southern Bog Lemming				S3S4	4 Secure	89	56.2 ± 0.0	NB
A	<i>Tyrannus tyrannus</i>	Eastern Kingbird				S3S4B,S3S4M	3 Sensitive	460	2.3 ± 1.0	NB
A	<i>Actitis macularius</i>	Spotted Sandpiper				S3S4B,S5M	4 Secure	855	0.6 ± 0.0	NB
A	<i>Gallinago delicata</i>	Wilson's Snipe				S3S4B,S5M	4 Secure	686	2.3 ± 0.0	NB
A	<i>Larus delawarensis</i>	Ring-billed Gull				S3S4B,S5M	4 Secure	272	0.6 ± 0.0	NB
A	<i>Dendroica striata</i>	Blackpoll Warbler				S3S4B,S5M	4 Secure	50	5.8 ± 7.0	NB
A	<i>Pluvialis squatarola</i>	Black-bellied Plover				S3S4M	4 Secure	1925	0.6 ± 0.0	NB
A	<i>Limosa haemastica</i>	Hudsonian Godwit				S3S4M	4 Secure	533	2.3 ± 0.0	NB
A	<i>Calidris pusilla</i>	Semipalmated Sandpiper				S3S4M	4 Secure	2484	0.6 ± 0.0	NB
A	<i>Calidris melanotos</i>	Pectoral Sandpiper				S3S4M	4 Secure	375	0.6 ± 0.0	NB
A	<i>Calidris alba</i>	Sanderling				S3S4M,S1N	3 Sensitive	1760	0.6 ± 0.0	NB
A	<i>Morus bassanus</i>	Northern Gannet				SHB,S5M	4 Secure	184	1.3 ± 0.0	NB
A	<i>Lanius ludovicianus</i>	Loggerhead Shrike				SXB,SXM	1 At Risk	1	25.9 ± 0.0	NB
I	<i>Gomphus ventricosus</i>	Skillet Clubtail	Endangered		Endangered	S1S2	2 May Be At Risk	1	81.6 ± 0.0	NB
I	<i>Alasmidonta varicosa</i>	Brook Floater	Special Concern		Special Concern	S2	3 Sensitive	28	31.3 ± 0.0	NB
I	<i>Lampsilis cariosa</i>	Yellow Lampmussel	Special Concern	Special Concern	Special Concern	S2	3 Sensitive	4	92.4 ± 0.0	NB
I	<i>Bombus terricola</i>	Yellow-banded Bumblebee	Special Concern			S3?	3 Sensitive	8	47.3 ± 0.0	NB
I	<i>Danaus plexippus</i>	Monarch	Special Concern	Special Concern	Special Concern	S3B,S3M	3 Sensitive	70	2.1 ± 1.0	NB
I	<i>Erora laeta</i>	Early Hairstreak				S1	2 May Be At Risk	2	26.7 ± 1.0	NB
I	<i>Leucorrhinia patricia</i>	Canada Whiteface				S1	2 May Be At Risk	7	71.8 ± 1.0	NB
I	<i>Plebejus saepiolus</i>	Greenish Blue				S1S2	4 Secure	1	60.3 ± 1.0	NB
I	<i>Strymon melinus</i>	Grey Hairstreak				S2	4 Secure	1	35.3 ± 1.0	NB
I	<i>Somatochlora brevicincta</i>	Quebec Emerald				S2	5 Undetermined	2	35.6 ± 0.0	NB
I	<i>Somatochlora tenebrosa</i>	Clamp-Tipped Emerald				S2	5 Undetermined	5	8.5 ± 1.0	NB
I	<i>Ladona exusta</i>	White Corporal				S2	5 Undetermined	2	58.2 ± 0.0	NB

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov	
I	<i>Coenagrion interrogatum</i>	Subarctic Bluet				S2	3 Sensitive	3	87.5 ± 1.0	NB	
I	<i>Callophrys henrici</i>	Henry's Elfin				S2S3	4 Secure	8	25.1 ± 0.0	NB	
I	<i>Agonum consimile</i>	a Ground Beetle				S3	4 Secure	1	24.6 ± 1.0	NB	
I	<i>Amara pallipes</i>	a Ground Beetle				S3	4 Secure	2	24.6 ± 1.0	NB	
I	<i>Calathus gregarius</i>	a Ground Beetle				S3	4 Secure	1	79.5 ± 1.0	NB	
I	<i>Dyschirius setosus</i>	a Ground Beetle				S3	5 Undetermined	3	56.7 ± 0.0	NB	
I	<i>Elaphrus americanus</i>	a Ground Beetle				S3	4 Secure	1	61.3 ± 0.0	NB	
I	<i>Lachnocrepis parallela</i>	a Ground Beetle				S3	4 Secure	1	56.7 ± 0.0	NB	
I	<i>Agonum crenistriatum</i>	a Ground Beetle				S3	5 Undetermined	1	24.6 ± 1.0	NB	
I	<i>Harpalus fulvilabris</i>	a Ground Beetle				S3	4 Secure	1	60.6 ± 0.0	NB	
I	<i>Carabus maeander</i>	a Ground Beetle				S3	5 Undetermined	1	24.6 ± 1.0	NB	
I	<i>Carabus serratus</i>	a Ground Beetle				S3	4 Secure	1	30.0 ± 1.0	NB	
I	<i>Hippodamia parenthesis</i>	Parenthesis Lady Beetle				S3	4 Secure	6	24.6 ± 1.0	NB	
I	<i>Trachysida aspera</i>	a Longhorned Beetle				S3		1	66.6 ± 0.0	NB	
I	<i>Hesperia sassacus</i>	Indian Skipper				S3	4 Secure	1	70.2 ± 5.0	NB	
I	<i>Euphyes bimacula</i>	Two-spotted Skipper				S3	4 Secure	6	20.8 ± 1.0	NB	
I	<i>Papilio brevicauda</i>	Short-tailed Swallowtail				S3	4 Secure	7	35.4 ± 7.0	NB	
I	<i>Papilio brevicauda bretonensis</i>	Short-tailed Swallowtail				S3	4 Secure	6	4.2 ± 0.0	NB	
I	<i>Lycaena hyllus</i>	Bronze Copper				S3	3 Sensitive	76	8.2 ± 0.0	NB	
I	<i>Lycaena dospassosi</i>	Salt Marsh Copper				S3	4 Secure	93	1.4 ± 0.0	NB	
I	<i>Satyrium acadica</i>	Acadian Hairstreak				S3	4 Secure	19	24.0 ± 10.0	NB	
I	<i>Callophrys polios</i>	Hoary Elfin				S3	4 Secure	7	10.2 ± 0.0	NB	
I	<i>Plebejus idas</i>	Northern Blue				S3	4 Secure	17	39.1 ± 0.0	NB	
I	<i>Plebejus idas empetri</i>	Crowberry Blue				S3	4 Secure	5	44.9 ± 0.0	NB	
I	<i>Speyeria aphrodite</i>	Aphrodite Fritillary				S3	4 Secure	8	25.5 ± 0.0	NB	
I	<i>Boloria chariclea</i>	Arctic Fritillary				S3	4 Secure	10	36.4 ± 1.0	NB	
I	<i>Polygonia satyrus</i>	Satyr Comma				S3	4 Secure	3	89.0 ± 2.0	PE	
I	<i>Polygonia gracilis</i>	Hoary Comma				S3	4 Secure	1	69.8 ± 0.0	NB	
I	<i>Nymphalis l-album</i>	Compton Tortoiseshell				S3	4 Secure	6	25.7 ± 10.0	NB	
I	<i>Gomphus abbreviatus</i>	Spine-crowned Clubtail				S3	4 Secure	1	94.7 ± 0.0	NB	
I	<i>Dorocordulia lepida</i>	Petite Emerald				S3	4 Secure	3	67.5 ± 1.0	NB	
I	<i>Somatochlora cingulata</i>	Lake Emerald				S3	4 Secure	3	76.2 ± 1.0	NB	
I	<i>Somatochlora forcipata</i>	Forcipate Emerald				S3	4 Secure	5	29.0 ± 0.0	NB	
I	<i>Williamsonia fletcheri</i>	Ebony Boghaunter				S3	4 Secure	17	20.6 ± 2.0	NB	
I	<i>Lestes eurinus</i>	Amber-Winged Spreadwing				S3	4 Secure	16	35.3 ± 1.0	NB	
I	<i>Lestes vigilax</i>	Swamp Spreadwing				S3	3 Sensitive	1	94.2 ± 0.0	NS	
I	<i>Stylurus scudderi</i>	Zebra Clubtail				S3	4 Secure	5	25.5 ± 0.0	NB	
I	<i>Alasmidonta undulata</i>	Triangle Floater				S3	3 Sensitive	29	45.6 ± 1.0	NB	
I	<i>Leptodea ochracea</i>	Tidewater Mucket				S3	4 Secure	22	34.7 ± 1.0	NB	
I	<i>Pantala hymenaea</i>	Spot-Winged Glider				S3B,S3M	4 Secure	3	13.5 ± 0.0	NB	
I	<i>Satyrium liparops</i>	Striped Hairstreak				S3S4	4 Secure	13	26.0 ± 0.0	NB	
I	<i>Satyrium liparops strigosum</i>	Striped Hairstreak				S3S4	4 Secure	11	8.3 ± 0.0	NB	
I	<i>Cupido comyntas</i>	Eastern Tailed Blue				S3S4	4 Secure	1	57.3 ± 0.0	NB	
I	<i>Coccinella transversoguttata richardsoni</i>	Transverse Lady Beetle				SH	2 May Be At Risk	27	5.2 ± 1.0	NB	
N	<i>Erioderma mollissimum</i>	Graceful Felt Lichen	Endangered		Endangered		SH	2 May Be At Risk	1	87.9 ± 1.0	NB
N	<i>Erioderma pedicellatum (Atlantic pop.)</i>	Boreal Felt Lichen - Atlantic pop.	Endangered	Endangered	Endangered		SH	1 At Risk	2	99.1 ± 0.0	NS
N	<i>Peltigera hydrothyria</i>	Eastern Waterfan	Threatened			S1	5 Undetermined	6	49.9 ± 1.0	NB	
N	<i>Anzia colpodes</i>	Black-foam Lichen	Threatened			S1S2	5 Undetermined	2	73.7 ± 1.0	NB	



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N	<i>Degelia plumbea</i>	Blue Felt Lichen	Special Concern	Special Concern	Special Concern	S1	2 May Be At Risk	1	99.0 ± 0.0	NS
N	<i>Pseudevernia cladonia</i>	Ghost Antler Lichen	Not At Risk			S2S3	5 Undetermined	3	79.2 ± 0.0	NB
N	<i>Aloina rigida</i>	Aloe-Like Rigid Screw Moss				S1	2 May Be At Risk	2	53.2 ± 0.0	NB
N	<i>Aulacomnium heterostichum</i>	One-sided Groove Moss				S1	2 May Be At Risk	1	76.3 ± 0.0	NB
N	<i>Campylostelium saxicola</i>	a Moss				S1	2 May Be At Risk	3	78.5 ± 0.0	NB
N	<i>Dicranoweisia crispula</i>	Mountain Thatch Moss				S1	2 May Be At Risk	1	77.9 ± 0.0	NB
N	<i>Didymodon rigidulus</i> var. <i>gracilis</i>	a moss				S1	2 May Be At Risk	1	85.4 ± 1.0	NB
N	<i>Syntrichia ruralis</i>	a Moss				S1	2 May Be At Risk	1	93.0 ± 0.0	NB
N	<i>Zygodon viridissimus</i> var. <i>viridissimus</i>	a Moss				S1	2 May Be At Risk	1	77.7 ± 0.0	NB
N	<i>Cladonia metacorallifera</i>	Reptilian Pixie-cup Lichen				S1	5 Undetermined	5	71.7 ± 1.0	NB
N	<i>Coccocarpia palmicola</i>	Salted Shell Lichen				S1	2 May Be At Risk	1	71.7 ± 1.0	NB
N	<i>Peltigera malacea</i>	Veinless Pelt Lichen				S1	5 Undetermined	1	84.3 ± 1.0	NB
N	<i>Bryoria bicolor</i>	Electrified Horsehair Lichen				S1	2 May Be At Risk	1	84.3 ± 1.0	NB
N	<i>Hygrobiella laxifolia</i>	Lax Notchwort				S1?	6 Not Assessed	1	85.7 ± 1.0	NB
N	<i>Bartramia ithyphylla</i>	Straight-leaved Apple Moss				S1?	2 May Be At Risk	2	78.8 ± 1.0	NB
N	<i>Dicranum bonjeanii</i>	Bonjean's Broom Moss				S1?	2 May Be At Risk	1	96.3 ± 1.0	NB
N	<i>Dicranum condensatum</i>	Condensed Broom Moss				S1?	2 May Be At Risk	1	78.0 ± 0.0	NB
N	<i>Entodon brevisetus</i>	a Moss				S1?	2 May Be At Risk	1	82.5 ± 10.0	NB
N	<i>Eurhynchium hians</i>	Light Beaked Moss				S1?	2 May Be At Risk	1	95.8 ± 0.0	NB
N	<i>Homomallium adnatum</i>	Adnate Hairy-gray Moss				S1?	2 May Be At Risk	4	59.7 ± 1.0	NB
N	<i>Plagiothecium latebricola</i>	Alder Silk Moss				S1?	2 May Be At Risk	2	84.6 ± 1.0	NB
N	<i>Rhytidium rugosum</i>	Wrinkle-leaved Moss				S1?	2 May Be At Risk	2	85.3 ± 1.0	NB
N	<i>Seligeria recurvata</i>	a Moss				S1?	2 May Be At Risk	3	53.4 ± 15.0	NB
N	<i>Timmia megapolitana</i>	Metropolitan Timmia Moss				S1?	2 May Be At Risk	1	98.2 ± 1.0	NS
N	<i>Rhizomnium pseudopunctatum</i>	Felted Leafy Moss				S1?	2 May Be At Risk	1	73.8 ± 0.0	NB
N	<i>Cephaloziella spinigera</i>	Spiny Threadwort				S1S2	6 Not Assessed	2	74.0 ± 0.0	NB
N	<i>Cladopodiella francisci</i>	Holt's Notchwort				S1S2	6 Not Assessed	4	69.3 ± 0.0	NB
N	<i>Harpanthus flotovianus</i>	Great Mountain Flapwort				S1S2	6 Not Assessed	2	72.5 ± 1.0	NB
N	<i>Jungermannia obovata</i>	Egg Flapwort				S1S2	6 Not Assessed	1	79.9 ± 0.0	NB
N	<i>Odontoschisma sphagni</i>	Bog-Moss Flapwort				S1S2	6 Not Assessed	1	84.1 ± 0.0	NB
N	<i>Pallavicinia lyellii</i>	Lyell's Ribbonwort				S1S2	6 Not Assessed	1	82.5 ± 1.0	NB
N	<i>Radula tenax</i>	Tenacious Scalewort				S1S2	6 Not Assessed	1	79.9 ± 0.0	NB
N	<i>Brachythecium acuminatum</i>	Acuminate Ragged Moss				S1S2	5 Undetermined	2	80.8 ± 2.0	NB
N	<i>Bryum salinum</i>	a Moss				S1S2	2 May Be At Risk	1	84.6 ± 1.0	NB
N	<i>Distichium inclinatum</i>	Inclined Iris Moss				S1S2	2 May Be At Risk	5	85.4 ± 1.0	NB
N	<i>Ditrichum pallidum</i>	Pale Cow-hair Moss				S1S2	2 May Be At Risk	1	82.8 ± 1.0	NB
N	<i>Drummondia prorepens</i>	a Moss				S1S2	2 May Be At Risk	1	78.4 ± 0.0	NB
N	<i>Hygrohypnum bestii</i>	Best's Brook Moss				S1S2	3 Sensitive	5	77.7 ± 1.0	NB
N	<i>Seligeria brevifolia</i>	a Moss				S1S2	3 Sensitive	4	77.5 ± 0.0	NB
N	<i>Timmia norvegica</i>	a moss				S1S2	2 May Be At Risk	2	85.6 ± 0.0	NB
N	<i>Timmia norvegica</i> var. <i>excurrentis</i>	a moss				S1S2	2 May Be At Risk	1	85.6 ± 0.0	NB
N	<i>Tortella humilis</i>	Small Crisp Moss				S1S2	2 May Be At Risk	7	79.9 ± 1.0	NB
N	<i>Pseudotaxiphyllum distichaceum</i>	a Moss				S1S2	2 May Be At Risk	1	27.1 ± 1.0	NB
N	<i>Umbilicaria vellea</i>	Grizzled Rocktripe Lichen				S1S2	5 Undetermined	1	85.0 ± 1.0	NB

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N	<i>Peltigera scabrosa</i>	Greater Toad Pelt Lichen				S1S2	2 May Be At Risk	4	70.1 ± 1.0	NB
N	<i>Tritomaria scitula</i>	Mountain Notchwort				S1S3	6 Not Assessed	1	76.0 ± 1.0	NB
N	<i>Amphidium mougeotii</i>	a Moss				S2	3 Sensitive	11	75.6 ± 0.0	NB
N	<i>Anomodon viticulosus</i>	a Moss				S2	2 May Be At Risk	3	67.1 ± 10.0	NB
N	<i>Cirriphyllum piliferum</i>	Hair-pointed Moss				S2	3 Sensitive	4	64.5 ± 1.0	NB
N	<i>Dicranella palustris</i>	Drooping-Leaved Fork Moss				S2	3 Sensitive	7	72.5 ± 1.0	NB
N	<i>Didymodon ferrugineus</i>	a moss				S2	3 Sensitive	1	85.1 ± 0.0	NB
N	<i>Anomodon tristis</i>	a Moss				S2	2 May Be At Risk	3	79.3 ± 10.0	NB
N	<i>Isopterygiopsis pulchella</i>	Neat Silk Moss				S2	3 Sensitive	7	76.7 ± 1.0	NB
N	<i>Platydictya jungermannioides</i>	False Willow Moss				S2	3 Sensitive	4	53.4 ± 15.0	NB
N	<i>Pohlia elongata</i>	Long-necked Nodding Moss				S2	3 Sensitive	14	76.3 ± 0.0	NB
N	<i>Pohlia sphagnicola</i>	a moss				S2	3 Sensitive	1	72.6 ± 0.0	NB
N	<i>Seligeria calcarea</i>	Chalk Brittle Moss				S2	3 Sensitive	2	72.5 ± 0.0	NB
N	<i>Sphagnum centrale</i>	Central Peat Moss				S2	3 Sensitive	6	73.0 ± 1.0	NB
N	<i>Sphagnum flexuosum</i>	Flexuous Peatmoss				S2	3 Sensitive	3	58.6 ± 10.0	NB
N	<i>Tayloria serrata</i>	Serrate Trumpet Moss				S2	3 Sensitive	7	55.3 ± 100.0	NB
N	<i>Tetradontium brownianum</i>	Little Georgia				S2	3 Sensitive	12	76.3 ± 0.0	NB
N	<i>Thamnobryum alleghaniense</i>	a Moss				S2	3 Sensitive	12	50.4 ± 1.0	NB
N	<i>Ulota phyllantha</i>	a Moss				S2	3 Sensitive	4	85.5 ± 0.0	NB
N	<i>Anomobryum filiforme</i>	a moss				S2	5 Undetermined	3	85.4 ± 1.0	NB
N	<i>Cladonia macrophylla</i>	Fig-leaved Lichen				S2	5 Undetermined	3	77.8 ± 1.0	NB
N	<i>Nephroma laevigatum</i>	Mustard Kidney Lichen				S2	2 May Be At Risk	1	69.6 ± 0.0	NB
N	<i>Anacamptodon splachnoides</i>	a Moss				S2?	3 Sensitive	2	56.1 ± 1.0	NB
N	<i>Andreaea rothii</i>	a Moss				S2?	3 Sensitive	5	75.6 ± 0.0	NB
N	<i>Anomodon minor</i>	Blunt-leaved Anomodon Moss				S2?	2 May Be At Risk	1	66.4 ± 1.0	NB
N	<i>Bryum pallescens</i>	Pale Bryum Moss				S2?	5 Undetermined	1	69.8 ± 100.0	NB
N	<i>Dichelyma capillaceum</i>	Hairlike Dichelyma Moss				S2?	3 Sensitive	1	82.4 ± 3.0	NB
N	<i>Dicranum spurium</i>	Spurred Broom Moss				S2?	3 Sensitive	1	91.0 ± 0.0	PE
N	<i>Hygrohypnum montanum</i>	a Moss				S2?	3 Sensitive	1	75.9 ± 1.0	NB
N	<i>Sphagnum angermanicum</i>	a Peatmoss				S2?	3 Sensitive	2	80.6 ± 0.0	NB
N	<i>Trichodon cylindricus</i>	Cylindric Hairy-teeth Moss				S2?	3 Sensitive	2	53.4 ± 15.0	NB
N	<i>Plagiomnium rostratum</i>	Long-beaked Leafy Moss				S2?	3 Sensitive	4	84.8 ± 0.0	NB
N	<i>Ramalina pollinaria</i>	Chalky Ramalina Lichen				S2?	5 Undetermined	1	82.1 ± 1.0	NB
N	<i>Collema leptaleum</i>	Crumpled Bat's Wing Lichen				S2?	5 Undetermined	1	76.4 ± 0.0	NB
N	<i>Nephroma arcticum</i>	Arctic Kidney Lichen				S2?	3 Sensitive	1	82.7 ± 1.0	NB
N	<i>Bryum uliginosum</i>	a Moss				S2S3	3 Sensitive	1	85.5 ± 0.0	NB
N	<i>Buxbaumia aphylla</i>	Brown Shield Moss				S2S3	3 Sensitive	2	91.0 ± 0.0	PE
N	<i>Calliergonella cuspidata</i>	Common Large Wetland Moss				S2S3	3 Sensitive	2	56.4 ± 0.0	PE
N	<i>Campylium polygamum</i>	a Moss				S2S3	3 Sensitive	2	80.2 ± 0.0	NB
N	<i>Palustriella falcata</i>	a Moss				S2S3	3 Sensitive	2	84.9 ± 0.0	NB
N	<i>Didymodon rigidulus</i>	Rigid Screw Moss				S2S3	3 Sensitive	8	80.8 ± 2.0	NB
N	<i>Ephemerum serratum</i>	a Moss				S2S3	3 Sensitive	2	91.8 ± 0.0	NB
N	<i>Orthotrichum speciosum</i>	Showy Bristle Moss				S2S3	5 Undetermined	6	57.1 ± 4.0	NB
N	<i>Pohlia prolifera</i>	Cottony Nodding Moss				S2S3	3 Sensitive	13	53.4 ± 15.0	NB
N	<i>Racomitrium fasciculare</i>	a Moss				S2S3	3 Sensitive	3	77.9 ± 0.0	NB
N	<i>Racomitrium affine</i>	a Moss				S2S3	3 Sensitive	1	73.5 ± 1.0	NB

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N	<i>Saelania glaucescens</i>	Blue Dew Moss				S2S3	3 Sensitive	2	77.9 ± 0.0	NB
N	<i>Sphagnum subfulvum</i>	a Peatmoss				S2S3	2 May Be At Risk	2	71.8 ± 0.0	NB
N	<i>Taxiphyllum deplanatum</i>	Imbricate Yew-leaved Moss				S2S3	3 Sensitive	2	80.1 ± 1.0	NB
N	<i>Zygodon viridissimus</i>	a Moss				S2S3	2 May Be At Risk	2	77.6 ± 0.0	NB
N	<i>Schistidium agassizii</i>	Elf Bloom Moss				S2S3	3 Sensitive	3	73.5 ± 1.0	NB
N	<i>Loeskeobryum brevirostre</i>	a Moss				S2S3	3 Sensitive	10	75.6 ± 0.0	NB
N	<i>Cyrtomnium hymenophylloides</i>	Short-pointed Lantern Moss				S2S3	3 Sensitive	6	72.7 ± 0.0	NB
N	<i>Cladonia acuminata</i>	Scantly Clad Pixie Lichen				S2S3	5 Undetermined	2	85.0 ± 1.0	NB
N	<i>Cladonia ramulosa</i>	Bran Lichen				S2S3	5 Undetermined	4	80.1 ± 1.0	NB
N	<i>Cladonia sulphurina</i>	Greater Sulphur-cup Lichen				S2S3	5 Undetermined	1	69.5 ± 1.0	NB
N	<i>Dendriscoaulon umhausense</i>	a lichen				S2S3	3 Sensitive	1	78.9 ± 0.0	NB
N	<i>Parmeliopsis ambigua</i>	Green Starburst Lichen				S2S3	5 Undetermined	1	89.1 ± 1.0	NB
N	<i>Sphaerophorus globosus</i>	Northern Coral Lichen				S2S3	3 Sensitive	5	84.3 ± 1.0	NB
N	<i>Hypnum curvifolium</i>	Curved-leaved Plait Moss				S3	3 Sensitive	7	75.6 ± 0.0	NB
N	<i>Tortella fragilis</i>	Fragile Twisted Moss				S3	3 Sensitive	1	85.6 ± 0.0	NB
N	<i>Schistidium maritimum</i>	a Moss				S3	4 Secure	6	73.8 ± 0.0	NB
N	<i>Hymenostylium recurvirostre</i>	Hymenostylium Moss				S3	3 Sensitive	4	85.9 ± 1.0	NB
N	<i>Collema nigrescens</i>	Blistered Tarpaper Lichen				S3	3 Sensitive	2	78.9 ± 0.0	NB
N	<i>Solorina saccata</i>	Woodland Owl Lichen				S3	5 Undetermined	6	85.0 ± 1.0	NB
N	<i>Ahtiana aurescens</i>	Eastern Candlewax Lichen				S3	5 Undetermined	1	73.5 ± 0.0	NB
N	<i>Normandina pulchella</i>	Rimmed Elf-ear Lichen				S3	5 Undetermined	3	80.1 ± 1.0	NB
N	<i>Cladonia farinacea</i>	Farinose Pixie Lichen				S3	5 Undetermined	5	77.7 ± 1.0	NB
N	<i>Leptogium lichenoides</i>	Tattered Jellyskin Lichen				S3	5 Undetermined	6	85.0 ± 1.0	NB
N	<i>Nephroma bellum</i>	Naked Kidney Lichen				S3	4 Secure	3	77.2 ± 1.0	NB
N	<i>Peltigera degenii</i>	Lustrous Pelt Lichen				S3	5 Undetermined	3	80.7 ± 1.0	NB
N	<i>Usnea strigosa</i>	Bushy Beard Lichen				S3	5 Undetermined	4	10.7 ± 0.0	NB
N	<i>Leptogium laceroides</i>	Short-bearded Jellyskin Lichen				S3	3 Sensitive	2	73.7 ± 1.0	NB
N	<i>Peltigera membranacea</i>	Membranous Pelt Lichen				S3	5 Undetermined	6	85.0 ± 1.0	NB
N	<i>Cladonia carneola</i>	Crowned Pixie-cup Lichen				S3	5 Undetermined	1	79.5 ± 1.0	NB
N	<i>Cladonia deformis</i>	Lesser Sulphur-cup Lichen				S3	4 Secure	5	77.8 ± 1.0	NB
N	<i>Aulacomnium androgynum</i>	Little Groove Moss				S3?	4 Secure	9	53.4 ± 15.0	NB
N	<i>Dicranella rufescens</i>	Red Forklet Moss				S3?	5 Undetermined	1	85.6 ± 0.0	NB
N	<i>Rhytidiadelphus loreus</i>	Lanky Moss				S3?	2 May Be At Risk	1	85.4 ± 1.0	NB
N	<i>Sphagnum lescurii</i>	a Peatmoss				S3?	5 Undetermined	4	40.8 ± 0.0	NS
N	<i>Stereocaulon subcoralloides</i>	Coralloid Foam Lichen				S3?	5 Undetermined	1	82.1 ± 1.0	NB
N	<i>Barbula convoluta</i>	Lesser Bird's-claw Beard Moss				S3S4	4 Secure	1	68.7 ± 15.0	NB
N	<i>Brachythecium velutinum</i>	Velvet Ragged Moss				S3S4	4 Secure	2	81.1 ± 1.0	NB
N	<i>Dicranella cerviculata</i>	a Moss				S3S4	3 Sensitive	3	73.4 ± 0.0	NS
N	<i>Dicranum majus</i>	Greater Broom Moss				S3S4	4 Secure	21	70.7 ± 0.0	NB
N	<i>Dicranum leioneuron</i>	a Dicranum Moss				S3S4	4 Secure	3	8.8 ± 0.0	NB
N	<i>Encalypta ciliata</i>	Fringed Extinguisher Moss				S3S4	3 Sensitive	1	85.1 ± 0.0	NB
N	<i>Fissidens bryoides</i>	Lesser Pocket Moss				S3S4	4 Secure	3	58.7 ± 5.0	NB
N	<i>Heterocladium dimorphum</i>	Dimorphous Tangle Moss				S3S4	4 Secure	6	70.8 ± 0.0	NB
N	<i>Isopterygiopsis muelleriana</i>	a Moss				S3S4	4 Secure	15	72.7 ± 0.0	NB
N	<i>Myurella julacea</i>	Small Mouse-tail Moss				S3S4	4 Secure	2	85.6 ± 0.0	NB

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
N	<i>Physcomitrium pyriforme</i>	Pear-shaped Urn Moss				S3S4	3 Sensitive	1	96.4 ± 0.0	NB
N	<i>Pogonatum dentatum</i>	Mountain Hair Moss				S3S4	4 Secure	4	73.4 ± 0.0	NS
N	<i>Sphagnum compactum</i>	Compact Peat Moss				S3S4	4 Secure	2	55.8 ± 1.0	PE
N	<i>Sphagnum quinquefarium</i>	Five-ranked Peat Moss				S3S4	4 Secure	1	79.7 ± 0.0	NB
N	<i>Sphagnum torreyanum</i>	a Peatmoss				S3S4	4 Secure	2	53.8 ± 0.0	NB
N	<i>Sphagnum austinii</i>	Austin's Peat Moss				S3S4	4 Secure	1	40.8 ± 0.0	NS
N	<i>Sphagnum contortum</i>	Twisted Peat Moss				S3S4	4 Secure	1	53.8 ± 0.0	NB
N	<i>Tetraphis geniculata</i>	Geniculate Four-tooth Moss				S3S4	4 Secure	12	68.7 ± 15.0	NB
N	<i>Tetraplodon angustatus</i>	Toothed-leaved Nitrogen Moss				S3S4	4 Secure	2	76.3 ± 0.0	NB
N	<i>Weissia controversa</i>	Green-Cushioned Weissia				S3S4	4 Secure	1	85.9 ± 1.0	NB
N	<i>Abietinella abietina</i>	Wiry Fern Moss				S3S4	4 Secure	1	85.6 ± 0.0	NB
N	<i>Trichostomum tenuirostre</i>	Acid-Soil Moss				S3S4	4 Secure	3	77.9 ± 0.0	NB
N	<i>Rauvella scita</i>	Smaller Fern Moss				S3S4	3 Sensitive	1	72.6 ± 0.0	NB
N	<i>Pannaria rubiginosa</i>	Brown-eyed Shingle Lichen				S3S4	3 Sensitive	1	85.6 ± 1.0	NB
N	<i>Ramalina thrausta</i>	Angelhair Ramalina Lichen				S3S4	5 Undetermined	11	70.1 ± 1.0	NB
N	<i>Hypogymnia vittata</i>	Slender Monk's Hood Lichen				S3S4	4 Secure	22	70.1 ± 1.0	NB
N	<i>Cladonia floerkeana</i>	Gritty British Soldiers Lichen				S3S4	4 Secure	3	81.9 ± 1.0	NB
N	<i>Hypocenomyce friesii</i>	a Lichen				S3S4	5 Undetermined	1	85.0 ± 1.0	NB
N	<i>Melanelia panniformis</i>	Shingled Camouflage Lichen				S3S4	5 Undetermined	4	72.3 ± 1.0	NB
N	<i>Nephroma parile</i>	Powdery Kidney Lichen				S3S4	4 Secure	6	71.7 ± 1.0	NB
N	<i>Protopannaria pezizoides</i>	Brown-gray Moss-shingle Lichen				S3S4	4 Secure	10	85.0 ± 1.0	NB
N	<i>Pseudocyphellaria perpetua</i>	Gilded Specklebelly Lichen				S3S4	3 Sensitive	9	10.8 ± 0.0	NB
N	<i>Stereocaulon paschale</i>	Easter Foam Lichen				S3S4	5 Undetermined	1	34.0 ± 1.0	NB
N	<i>Anaptychia palmulata</i>	Shaggy Fringed Lichen				S3S4	3 Sensitive	3	73.7 ± 1.0	NB
N	<i>Peltigera neopolydactyla</i>	Undulating Pelt Lichen				S3S4	5 Undetermined	7	71.7 ± 1.0	NB
N	<i>Cladonia cariosa</i>	Lesser Ribbed Pixie Lichen				S3S4	4 Secure	3	80.0 ± 1.0	NB
N	<i>Hypocenomyce scalaris</i>	Common Clam Lichen				S3S4	5 Undetermined	1	82.1 ± 1.0	NB
N	<i>Dermatocarpon luridum</i>	Brookside Stippleback Lichen				S3S4	4 Secure	5	69.5 ± 1.0	NB
N	<i>Leucodon brachypus</i>	a Moss				SH	2 May Be At Risk	12	69.5 ± 0.0	NB
N	<i>Splachnum luteum</i>	Yellow Collar Moss				SH	5 Undetermined	1	69.8 ± 100.0	NB
N	<i>Cyrtio-hypnum minutulum</i>	Tiny Cedar Moss				SH	2 May Be At Risk	3	88.0 ± 10.0	NB
P	<i>Juglans cinerea</i>	Butternut	Endangered	Endangered	Endangered	S1	1 At Risk	13	65.8 ± 1.0	NB
P	<i>Symphyotrichum laurentianum</i>	Gulf of St Lawrence Aster	Threatened	Threatened	Endangered	S1	1 At Risk	14	67.3 ± 0.0	NB
P	<i>Symphyotrichum subulatum</i> (Bathurst pop)	Bathurst Aster - Bathurst pop.	Special Concern	Special Concern	Endangered	S2	1 At Risk	59	52.4 ± 0.0	NB
P	<i>Isoetes prototypus</i>	Prototype Quillwort	Special Concern	Special Concern	Endangered	S2	1 At Risk	7	90.3 ± 0.0	NS
P	<i>Lechea maritima</i> var. <i>subcylindrica</i>	Beach Pinweed	Special Concern			S2	3 Sensitive	478	27.0 ± 0.0	NB
P	<i>Cryptotaenia canadensis</i>	Canada Honewort				S1	2 May Be At Risk	1	95.6 ± 1.0	NB
P	<i>Antennaria howellii</i> ssp. <i>petaloidea</i>	Pussy-Toes				S1	2 May Be At Risk	4	73.6 ± 5.0	PE
P	<i>Symphyotrichum subulatum</i> (non-Bathurst pop)	Annual Saltmarsh Aster				S1	2 May Be At Risk	12	53.2 ± 0.0	NB

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P	<i>Pseudognaphalium obtusifolium</i>	Eastern Cudweed				S1	2 May Be At Risk	27	35.1 ± 5.0	NB
P	<i>Hieracium robinsonii</i>	Robinson's Hawkweed				S1	3 Sensitive	5	74.8 ± 0.0	NB
P	<i>Solidago multiradiata</i>	Multi-rayed Goldenrod				S1	2 May Be At Risk	10	42.7 ± 0.0	NB
P	<i>Betula michauxii</i>	Michaux's Dwarf Birch				S1	2 May Be At Risk	3	90.0 ± 0.0	NB
P	<i>Draba arabisans</i>	Rock Whitlow-Grass				S1	2 May Be At Risk	8	73.3 ± 0.0	NB
P	<i>Draba glabella</i>	Rock Whitlow-Grass				S1	2 May Be At Risk	3	85.3 ± 0.0	NB
P	<i>Draba incana</i>	Twisted Whitlow-grass				S1	2 May Be At Risk	4	98.8 ± 0.0	PE
P	<i>Stellaria crassifolia</i>	Fleshy Stitchwort				S1	2 May Be At Risk	3	1.4 ± 5.0	NB
P	<i>Chenopodium simplex</i>	Maple-leaved Goosefoot				S1	2 May Be At Risk	6	60.6 ± 1.0	NB
P	<i>Suaeda rolandii</i>	Roland's Sea-Blite				S1	3 Sensitive	3	48.2 ± 0.0	NB
P	<i>Corema conradii</i>	Broom Crowberry				S1	2 May Be At Risk	6	68.6 ± 0.0	PE
P	<i>Vaccinium boreale</i>	Northern Blueberry				S1	2 May Be At Risk	5	26.1 ± 1.0	NB
P	<i>Vaccinium uliginosum</i>	Alpine Bilberry				S1	2 May Be At Risk	1	83.8 ± 1.0	PE
P	<i>Chamaesyce polygonifolia</i>	Seaside Spurge				S1	2 May Be At Risk	21	49.9 ± 0.0	NB
P	<i>Bartonia virginica</i>	Yellow Bartonia				S1	2 May Be At Risk	3	96.2 ± 0.0	NB
P	<i>Proserpinaca pectinata</i>	Comb-leaved Mermaidweed				S1	2 May Be At Risk	2	80.5 ± 5.0	NS
P	<i>Primula laurentiana</i>	Laurentian Primrose				S1	2 May Be At Risk	9	85.6 ± 0.0	NB
P	<i>Ranunculus sceleratus</i>	Cursed Buttercup				S1	2 May Be At Risk	1	85.7 ± 100.0	NB
P	<i>Amelanchier fernaldii</i>	Fernald's Serviceberry				S1	2 May Be At Risk	3	44.3 ± 1.0	NB
P	<i>Crataegus jonesiae</i>	Jones' Hawthorn				S1	2 May Be At Risk	1	93.3 ± 1.0	NB
P	<i>Dryas integrifolia</i>	Entire-leaved Mountain Avens				S1	2 May Be At Risk	11	41.3 ± 3.0	NB
P	<i>Waldsteinia fragarioides</i>	Barren Strawberry				S1	2 May Be At Risk	1	42.6 ± 1.0	NB
P	<i>Salix myrtillofolia</i>	Blueberry Willow				S1	2 May Be At Risk	24	42.0 ± 0.0	NB
P	<i>Saxifraga paniculata</i> <i>ssp. neogaea</i>	White Mountain Saxifrage				S1	2 May Be At Risk	12	84.6 ± 0.0	NB
P	<i>Agalinis paupercula</i> <i>var. borealis</i>	Small-flowered Agalinis				S1	2 May Be At Risk	29	42.3 ± 0.0	NS
P	<i>Carex annectens</i>	Yellow-Fruited Sedge				S1	2 May Be At Risk	3	8.0 ± 0.0	NB
P	<i>Carex atlantica</i> <i>ssp. atlantica</i>	Atlantic Sedge				S1	2 May Be At Risk	8	28.5 ± 0.0	NB
P	<i>Carex backii</i>	Rocky Mountain Sedge				S1	2 May Be At Risk	3	60.0 ± 0.0	NB
P	<i>Carex merritt-feraldii</i>	Merritt Fernald's Sedge				S1	2 May Be At Risk	1	60.6 ± 0.0	NB
P	<i>Carex rariflora</i>	Loose-flowered Alpine Sedge				S1	2 May Be At Risk	1	98.7 ± 0.0	PE
P	<i>Carex sterilis</i>	Sterile Sedge				S1	2 May Be At Risk	1	65.8 ± 2.0	NB
P	<i>Carex grisea</i>	Inflated Narrow-leaved Sedge				S1	2 May Be At Risk	1	96.7 ± 5.0	NB
P	<i>Scirpus pendulus</i>	Hanging Bulrush				S1	2 May Be At Risk	7	40.9 ± 0.0	NS
P	<i>Sisyrinchium angustifolium</i>	Narrow-leaved Blue-eyed-grass				S1	2 May Be At Risk	2	60.0 ± 5.0	NS
P	<i>Juncus greenei</i>	Greene's Rush				S1	2 May Be At Risk	11	43.8 ± 0.0	NB
P	<i>Juncus stygius</i>	Moor Rush				S1	2 May Be At Risk	1	94.9 ± 0.0	NB
P	<i>Juncus stygius</i> <i>ssp. americanus</i>	Moor Rush				S1	2 May Be At Risk	16	40.6 ± 5.0	NB
P	<i>Goodyera pubescens</i>	Downy Rattlesnake-Plantain				S1	2 May Be At Risk	5	59.3 ± 0.0	NB
P	<i>Malaxis brachypoda</i>	White Adder's-Mouth				S1	2 May Be At Risk	1	97.0 ± 1.0	NS
P	<i>Platanthera macrophylla</i>	Large Round-Leaved Orchid				S1	2 May Be At Risk	3	29.0 ± 0.0	NB
P	<i>Calamagrostis stricta</i> <i>ssp. inexpansa</i>	Slim-stemmed Reed Grass				S1	2 May Be At Risk	2	36.0 ± 1.0	NB
P	<i>Catabrosa aquatica</i> <i>var. laurentiana</i>	Water Whorl Grass				S1	2 May Be At Risk	3	82.6 ± 5.0	PE
P	<i>Danthonia compressa</i>	Flattened Oat Grass				S1	2 May Be At Risk	15	64.2 ± 0.0	NS
P	<i>Festuca subverticillata</i>	Nodding Fescue				S1	2 May Be At Risk	6	90.5 ± 0.0	NS
P	<i>Puccinellia ambigua</i>	Dwarf Alkali Grass				S1	5 Undetermined	1	73.7 ± 5.0	PE
P	<i>Potamogeton friesii</i>	Fries' Pondweed				S1	2 May Be At Risk	11	50.9 ± 0.0	PE

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P	<i>Cystopteris laurentiana</i>	Laurentian Bladder Fern				S1	2 May Be At Risk	1	94.7 ± 1.0	NB
P	<i>Dryopteris filix-mas</i>	Male Fern				S1	2 May Be At Risk	2	49.4 ± 1.0	NB
P	<i>Schizaea pusilla</i>	Little Curlygrass Fern				S1	2 May Be At Risk	1	80.0 ± 0.0	NB
P	<i>Bidens heterodoxa</i>	Connecticut Beggar-Ticks				S1?	2 May Be At Risk	4	79.3 ± 0.0	NB
P	<i>Selaginella rupestris</i>	Rock Spikemoss				S1S2	2 May Be At Risk	7	88.3 ± 1.0	NB
P	<i>Cuscuta cephalanthi</i>	Buttonbush Dodder				S1S3	2 May Be At Risk	6	5.0 ± 0.0	NB
P	<i>Eriophorum russeolum</i> <i>var. albidum</i>	Russet Cotton-Grass				S1S3	5 Undetermined	1	35.9 ± 1.0	NB
P	<i>Listera australis</i>	Southern Twayblade			Endangered	S2	1 At Risk	31	8.4 ± 0.0	NB
P	<i>Osmorhiza longistylis</i>	Smooth Sweet Cicely				S2	3 Sensitive	5	74.3 ± 1.0	NS
P	<i>Pseudognaphalium macounii</i>	Macoun's Cudweed				S2	3 Sensitive	41	46.5 ± 0.0	PE
P	<i>Ionactis linariifolius</i>	Stiff Aster				S2	3 Sensitive	1	66.2 ± 5.0	NB
P	<i>Symphotrichum subulatum</i>	Annual Saltmarsh Aster				S2	1 At Risk	52	97.5 ± 0.0	NB
P	<i>Impatiens pallida</i>	Pale Jewelweed				S2	2 May Be At Risk	1	95.9 ± 0.0	NS
P	<i>Arabis drummondii</i>	Drummond's Rockcress				S2	3 Sensitive	5	59.8 ± 0.0	NB
P	<i>Sagina nodosa</i>	Knotted Pearlwort				S2	3 Sensitive	2	69.5 ± 0.0	PE
P	<i>Sagina nodosa</i> ssp. <i>borealis</i>	Knotted Pearlwort				S2	3 Sensitive	3	68.7 ± 0.0	PE
P	<i>Stellaria longifolia</i>	Long-leaved Starwort				S2	3 Sensitive	6	18.6 ± 1.0	NB
P	<i>Atriplex franktonii</i>	Frankton's Saltbush				S2	4 Secure	7	12.4 ± 0.0	NB
P	<i>Chenopodium rubrum</i>	Red Pigweed				S2	3 Sensitive	10	8.5 ± 0.0	NB
P	<i>Hypericum dissimulatum</i>	Disguised St John's-wort				S2	3 Sensitive	4	57.2 ± 0.0	PE
P	<i>Shepherdia canadensis</i>	Soapberry				S2	3 Sensitive	5	38.6 ± 1.0	NB
P	<i>Gentiana linearis</i>	Narrow-Leaved Gentian				S2	3 Sensitive	1	57.0 ± 50.0	NB
P	<i>Myriophyllum humile</i>	Low Water Milfoil				S2	3 Sensitive	1	78.5 ± 1.0	NB
P	<i>Proserpinaca palustris</i> <i>var. crebra</i>	Marsh Mermaidweed				S2	3 Sensitive	1	94.4 ± 0.0	NS
P	<i>Hedeoma pulegioides</i>	American False Pennyroyal				S2	4 Secure	4	71.3 ± 1.0	NS
P	<i>Nuphar lutea</i> ssp. <i>rubrodisca</i>	Red-disked Yellow Pond-lily				S2	3 Sensitive	12	21.7 ± 0.0	NB
P	<i>Orobanche uniflora</i>	One-Flowered Broomrape				S2	3 Sensitive	2	94.2 ± 0.0	PE
P	<i>Polygala paucifolia</i>	Fringed Milkwort				S2	3 Sensitive	3	89.3 ± 1.0	NB
P	<i>Polygonum careyi</i>	Carey's Smartweed				S2	3 Sensitive	2	18.0 ± 1.0	NB
P	<i>Anemone parviflora</i>	Small-flowered Anemone				S2	3 Sensitive	8	42.1 ± 0.0	NB
P	<i>Hepatica nobilis</i> var. <i>obtusata</i>	Round-lobed Hepatica				S2	3 Sensitive	3	95.8 ± 0.0	NS
P	<i>Crataegus scabrida</i>	Rough Hawthorn				S2	3 Sensitive	4	21.8 ± 1.0	NB
P	<i>Crataegus succulenta</i>	Fleshy Hawthorn				S2	3 Sensitive	2	48.0 ± 0.0	PE
P	<i>Salix candida</i>	Sage Willow				S2	3 Sensitive	2	86.4 ± 0.0	PE
P	<i>Euphrasia randii</i>	Rand's Eyebright				S2	2 May Be At Risk	4	50.8 ± 0.0	PE
P	<i>Scrophularia lanceolata</i>	Lance-leaved Figwort				S2	3 Sensitive	2	92.9 ± 1.0	NB
P	<i>Dirca palustris</i>	Eastern Leatherwood				S2	2 May Be At Risk	1	33.0 ± 1.0	NB
P	<i>Sagittaria calycina</i> var. <i>spongiosa</i>	Long-lobed Arrowhead				S2	4 Secure	88	45.9 ± 0.0	NB
P	<i>Symplocarpus foetidus</i>	Eastern Skunk Cabbage				S2	3 Sensitive	114	42.2 ± 0.0	NS
P	<i>Carex comosa</i>	Bearded Sedge				S2	2 May Be At Risk	5	35.0 ± 0.0	NB
P	<i>Carex granularis</i>	Limestone Meadow Sedge				S2	3 Sensitive	10	8.0 ± 0.0	NB
P	<i>Carex gynocrates</i>	Northern Bog Sedge				S2	3 Sensitive	2	92.9 ± 1.0	NB
P	<i>Carex hirtifolia</i>	Pubescent Sedge				S2	3 Sensitive	11	61.0 ± 5.0	NB
P	<i>Carex livida</i> var. <i>radicalis</i>	Livid Sedge				S2	3 Sensitive	8	39.7 ± 0.0	NS
P	<i>Carex plantaginea</i>	Plantain-Leaved Sedge				S2	3 Sensitive	1	86.7 ± 0.0	NB

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P	<i>Carex rostrata</i>	Narrow-leaved Beaked Sedge				S2	3 Sensitive	2	57.7 ± 5.0	NB
P	<i>Carex tenuiflora</i>	Sparse-Flowered Sedge				S2	2 May Be At Risk	10	43.3 ± 0.0	NS
P	<i>Carex albicans</i> var. <i>emmonsii</i>	White-tinged Sedge				S2	3 Sensitive	12	6.3 ± 0.0	NB
P	<i>Eriophorum gracile</i>	Slender Cottongrass				S2	2 May Be At Risk	49	10.4 ± 0.0	NB
P	<i>Blysmus rufus</i>	Red Bulrush				S2	3 Sensitive	31	50.5 ± 0.0	PE
P	<i>Juncus vaseyi</i>	Vasey Rush				S2	3 Sensitive	10	24.3 ± 0.0	NB
P	<i>Allium tricoccum</i>	Wild Leek				S2	2 May Be At Risk	5	60.8 ± 5.0	NB
P	<i>Calypso bulbosa</i> var. <i>americana</i>	Calypso				S2	2 May Be At Risk	2	60.9 ± 5.0	NB
P	<i>Coeloglossum viride</i> var. <i>virescens</i>	Long-bracted Frog Orchid				S2	2 May Be At Risk	4	47.3 ± 10.0	NB
P	<i>Goodyera oblongifolia</i>	Menzies' Rattlesnake-plantain				S2	3 Sensitive	1	56.4 ± 0.0	PE
P	<i>Spiranthes lucida</i>	Shining Ladies'-Tresses				S2	3 Sensitive	2	61.1 ± 1.0	NB
P	<i>Spiranthes ochroleuca</i>	Yellow Ladies'-tresses				S2	2 May Be At Risk	6	32.1 ± 0.0	NB
P	<i>Elymus canadensis</i>	Canada Wild Rye				S2	2 May Be At Risk	1	34.3 ± 1.0	NB
P	<i>Piptatherum canadense</i>	Canada Rice Grass				S2	3 Sensitive	3	37.7 ± 10.0	NB
P	<i>Poa glauca</i>	Glaucous Blue Grass				S2	4 Secure	8	84.8 ± 0.0	NB
P	<i>Puccinellia laurentiana</i>	Nootka Alkali Grass				S2	3 Sensitive	1	74.4 ± 10.0	NB
P	<i>Puccinellia phryganodes</i>	Creeping Alkali Grass				S2	3 Sensitive	2	16.7 ± 1.0	NB
P	<i>Zizania aquatica</i> var. <i>aquatica</i>	Indian Wild Rice				S2	5 Undetermined	4	57.1 ± 0.0	NB
P	<i>Piptatherum pungens</i>	Slender Rice Grass				S2	2 May Be At Risk	5	56.5 ± 5.0	NB
P	<i>Potamogeton vaseyi</i>	Vasey's Pondweed				S2	3 Sensitive	1	42.6 ± 0.0	PE
P	<i>Asplenium trichomanes</i>	Maidenhair Spleenwort				S2	3 Sensitive	3	60.2 ± 1.0	NB
P	<i>Woodwardia virginica</i>	Virginia Chain Fern				S2	3 Sensitive	11	43.2 ± 0.0	NS
P	<i>Woodsia alpina</i>	Alpine Cliff Fern				S2	3 Sensitive	1	72.9 ± 0.0	NB
P	<i>Lycopodium sitchense</i>	Sitka Clubmoss				S2	3 Sensitive	4	32.7 ± 0.0	NB
P	<i>Selaginella selaginoides</i>	Low Spikemoss				S2	3 Sensitive	7	83.6 ± 0.0	NB
P	<i>Toxicodendron radicans</i>	Poison Ivy				S2?	3 Sensitive	6	27.6 ± 0.0	NB
P	<i>Symphotrichum novi-belgii</i> var. <i>crenifolium</i>	New York Aster				S2?	5 Undetermined	5	39.8 ± 0.0	NB
P	<i>Humulus lupulus</i> var. <i>lupuloides</i>	Common Hop				S2?	3 Sensitive	2	56.5 ± 5.0	NB
P	<i>Rubus recurvicaulis</i>	Arching Dewberry				S2?	4 Secure	3	11.3 ± 0.0	NB
P	<i>Galium obtusum</i>	Blunt-leaved Bedstraw				S2?	4 Secure	7	32.1 ± 10.0	NB
P	<i>Salix myricoides</i>	Bayberry Willow				S2?	3 Sensitive	1	42.0 ± 1.0	NB
P	<i>Carex vacillans</i>	Estuarine Sedge				S2?	3 Sensitive	1	46.0 ± 0.0	NB
P	<i>Platanthera huronensis</i>	Fragrant Green Orchid				S2?	5 Undetermined	1	99.7 ± 10.0	NS
P	<i>Solidago altissima</i>	Tall Goldenrod				S2S3	4 Secure	1	57.4 ± 0.0	NB
P	<i>Barbarea orthoceras</i>	American Yellow Rocket				S2S3	3 Sensitive	2	94.7 ± 1.0	NB
P	<i>Ceratophyllum echinatum</i>	Prickly Hornwort				S2S3	3 Sensitive	24	20.7 ± 0.0	NB
P	<i>Callitriche hermaphroditica</i>	Northern Water-starwort				S2S3	4 Secure	9	44.9 ± 0.0	NB
P	<i>Elatine americana</i>	American Waterwort				S2S3	3 Sensitive	6	36.0 ± 0.0	NB
P	<i>Bartonia paniculata</i>	Branched Bartonia				S2S3	3 Sensitive	1	64.1 ± 0.0	NS
P	<i>Bartonia paniculata</i> ssp. <i>iodandra</i>	Branched Bartonia				S2S3	3 Sensitive	13	76.9 ± 0.0	NB
P	<i>Geranium robertianum</i>	Herb Robert				S2S3	4 Secure	74	48.5 ± 0.0	PE
P	<i>Epilobium coloratum</i>	Purple-veined Willowherb				S2S3	3 Sensitive	5	24.1 ± 1.0	NB
P	<i>Rumex maritimus</i> var.	Peach-leaved Dock				S2S3	5 Undetermined	3	67.3 ± 0.0	NB

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
P	<i>persicarioides</i>									
P	<i>Rumex pallidus</i>	Seabeach Dock				S2S3	3 Sensitive	5	53.7 ± 0.0	NB
P	<i>Rubus pensilvanicus</i>	Pennsylvania Blackberry				S2S3	4 Secure	26	38.3 ± 0.0	NB
P	<i>Galium labradoricum</i>	Labrador Bedstraw				S2S3	3 Sensitive	10	50.9 ± 0.0	PE
P	<i>Carex adusta</i>	Lesser Brown Sedge				S2S3	4 Secure	8	20.8 ± 0.0	NB
P	<i>Corallorhiza maculata</i> <i>var. occidentalis</i>	Spotted Coralroot				S2S3	3 Sensitive	6	26.8 ± 10.0	NB
P	<i>Listera auriculata</i>	Auricled Twayblade				S2S3	3 Sensitive	8	84.8 ± 0.0	NB
P	<i>Spiranthes cernua</i>	Nodding Ladies'-Tresses				S2S3	3 Sensitive	15	28.7 ± 0.0	NB
P	<i>Eragrostis pectinacea</i>	Tufted Love Grass				S2S3	4 Secure	5	24.4 ± 0.0	NB
P	<i>Stuckenia filiformis</i> <i>ssp. alpina</i>	Thread-leaved Pondweed				S2S3	3 Sensitive	2	9.2 ± 1.0	NB
P	<i>Stuckenia pectinata</i>	Sago Pondweed				S2S3	3 Sensitive	42	46.9 ± 0.0	PE
P	<i>Potamogeton</i> <i>praelongus</i>	White-stemmed Pondweed				S2S3	4 Secure	19	41.3 ± 0.0	NS
P	<i>Ophioglossum pusillum</i>	Northern Adder's-tongue				S2S3	3 Sensitive	5	50.2 ± 50.0	NS
P	<i>Panax trifolius</i>	Dwarf Ginseng				S3	3 Sensitive	22	25.9 ± 0.0	NB
P	<i>Artemisia campestris</i>	Field Wormwood				S3	4 Secure	3	90.2 ± 0.0	NB
P	<i>Artemisia campestris</i> <i>ssp. caudata</i>	Field Wormwood				S3	4 Secure	5	69.3 ± 0.0	PE
P	<i>Bidens hyperborea</i>	Estuary Beggarticks				S3	4 Secure	42	32.0 ± 0.0	NB
P	<i>Bidens hyperborea</i> <i>var. hyperborea</i>	Estuary Beggarticks				S3	4 Secure	3	32.0 ± 0.0	NB
P	<i>Erigeron hyssopifolius</i>	Hyssop-leaved Fleabane				S3	4 Secure	35	39.1 ± 1.0	NB
P	<i>Prenanthes racemosa</i>	Glaucous Rattlesnakeroot				S3	4 Secure	1	91.4 ± 0.0	PE
P	<i>Symphotrichum</i> <i>boreale</i>	Boreal Aster				S3	3 Sensitive	8	51.2 ± 0.0	PE
P	<i>Betula pumila</i>	Bog Birch				S3	4 Secure	91	42.3 ± 0.0	NB
P	<i>Arabis glabra</i>	Tower Mustard				S3	5 Undetermined	1	97.5 ± 0.0	NB
P	<i>Arabis hirsuta</i> <i>var. pycnocarpa</i>	Western Hairy Rockcross				S3	4 Secure	10	4.2 ± 0.0	NB
P	<i>Cardamine maxima</i>	Large Toothwort				S3	4 Secure	3	70.3 ± 0.0	PE
P	<i>Subularia aquatica</i> <i>var. americana</i>	Water Awlwort				S3	4 Secure	2	79.6 ± 0.0	NB
P	<i>Stellaria humifusa</i>	Saltmarsh Starwort				S3	4 Secure	17	1.3 ± 5.0	NB
P	<i>Hudsonia tomentosa</i>	Woolly Beach-heath				S3	4 Secure	222	16.2 ± 0.0	NB
P	<i>Crassula aquatica</i>	Water Pygmyweed				S3	4 Secure	5	56.1 ± 0.0	NB
P	<i>Rhodiola rosea</i>	Roseroot				S3	4 Secure	12	73.1 ± 0.0	NB
P	<i>Elatine minima</i>	Small Waterwort				S3	4 Secure	1	80.1 ± 0.0	NB
P	<i>Geranium bicknellii</i>	Bicknell's Crane's-bill				S3	4 Secure	16	20.8 ± 0.0	NB
P	<i>Myriophyllum farwellii</i>	Farwell's Water Milfoil				S3	4 Secure	9	37.7 ± 1.0	NB
P	<i>Myriophyllum</i> <i>verticillatum</i>	Whorled Water Milfoil				S3	4 Secure	14	37.4 ± 1.0	NB
P	<i>Teucrium canadense</i>	Canada Germander				S3	3 Sensitive	91	5.7 ± 0.0	NB
P	<i>Nuphar lutea</i> <i>ssp. pumila</i>	Small Yellow Pond-lily				S3	4 Secure	7	36.6 ± 5.0	NB
P	<i>Epilobium hornemannii</i>	Hornemann's Willowherb				S3	4 Secure	2	83.8 ± 1.0	NB
P	<i>Epilobium hornemannii</i> <i>ssp. hornemannii</i>	Hornemann's Willowherb				S3	4 Secure	1	83.9 ± 0.0	NB
P	<i>Epilobium strictum</i>	Downy Willowherb				S3	4 Secure	16	6.5 ± 0.0	NB
P	<i>Polygala sanguinea</i>	Blood Milkwort				S3	3 Sensitive	14	15.9 ± 0.0	NB
P	<i>Polygonum arifolium</i>	Halberd-leaved Tearthumb				S3	4 Secure	79	8.9 ± 0.0	NB
P	<i>Polygonum punctatum</i>	Dotted Smartweed				S3	4 Secure	4	38.2 ± 5.0	NB
P	<i>Polygonum punctatum</i> <i>var. confertiflorum</i>	Dotted Smartweed				S3	4 Secure	18	44.1 ± 0.0	NS
P	<i>Polygonum scandens</i>	Climbing False Buckwheat				S3	4 Secure	50	18.0 ± 1.0	NB
P	<i>Samolus valerandi</i>	Seaside Brookweed				S3	4 Secure	5	51.1 ± 0.0	NB



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P	<i>Samolus valerandi</i> ssp. <i>parviflorus</i>	Seaside Brookweed				S3	4 Secure	161	4.1 ± 0.0	NB
P	<i>Pyrola minor</i>	Lesser Pyrola				S3	4 Secure	5	43.6 ± 0.0	NS
P	<i>Clematis occidentalis</i>	Purple Clematis				S3	4 Secure	7	52.6 ± 0.0	NS
P	<i>Ranunculus gmelinii</i>	Gmelin's Water Buttercup				S3	4 Secure	35	34.6 ± 0.0	NB
P	<i>Thalictrum venulosum</i>	Northern Meadow-rue				S3	4 Secure	1	83.9 ± 1.0	PE
P	<i>Amelanchier canadensis</i>	Canada Serviceberry				S3	4 Secure	35	1.0 ± 0.0	NB
P	<i>Rosa palustris</i>	Swamp Rose				S3	4 Secure	4	35.3 ± 0.0	NB
P	<i>Sanguisorba canadensis</i>	Canada Burnet				S3	4 Secure	15	78.0 ± 0.0	NB
P	<i>Galium boreale</i>	Northern Bedstraw				S3	4 Secure	7	53.4 ± 5.0	NS
P	<i>Salix interior</i>	Sandbar Willow				S3	4 Secure	1	41.9 ± 1.0	NB
P	<i>Salix pedicellaris</i>	Bog Willow				S3	4 Secure	31	8.9 ± 0.0	NB
P	<i>Comandra umbellata</i>	Bastard's Toadflax				S3	4 Secure	53	3.6 ± 0.0	NB
P	<i>Limosella australis</i>	Southern Mudwort				S3	4 Secure	95	7.4 ± 1.0	NB
P	<i>Veronica serpyllifolia</i> ssp. <i>humifusa</i>	Thyme-Leaved Speedwell				S3	4 Secure	6	76.5 ± 0.0	NB
P	<i>Pilea pumila</i>	Dwarf Clearweed				S3	4 Secure	27	48.4 ± 0.0	PE
P	<i>Viola adunca</i>	Hooked Violet				S3	4 Secure	5	60.4 ± 0.0	NB
P	<i>Viola nephrophylla</i>	Northern Bog Violet				S3	4 Secure	3	53.1 ± 0.0	PE
P	<i>Carex aquatilis</i>	Water Sedge				S3	4 Secure	20	28.5 ± 0.0	NB
P	<i>Carex arcta</i>	Northern Clustered Sedge				S3	4 Secure	3	57.4 ± 20.0	NB
P	<i>Carex atratiformis</i>	Scabrous Black Sedge				S3	4 Secure	3	90.5 ± 0.0	NS
P	<i>Carex capillaris</i>	Hairlike Sedge				S3	4 Secure	8	60.2 ± 0.0	NS
P	<i>Carex chordorrhiza</i>	Creeping Sedge				S3	4 Secure	53	34.2 ± 0.0	NB
P	<i>Carex conoidea</i>	Field Sedge				S3	4 Secure	6	8.0 ± 0.0	NB
P	<i>Carex eburnea</i>	Bristle-leaved Sedge				S3	4 Secure	2	55.3 ± 100.0	NB
P	<i>Carex exilis</i>	Coastal Sedge				S3	4 Secure	3	75.8 ± 0.0	NS
P	<i>Carex garberi</i>	Garber's Sedge				S3	3 Sensitive	1	8.2 ± 0.0	NB
P	<i>Carex haydenii</i>	Hayden's Sedge				S3	4 Secure	2	10.6 ± 0.0	NB
P	<i>Carex lupulina</i>	Hop Sedge				S3	4 Secure	4	48.5 ± 1.0	NB
P	<i>Carex michauxiana</i>	Michaux's Sedge				S3	4 Secure	8	39.8 ± 0.0	NS
P	<i>Carex ormostachya</i>	Necklace Spike Sedge				S3	4 Secure	4	51.3 ± 1.0	NB
P	<i>Carex rosea</i>	Rosy Sedge				S3	4 Secure	11	89.7 ± 0.0	NB
P	<i>Carex tenera</i>	Tender Sedge				S3	4 Secure	9	21.1 ± 0.0	NB
P	<i>Carex tuckermanii</i>	Tuckerman's Sedge				S3	4 Secure	18	53.4 ± 10.0	NB
P	<i>Carex wiegandii</i>	Wiegand's Sedge				S3	4 Secure	113	10.0 ± 0.0	NB
P	<i>Carex recta</i>	Estuary Sedge				S3	4 Secure	18	18.4 ± 0.0	NB
P	<i>Cyperus dentatus</i>	Toothed Flatsedge				S3	4 Secure	1	47.0 ± 1.0	NB
P	<i>Cyperus esculentus</i>	Perennial Yellow Nutsedge				S3	4 Secure	1	71.0 ± 0.0	NB
P	<i>Eleocharis intermedia</i>	Matted Spikerush				S3	4 Secure	1	80.9 ± 0.0	NB
P	<i>Eleocharis quinqueflora</i>	Few-flowered Spikerush				S3	4 Secure	1	92.4 ± 0.0	PE
P	<i>Rhynchospora capitellata</i>	Small-headed Beakrush				S3	4 Secure	2	98.0 ± 1.0	NB
P	<i>Rhynchospora fusca</i>	Brown Beakrush				S3	4 Secure	9	39.9 ± 0.0	NS
P	<i>Trichophorum clintonii</i>	Clinton's Clubrush				S3	4 Secure	18	83.5 ± 0.0	NB
P	<i>Schoenoplectus fluviatilis</i>	River Bulrush				S3	3 Sensitive	4	26.9 ± 1.0	NB
P	<i>Schoenoplectus torreyi</i>	Torrey's Bulrush				S3	4 Secure	1	20.3 ± 0.0	NB
P	<i>Lemna trisulca</i>	Star Duckweed				S3	4 Secure	20	36.0 ± 0.0	NB
P	<i>Cypripedium reginae</i>	Showy Lady's-Slipper				S3	3 Sensitive	27	45.3 ± 5.0	PE
P	<i>Liparis loeselii</i>	Loesel's Twayblade				S3	4 Secure	33	8.3 ± 0.0	NB
P	<i>Platanthera blephariglottis</i>	White Fringed Orchid				S3	4 Secure	87	8.5 ± 0.0	NB
P	<i>Platanthera grandiflora</i>	Large Purple Fringed Orchid				S3	3 Sensitive	12	27.9 ± 1.0	NB

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
P	<i>Bromus latiglumis</i>	Broad-Glumed Brome				S3	3 Sensitive	4	60.2 ± 0.0	NB
P	<i>Calamagrostis pickeringii</i>	Pickering's Reed Grass				S3	4 Secure	6	56.7 ± 0.0	NB
P	<i>Dichanthelium depauperatum</i>	Starved Panic Grass				S3	4 Secure	6	44.0 ± 0.0	NB
P	<i>Potamogeton obtusifolius</i>	Blunt-leaved Pondweed				S3	4 Secure	31	34.1 ± 0.0	NB
P	<i>Xyris montana</i>	Northern Yellow-Eyed-Grass				S3	4 Secure	59	9.7 ± 0.0	NB
P	<i>Zannichellia palustris</i>	Horned Pondweed				S3	4 Secure	59	10.8 ± 0.0	NB
P	<i>Asplenium trichomanes-ramosum</i>	Green Spleenwort				S3	4 Secure	10	60.2 ± 1.0	NB
P	<i>Dryopteris fragrans</i> var. <i>remotiuscula</i>	Fragrant Wood Fern				S3	4 Secure	32	71.3 ± 0.0	NB
P	<i>Woodsia glabella</i>	Smooth Cliff Fern				S3	4 Secure	23	71.3 ± 0.0	NB
P	<i>Isoetes tuckermanii</i>	Tuckerman's Quillwort				S3	4 Secure	2	76.9 ± 0.0	NB
P	<i>Lycopodium sabinifolium</i>	Ground-Fir				S3	4 Secure	16	31.2 ± 0.0	NB
P	<i>Huperzia appalachiana</i>	Appalachian Fir-Clubmoss				S3	3 Sensitive	11	84.9 ± 0.0	NB
P	<i>Botrychium dissectum</i>	Cut-leaved Moonwort				S3	4 Secure	7	18.0 ± 1.0	NB
P	<i>Botrychium lanceolatum</i> var. <i>angustisegmentum</i>	Lance-Leaf Grape-Fern				S3	3 Sensitive	11	30.5 ± 0.0	NB
P	<i>Botrychium simplex</i>	Least Moonwort				S3	4 Secure	6	35.9 ± 0.0	NB
P	<i>Polypodium appalachianum</i>	Appalachian Polypody				S3	4 Secure	14	45.8 ± 1.0	NB
P	<i>Crataegus submollis</i>	Quebec Hawthorn				S3?	3 Sensitive	1	99.9 ± 7.0	NS
P	<i>Mertensia maritima</i>	Sea Lungwort				S3S4	4 Secure	5	53.5 ± 0.0	NB
P	<i>Suaeda calceoliformis</i>	Horned Sea-blite				S3S4	4 Secure	41	3.2 ± 0.0	NB
P	<i>Myriophyllum sibiricum</i>	Siberian Water Milfoil				S3S4	4 Secure	17	52.8 ± 0.0	NS
P	<i>Utricularia gibba</i>	Humped Bladderwort				S3S4	4 Secure	5	22.5 ± 0.0	NB
P	<i>Rumex maritimus</i>	Sea-Side Dock				S3S4	4 Secure	70	4.3 ± 0.0	NB
P	<i>Rumex maritimus</i> var. <i>fueginus</i>	Tierra del Fuego Dock				S3S4	4 Secure	9	26.7 ± 0.0	NB
P	<i>Rubus chamaemorus</i>	Cloudberry				S3S4	4 Secure	72	34.4 ± 0.0	NB
P	<i>Geocaulon lividum</i>	Northern Comandra				S3S4	4 Secure	39	18.0 ± 1.0	NB
P	<i>Juniperus horizontalis</i>	Creeping Juniper				S3S4	4 Secure	20	44.8 ± 0.0	PE
P	<i>Cladium mariscoides</i>	Smooth Twigrush				S3S4	4 Secure	7	22.9 ± 1.0	NB
P	<i>Eriophorum russeolum</i>	Russet Cottongrass				S3S4	4 Secure	222	9.0 ± 0.0	NB
P	<i>Triglochin gaspensis</i>	Gasp ⌊- Arrowgrass				S3S4	4 Secure	67	8.7 ± 0.0	NB
P	<i>Spirodela polyrrhiza</i>	Great Duckweed				S3S4	4 Secure	14	35.6 ± 0.0	NB
P	<i>Corallorhiza maculata</i>	Spotted Coralroot				S3S4	3 Sensitive	17	32.4 ± 5.0	NB
P	<i>Calamagrostis stricta</i>	Slim-stemmed Reed Grass				S3S4	4 Secure	26	2.1 ± 2.0	NB
P	<i>Calamagrostis stricta</i> ssp. <i>stricta</i>	Slim-stemmed Reed Grass				S3S4	4 Secure	7	41.7 ± 0.0	NS
P	<i>Calamagrostis stricta</i> var. <i>stricta</i>	Slim-stemmed Reed Grass				S3S4	4 Secure	10	44.5 ± 0.0	PE
P	<i>Distichlis spicata</i>	Salt Grass				S3S4	4 Secure	86	0.5 ± 0.0	NB
P	<i>Potamogeton oakesianus</i>	Oakes' Pondweed				S3S4	4 Secure	13	22.5 ± 0.0	NB
P	<i>Montia fontana</i>	Water Blinks				SH	2 May Be At Risk	2	2.1 ± 1.0	NB
P	<i>Agalinis maritima</i>	Saltmarsh Agalinis				SX	0.1 Extirpated	2	62.6 ± 50.0	NB

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98	Sollows, M.C., 2008. NBM Science Collections databases: mammals. New Brunswick Museum, Saint John NB, download Jan. 2008, 4983 recs.
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85	Burns, L. 2013. Personal communication concerning bat occurrence on PEI. Winter 2013. Pers. comm.
80	Hinds, H.R. 1986. Notes on New Brunswick plant collections. Connell Memorial Herbarium, unpubl, 739 recs.
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66	Canadian Wildlife Service, Dartmouth. 2010. Piping Plover censuses 2007-09, 304 recs.
59	Benjamin, L.K. (compiler). 2007. Significant Habitat & Species Database. Nova Scotia Dept Natural Resources, 8439 recs.
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58	Brunelle, P.-M. (compiler). 2009. ADIP/MDDS Odonata Database: data to 2006 inclusive. Atlantic Dragonfly Inventory Program (ADIP), 24200 recs.
57	Newell, R.E. 2000. E.C. Smith Herbarium Database. Acadia University, Wolfville NS, 7139 recs.
56	Ayles, P. 2006. Prince Edward Island National Park Digital Database. Parks Canada, 179 recs.
52	Blaney, C.S. 2003. Fieldwork 2003. Atlantic Canada Conservation Data Centre. Sackville NB, 1042 recs.
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46	Erskine, A.J. 1999. Maritime Nest Records Scheme (MNRS) 1937-1999. Canadian Wildlife Service, Sackville, 313 recs.

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42	Benedict, B. Connell Herbarium Specimen Database Download 2004. Connell Memorial Herbarium, University of New Brunswick. 2004.
41	Wissink, R. 2006. Fundy National Park Digital Database. Parks Canada, 41 recs.
40	Curley, F.R. 2005. PEF&W Collection 2003-04. PEI Fish & Wildlife Div., 716 recs.
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38	Doucet, D.A. 2007. Lepidopteran Records, 1988-2006. Doucet, 700 recs.
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34	Donell, R. 2008. Rare plant records from rare coastal plant project. Bouctouche Dune Irving Eco-centre. Pers. comm. to D.M. Mazerolle, 50 recs.
33	Goltz, J.P. 2012. Field Notes, 1989-2005. , 1091 recs.
33	Munro, Marian K. Nova Scotia Provincial Museum of Natural History Herbarium Database. Nova Scotia Provincial Museum of Natural History, Halifax, Nova Scotia. 2013.
32	Newell, R.E. 2005. E.C. Smith Digital Herbarium. E.C. Smith Herbarium, Irving Biodiversity Collection, Acadia University, Web site: <a href="http://luxor.acadiau.ca/library/Herbarium/project/">http://luxor.acadiau.ca/library/Herbarium/project/</a> . 582 recs.
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26	Coursol, F. 2005. Dataset from New Brunswick fieldwork for <i>Eriocaulon parkeri</i> COSEWIC report. Coursol, Pers. comm. to C.S. Blaney, Aug 26. 110 recs.
26	Sollows, M.C., 2009. NBM Science Collections databases: molluscs. New Brunswick Museum, Saint John NB, download Jan. 2009, 6951 recs (2957 in Atlantic Canada).
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25	Tingley, S. (compiler). 2001. Butterflies of New Brunswick , Web site: <a href="http://www.geocities.com/Yosemite/8425/butterfly">www.geocities.com/Yosemite/8425/butterfly</a> . 142 recs.
24	Bateman, M.C. 2001. Coastal Waterfowl Surveys Database, 1965-2001. Canadian Wildlife Service, Sackville, 667 recs.
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20	Speers, L. 2008. Butterflies of Canada database: New Brunswick 1897-1999. Agriculture & Agri-Food Canada, Biological Resources Program, Ottawa, 2048 recs.
19	Canadian Wildlife Service, Atlantic Region. 2010. Piping Plover censuses 2006-09. , 35 recs.
19	Pike, E., Tingley, S. & Christie, D.S. 2000. Nature NB Listserve. University of New Brunswick, listserv.unb.ca/archives/naturenb. 68 recs.
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15	Edsall, J. 2001. Lepidopteran records in New Brunswick, 1997-99. , Pers. comm. to K.A. Bredin. 91 recs.
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11	Zinck, M. & Roland, A.E. 1998. Roland's Flora of Nova Scotia. Nova Scotia Museum, 3rd ed., rev. M. Zinck; 2 Vol., 1297 pp.
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9	Curley, F.R. 2007. PEF&W Collection. PEI Fish & Wildlife Div., 199 recs.
9	Godbout, V. 2002. SAR Inventory: Birds in Fort Beauséjour NHS. Parks Canada, Atlantic, SARINV02-01. 202 recs.
9	Layberry, R.A. & Hall, P.W., LaFontaine, J.D. 1998. The Butterflies of Canada. University of Toronto Press. 280 pp+plates.
9	Mawhinney, K. & Seutin, G. 2001. Lepidoptera Survey of the Salt Marshes of Kouchibouguac National Park. Parks Canada Unpublished Report, 5p. 9 recs.
8	Bredin, K.A. 2001. WTF Project: Freshwater Mussel Fieldwork in Freshwater Species data. Atlantic Canada Conservation Data Centre, 101 recs.
8	Hinds, H.R. 1997. Vascular Plants of Cocagne Island. , 14 recs.
8	Popma, T.M. 2003. Fieldwork 2003. Atlantic Canada Conservation Data Centre. Sackville NB, 113 recs.
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7	Doucet, D.A. 2009. Census of Globally Rare, Endemic Butterflies of Nova Scotia Gulf of St Lawrence Salt Marshes. Nova Scotia Dept of Natural Resources, Species at Risk, 155 recs.
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7	Kennedy, Joseph. 2010. New Brunswick Peregrine records, 2009. New Brunswick Dept Natural Resources, 19 recs (14 active).
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6	Downes, C. 1998-2000. Breeding Bird Survey Data. Canadian Wildlife Service, Ottawa, 111 recs.
6	Goltz, J.P. & Bishop, G. 2005. Confidential supplement to Status Report on Prototype Quillwort ( <i>Isoetes prototypus</i> ). Committee on the Status of Endangered Wildlife in Canada, 111 recs.
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6	Harris, P. 2004. Plant records from 1997-2003. Island Nature Trust, Charlottetown PE, 71 recs.
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6	Sabine, D.L. 2013. Dwayne Sabine butterfly records, 2009 and earlier.
5	Cowie, Faye. 2007. Surveyed Lakes in New Brunswick. Canadian Rivers Institute, 781 recs.
5	Dibblee, R.L. 1999. PEI Cormorant Survey. Prince Edward Island Fisheries, Aquaculture & Environment, 1p. 21 recs.
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5	Morrison, Annie. 2010. NCC Properties Fieldwork: June-August 2010. Nature Conservancy Canada, 508 recs.
5	Sollows, M.C. 2008. NBM Science Collections databases: herpetiles. New Brunswick Museum, Saint John NB, download Jan. 2008, 8636 recs.
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4	Gravel, Mireille. 2010. Coordonnées des tortues des bois Salmon River Road, 2005. Kouchibouguac National Park, 4 recs.
4	Hicklin, P.W. 1995. The Maritime Shorebird Survey Newsletter. <i>Calidris</i> , No. 3. 6 recs.
4	Klymko, J.J.D. 2012. Insect fieldwork & submissions, 2011. Atlantic Canada Conservation Data Centre. Sackville NB, 760 recs.
4	Munro, Marian K. Nova Scotia Provincial Museum of Natural History Herbarium Database. Nova Scotia Provincial Museum of Natural History, Halifax, Nova Scotia. 2014.
4	Popma, K. 2001. Phalarope & other bird observations in Westmorland Co. , Pers. comm. to K.A. Bredin. 5 recs.
4	Powell, B.C. 1967. Female sexual cycles of <i>Chrysemy spicta</i> & <i>Clemmys insculpta</i> in Nova Scotia. <i>Can. Field-Nat.</i> , 81:134-139. 26 recs.
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3	Chaput, G. 2002. Atlantic Salmon: Maritime Provinces Overview for 2001. Dept of Fisheries & Oceans, Atlantic Region, Science Stock Status Report D3-14. 39 recs.
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3	Godbout, Valérie. 2010. Étude de l'Aster du Saint-Laurent dans le parc national Kouchibouguac, 2000-04. Parks Canada, 3 recs.
3	Grondin, P. & Blouin, J-L., Bouchard, D.; et al. 1981. Description et cartographie de la vegetation du cordon littoral. Parc National de Kouchibouguac. Le Groupe Dryade, 57 pp.
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3	Majka, C.G. 2008. Lepidoptera at St Patricks, 1993-2007. Pers. comm. to R. Curley, 8 Jan. 29 recs, 29 recs.
3	Nye, T. 2002. Wood Turtle observations in Westmorland, Queens Cos. , Pers. com. to S.H. Gerriets, Dec. 3. 3 recs.
3	Sabine, D.L. 2005. 2001 Freshwater Mussel Surveys. New Brunswick Dept of Natural Resources & Energy, 590 recs.
3	Stevens, C. 1999. Cam Stevens field data from PEI vegetation plots. Sent along with specimens to C.S. Blaney. UNB masters research project, 732 recs.
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2	Boyne, A.W. & Grecian, V.D. 1999. Tern Surveys. Canadian Wildlife Service, Sackville, unpublished data. 23 recs.
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2	Cameron, R.P. 2014. 2013-14 rare species field data. Nova Scotia Department of Environment, 35 recs.
2	Donelle, R. 2007. Bouctouche Dune Rare Coastal Plant Data. Irving Eco-centre, la Dune du Bouctouche, 2 recs.
2	Doucet, D.A. 2008. Fieldwork 2008: Odonata. ACCDC Staff, 625 recs.
2	Gagnon, J. 2003. Prince Edward Island plant records. Societe de la faune et des parcs Quebec, 13 recs.
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2	Klymko, J.J.D.; Robinson, S.L. 2012. 2012 field data. Atlantic Canada Conservation Data Centre, 447 recs.
2	Macaulay, M. Notes on newly discovered <i>Hepatica nobilis</i> var. <i>obtusa</i> population in Cumberland Co. NS. Pers. comm. to S. Blaney, 1 rec.
2	Mazerolle, D. 2003. Assessment and Rehabilitation of the Gulf of St Lawrence Aster ( <i>Symphyotrichum laurentianum</i> ) in Southeastern New Brunswick. Irving Eco-centre, la Dune du Bouctouche, 13 recs.
2	O'Neil, S. 1998. Atlantic Salmon: Northumberland Strait Nova Scotia part of SFA 18. Dept of Fisheries & Oceans, Atlantic Region, Science. Stock Status Report D3-08. 9 recs.
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2	Prince Edward Island National Park. 2014. Prince Edward Island National Park Herbarium. Parks Canada Agency, PEINP, 39 recs.
1	Amirault, D.L. 2005. 2005 Peregrine Falcon Survey. Canadian Wildlife Service, Sackville, unpublished data. 27 recs.
1	Bagnell, B.A. 2003. Update to New Brunswick Rare Bryophyte Occurrences. B&B Botanical, Sussex, 5 recs.
1	Belland, R.J. 2012. PEI moss records from New York Botanical Garden. NYBG Virtual Herbarium, Web site: <a href="http://sciweb.nybg.org/science2/vii2.asp">http://sciweb.nybg.org/science2/vii2.asp</a> 135 recs.
1	Blaney, C.S. 1999. Fieldwork 1999. Atlantic Canada Conservation Data Centre. Sackville NB, 292 recs.
1	Blaney, C.S. 2014. 2014 Bank Swallow colony observation, Westcock, NB. Atlantic Canada Conservation Data Centre.
1	Bouchard, A. Herbar Marie-Victorin. Universite de Montreal, Montreal QC. 1999.
1	Bredin, K.A. 2000. NB & NS Bog Project, fieldwork. Atlantic Canada Conservation Data Centre, Sackville, 1 rec.
1	Bredin, K.A. 2002. NB Freshwater Mussel Fieldwork. Atlantic Canada Conservation Data Centre, 30 recs.
1	Cameron, R.P. 2009. <i>Erioderma pedicellatum</i> database, 1979-2008. Dept Environment & Labour, 103 recs.
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1	Christie, D.S. 2000. Christmas Bird Count Data, 1997-2000. Nature NB, 54 recs.
1	Clavette, A., and others. 2013. Peregrine Falcon nesting information from NatureNB listserv. NatureNB.
1	Clayden, S.R. 2012. NBM Science Collections databases: vascular plants. New Brunswick Museum, Saint John NB, 57 recs.
1	Cronin, P. & Ayer, C.; Dube, B.; Hooper, W.C.; LeBlanc, E.; Madden, A.; Pettigrew, T.; Seymour, P. 1998. Fish Species Management Plans (draft). NB DNRE Internal Report. Fredericton, 164pp.
1	Curley, F.R. Two rare aquatic plant specimens collected by F.R. Curley in PEI and given to D.M. Mazerolle. retired provincial biologist. 2015.
1	Doucet, D.A. 2007. Fieldwork 2007: Insects (minus Odonata). ACCDC Staff, 1 rec.
1	Doucet, D.A. 2008. Wood Turtle Records 2002-07. Pers. comm. to S. Gerriets, 7 recs, 7 recs.
1	Doucet, D.A. ACCDC Reference Collection. Atlantic Canada Conservation Data Centre, Sackville NB. 2008.
1	Edsall, J. 2007. Lepidopteran Records from Halls Creek, 1994-2000. Edsall, 43 recs.
1	Gerriets, S.H. 1997-2001. Element Occurrence Database. Atlantic Canada Conservation Data Centre, Sackville NB, 1 rec.
1	Giberson, D. 2008. UPEI Insect Collection. University of Prince Edward Island, 157 recs.
1	Giroux, P. 2013. Personal communication concerning species at risk in and around PEI NP, PE. Winter 2013. Pers. comm.
1	Glen, W. 1991. 1991 Prince Edward Island Forest Biomass Inventory Data. PEI Dept of Energy and Forestry, 10059 recs.
1	Goltz, J.P. 2007. Field Notes: <i>Listera australis</i> at Kouchibouguac National Park. , 7 recs.
1	Hill, N.M. 1994. Status report on the Long's bulrush <i>Scirpus longii</i> in Canada. Committee on the Status of Endangered Wildlife in Canada, 7 recs.
1	Hinds, H.R. 2000. Rare plants of Fundy in Rare Plants of Fundy: maps. Wissink, R. (ed.) Parks Canada, 2 recs.
1	Houle, F; Haber, E. 1990. Status of the Gulf of St. Lawrence Aster, <i>Aster laurentianus</i> (Asteraceae) in Canada. Can. Field-Nat., 104:455-459. 3 recs.
1	Kelly, Glen 2004. Botanical records from 2004 PEI Forestry fieldwork. Dept of Environment, Energy & Forestry, 71 recs.
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1	Kirkland, G.L. Jr., Schmidt, D.F. & Kirkland, C.J. 1979. First record of the long-tailed shrew ( <i>Sorex dispar</i> ) in New Brunswick. Can. Field-Nat., 93: 195-198. 1 rec.
1	Klymko, J.J.D. 2010. Miscellaneous observations reported to ACCDC (zoology). Pers. comm. from various persons, 3 recs.
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1	Lajeunesse, D. et al. 2002. PEINP Collection. Parks Canada, PEI National Park, 9 recs.
1	Loo, J. & MacDougall, A. 1994. GAP analysis: Summary Report. Fundy Model Forest, 2 recs.
1	MacPhail, V. Bee and syrphid specimens from MSc research. Pers. comm., J. Klymko. 2006.
1	Madden, A. 1998. Wood Turtle records in northern NB. New Brunswick Dept of Natural Resources & Energy, Campbellton, Pers. comm. to S.H. Gerriets. 16 recs.
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1	McAlpine, D.F. 1983. Species Record Cards. Fundy National Park, Library, 1 rec.
1	Miller, D.G. 2013. Peregrine Falcon nesting information from birdingnewbrunswick.ca. <a href="http://birdingnewbrunswick.ca">birdingnewbrunswick.ca</a> .
1	Mills, E. Connell Herbarium Specimens, 1957-2009. University New Brunswick, Fredericton. 2012.
1	Neily, T.H. & Pepper, C.; Toms, B. 2013. Nova Scotia lichen location database. Mersey Tobeatic Research Institute, 1301 records.
1	Porter, C.J.M. 2014. Field work data 2007-2014. Nova Scotia Nature Trust, 96 recs.
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# Appendix D

ARCHAEOLOGY REPORT, 2014





**Archaeological Assessment of a Proposed Development near Shediac, NB**  
Permit #: 2014 NB 93

Prepared for

Camping Shediac Camping Ltee/Ltd.

by

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## **ABSTRACT**

Between November 1<sup>st</sup> and the 2<sup>nd</sup>, 2014, an archaeological pedestrian survey took place at a proposed recreational development near Shediac, NB. The pedestrian survey was undertaken to identify any extant heritage/archaeological features of significance, any visible significant artifacts or if any potential exists for the presence of buried archaeological sites.



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## INTRODUCTION

Camping Shediac Camping Ltee/Ltd. commissioned the work of an archaeologist to mitigate the potential negative effects from construction activity surrounding the development of a recreational. The proposed development consists of an approximately 30 ha area intended for use as a recreational vehicle/camping site at PID 00883405, in east Shediac, New Brunswick. This permit application deals specifically with the assessment of the area required for the use of the camping site and the adjacent area. The area requiring assessment is approximately 725 m long by 475 m wide. This area will be cut, cleared and grubbed by the proponent and was assessed for the presence of heritage resources and the potential for buried archaeological resources.



## PREVIOUS RESEARCH

No other recorded archaeological sites are registered at Archaeological Services New Brunswick within the vicinity of the proposed construction activities in the area surveyed.

The Borden system is a nation-wide, geographically based method for recording sites of archaeological value. In New Brunswick, each Borden block is 10 minutes of latitude by 10 minutes of longitude. Each of these blocks is referred to by a four-letter code, which describes the location of that particular block. Consequently, sites within each Borden block are numbered sequentially in the order in which they are reported. The Borden block that is of concern to this report CbDd.



## **METHODS**

The information presented in this report was gained through research of relevant documents found at Archaeological Services in Fredericton and published materials, including topographic and surficial geology maps & reports, aerial photographs, and the New Brunswick Register of Historic Places. The field component was conducted using intensive visual inspection through pedestrian surveying. The entire area that is scheduled to be impacted by ground disturbing activities was surveyed (see Figures 2, 3 & 10).





## RESULTS

Early aerial photographs (1944 7326-25) indicate that the majority of the project area was once used for agriculture. The air photos also suggests that a once natural, small drainage channel (seasonal) may have existed within the project area near the eastern boundary. During the course of the pedestrian survey, this channel was not identifiable, although a couple of modern channels have been created with heavy equipment, likely designed to drain the road and businesses to the south. Evidence in the field also indicates that the area was ploughed in the past.

While conducting the pedestrian survey in transects, a few sub-century garbage dumps were noticed. They contained typical household items with the biggest measuring approximately 10 x 5 m. It is assumed that these dumps are products of the nearby houses (outside of project boundaries).

One very large extant structures was identified in the desktop survey and visible in the field. It is understood that this concrete foundation was constructed for a planned shopping plaza but never completed. The structure measures approximately 200 x 80 m and appears in the field as the 1982 aerial photo suggests (see Figures 6, 7 & 9).

Also, there was not any obvious indications to suggest that this area (within the project boundaries) would be a draw for Native or early European occupation. The ground within the delineated area was often rather wet and low-lying without any obvious indication of any former shorelines.

Throughout the course of the pedestrian survey, there was not any culturally significant extant or exposed features/artifacts identified.



## CONCLUSIONS & RECOMMENDATIONS

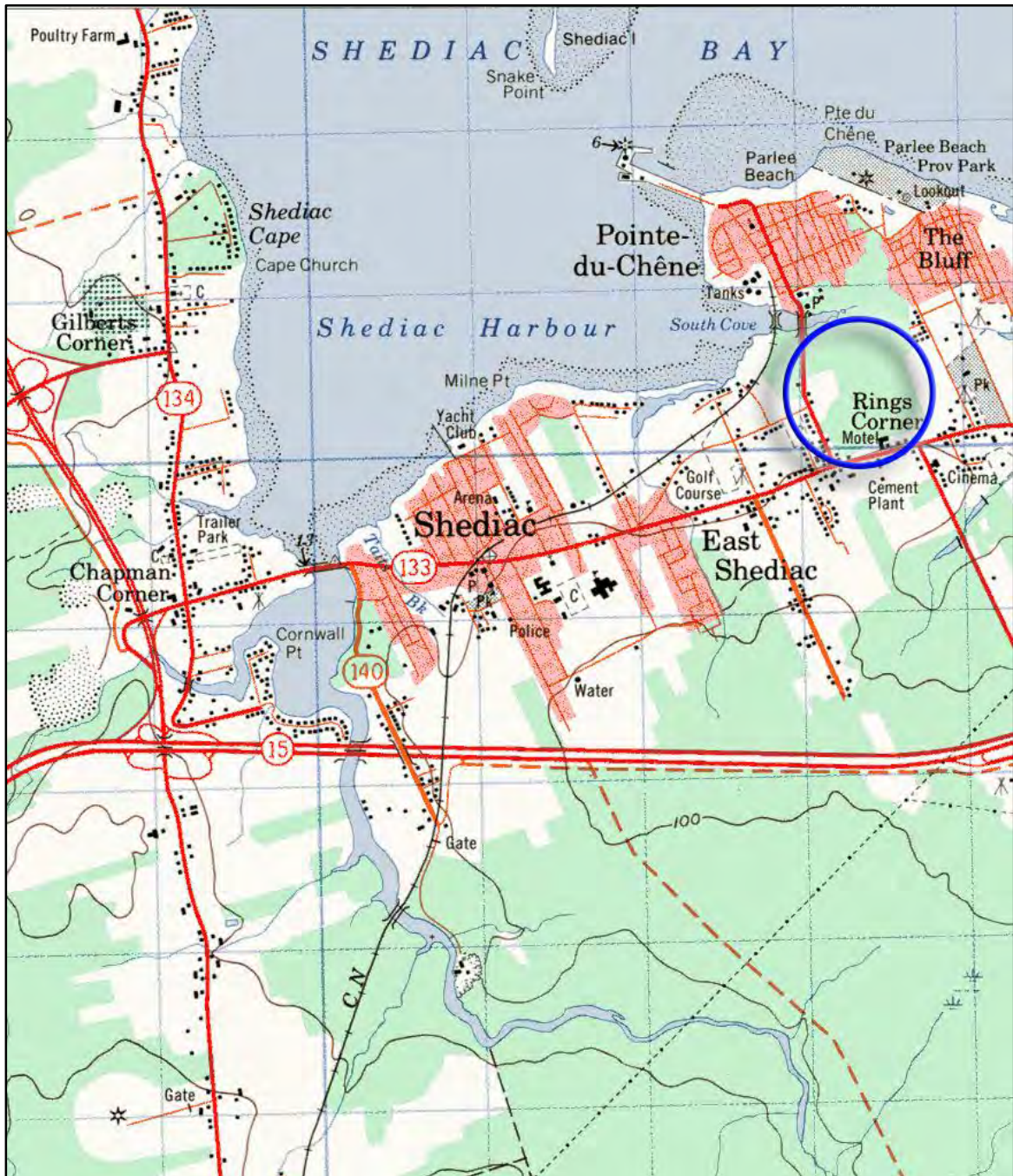
Between November 1<sup>st</sup> and the 2<sup>nd</sup>, 2014, an archaeological pedestrian survey took place at a proposed recreational development near Shediac, NB. The assessment of this property resulted in the failure to identify any evidence of significant past human use or the potential for the likelihood of any archaeological remains. With the results stated above, it is recommended that the proposed area be released for development.

If any change to the proposed footprint of this project is anticipated, then consultation with a permitted archaeologist should occur to ensure a minimal amount of damage to any buried heritage that may be present.



## APPENDIX





**Figure 1:** Approximate location of proposed recreational development (circled in blue).



**Figure 2:** Project location on modern aerial photograph.



**Figure 3:** Project location on an aerial photograph from 1944 (sortie 7326, pic 25).





**Figure 4:** Sub-century garbage dump at Waypoint 73.



**Figure 5:** Wetland near the north edge of proposed development.



**Figure 6:** Portion of large concrete foundation at south end of development.



**Figure 7:** Portion of large concrete foundation at south end of development.





**Figure 8:** Section of constructed drainage channel within the development area.





**Figure 9:** Abandoned foundation from air photo in 1982 (sortie 500, image 175).

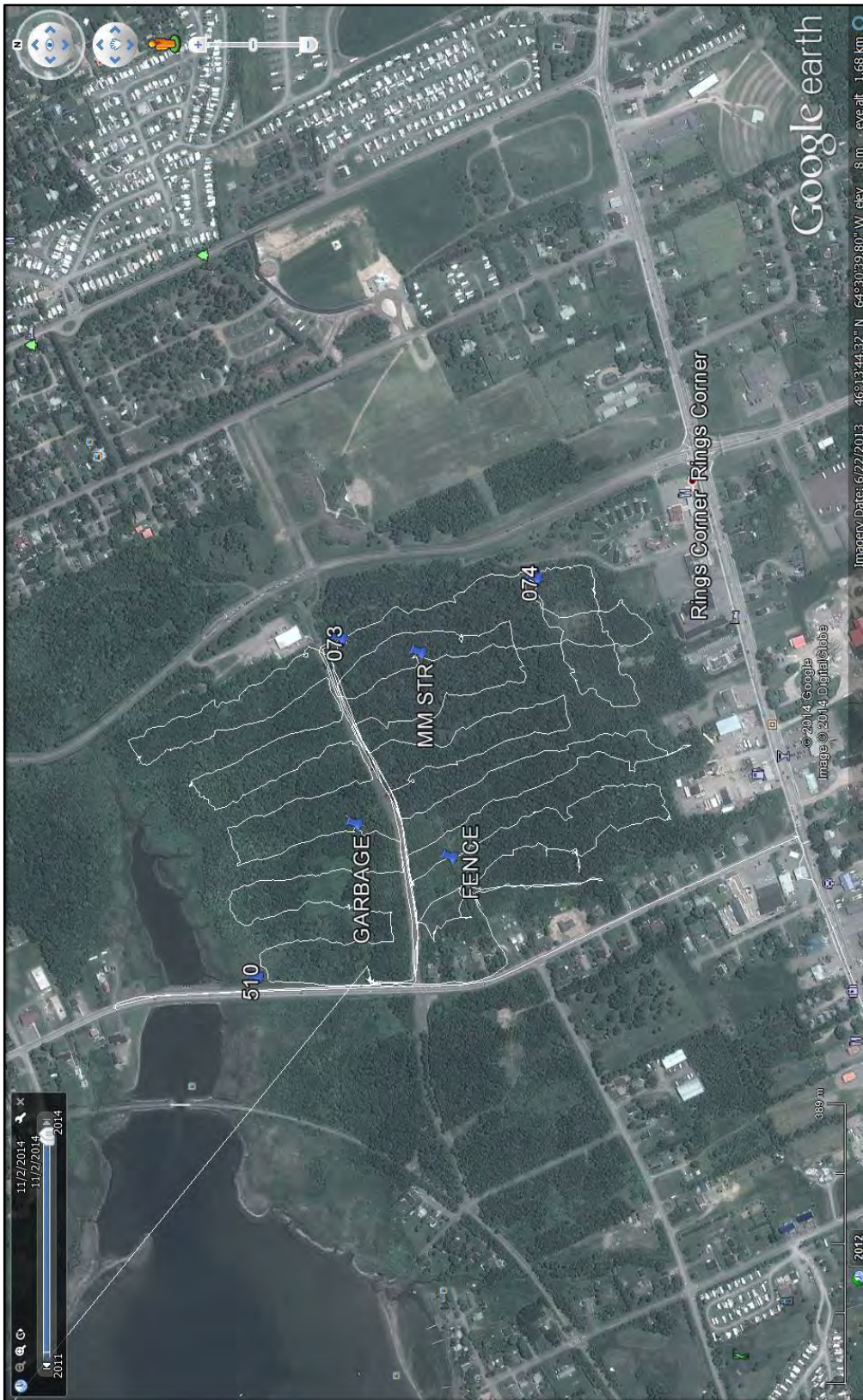


Figure 10: Track log for proposed development.





