



**Municipality of Cumberland  
County Environmental Issues  
and Analysis Report**

This Report has been prepared  
for the Municipality of the County  
of Cumberland

March 2011

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## **1.0 Introduction**

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### **1.1 PURPOSE OF THE ENVIRONMENTAL MASTER PLAN**

The Municipality of Cumberland County has recently completed two studies: the Cumberland County (NS) Integrated Community Sustainability Plan (ICSP) and the Regional Energy Strategy for Cumberland County, both identifying the need to review and update the current planning documents and weakness in the area of environmental protection. The development of an Environmental Master Plan will provide suggested planning document amendments addressing the issues identified in the two aforementioned studies. An Environmental Master Plan (EMP) is a guiding document focused on identifying and analyzing environmental features and incorporates the environmental issues identified in planning documents. The outcomes and analysis of the EMP will give guidance to update the County of Cumberland's Municipal Planning Strategy (MPS), Land Use Bylaws (LUB) and Secondary Plans.

The purpose of the EMP is to build on the established priorities reflected in current municipal and strategic plans and priorities outlined in the ICSP. The EMP can be used to reinforce understanding of environmental features and management of these features through detailed technical analysis and identification of best management practices. Identifying realistic opportunities to improve community land use, infrastructure and services by integrating and applying current GIS technology will facilitate land use planning analysis of environmental features. The EMP will generate a framework for evaluation of plans and policies based on their impact on community sustainability and resiliency; and provide a framework that reflects the strength of the landscape and communities in Cumberland County.

### **1.2 ABOUT THIS REPORT**

As the initial step in developing the Environmental Master Plan, this report focuses on identifying environmental issues and concerns within the County of Cumberland through literature research and stakeholder and public interviews. Also, the report provides an analysis of environmental features in Cumberland County. Environmental issues and analysis identified in this report will provide the key areas of interest in the development of the Environmental Master Plan and generate a framework for planning policy amendments.

### **1.3 REPORT METHODOLOGY**

Issues identified in this report have been gathered through the means of four tasks including a site visit to Cumberland County, literature research, interviews, and desktop research. Each of these tasks is described in further detail below.

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**Task 1: Site Visit**

Key team members visited Cumberland County on October 13 and 14, 2010. During the site visit the team completed several interviews with municipal staff and stakeholders, and an initial presentation was delivered to Council. The team visited key communities and sites in the County of Cumberland including local farm land, dykeland and aboiteaus systems, Joggins, Springhill, Pugwash, Oxford, and coastal areas along the Northumberland Shore. . The overall purpose of the site visit to Cumberland County was to gain a better understanding of the lay of the land and to understand the environmental issues and concerns as identified through face-to-face interviews and meetings.

**Task 2: Literature Review**

A review of existing literature and planning policies and regulations were assessed to gain knowledge regarding environmental issues in Cumberland County and Nova Scotia. The literature reviewed is included in Appendix A.

**Tasks 3: Stakeholder Interviews**

Extensive strategic interviewing process was completed to gain a better understanding of Cumberland County. A flexible interview was developed outline to guide inquiries and record responses. The intention of the interviews was to identify issues and opportunities in the Municipality, additional contacts of interest, studies and other sources of information on the Municipality, and such other considerations as may arise. A list of key stakeholders is identified in Appendix B along with an interview outline.

**Task 4: Desktop Analysis**

A desktop analysis of existing data and information were reviewed to allow the Project Team to identify an initial analysis of key environmental features and corresponding land use planning goals, issues or policy desires. In particular, information on the character, limitations, and potential interpretation of available data is outlined according to key environmental theme areas.

**1.4 REPORT LIMITATIONS**

Limitations in the development of the Issues and Analysis Report include seasonal timeframe, study approach and interview responses. The report has a limited timeframe therefore the environmental analysis did not consist of field investigation and only one site visit occurred during the fall season, limiting site analysis during other seasons. Consequently the study approach was limited to a desktop study of environmental features with one site visit occurring during from October 13-14, 2010. The desktop review allowed the Project Team to conduct an initial analysis of key environmental features and corresponding land use planning goals; however this approach did not allow for a thorough assessment of the environmental features.

INTRODUCTION

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In addition, research was also based in public and stakeholder interviews. Limited feedback and participation could therefore affect the outcome of the environment issues and analysis.

## 2.0 Cumberland County Background

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Cumberland County is the second largest county in Nova Scotia geographically with an area of approximately 4,271 km<sup>2</sup> (Cumberland County Municipality Corporation, 2010a). Cumberland encompasses the entire geographical boundary extending from the New Brunswick border to the Cobequid Pass with the Bay of Fundy and the Northumberland Strait bordering the County. Cumberland County does not include the four towns of Amherst, Oxford, Parrsboro and Springhill (Cumberland County Municipality Corporation, 2010a). Still, the four towns within the County's boundaries are the centres for residential development based on population size (9,505 residents, 3,941 residents, 1,401 residents and 1,178 residents, respectively; Statistics Canada, 2006). Settlement patterns within the County (excluding the Towns) are focused around two villages (Pugwash and River Hebert) and small service centres (Joggins, Maccan, Advocate, Wallace, Malagash, Collingwood and Wentworth), several small settlements, and cottage development along the Northumberland Strait (Cumberland County Municipality Corporation, 2010a).

The County consists of a diverse mix of landuses including incorporated towns, small villages, and rural agricultural development scattered throughout the countryside (Cumberland County Municipality Corporation, 2010b). Mining, fishing, forestry and agriculture resources comprise the resource-based industry in the County (Cumberland County Municipality Corporation, 2010a). Development mainly consists of rural residential, with several agricultural practices as well as forestry, mining, commercial and industrial land uses. Figure 1 depicts the general concentration of land uses within the County, as compiled by Department of Natural Resources. As shown in Table 2.1, 63.9% of land in Cumberland County is forests (including forests, regenerating and silviculture forests), with waterbodies at 10.5% and wetlands at 6.9%. Urban land use is the tenth largest land use in the area, with 1.2% of the total land use in Cumberland.

The Central Planning Area surrounding the Town of Amherst is a focus area for more urban, single unit residential development and commercial land uses, but still houses significant agricultural practices (Cumberland County Municipality Corporation, 2010b). The Northumberland Shore largely consists of closely clustered cottage developments used as seasonal residences; however these are increasing being converted to year-round residences. Areas of note include the Joggins area along the Bay of Fundy, which is recognized by the Province of Nova Scotia under the *Special Places Protection Act* for the protection of the Joggins Fossil Cliffs as a World Heritage Site (Cumberland County Municipality Corporation, 2010b). Other significant areas include the Chignecto game sanctuary, which is now being considered a potential Wilderness Protected Area, and Cape Chignecto Provincial Park.

**Detailed Land Use**

- Forest
- Forest (Silviculture)
- Forest (Regenerating)
- Brush/Alders
- Clear cut
- Burn
- Partial depletion not verified
- Agriculture
- Blueberries

**Map Features**

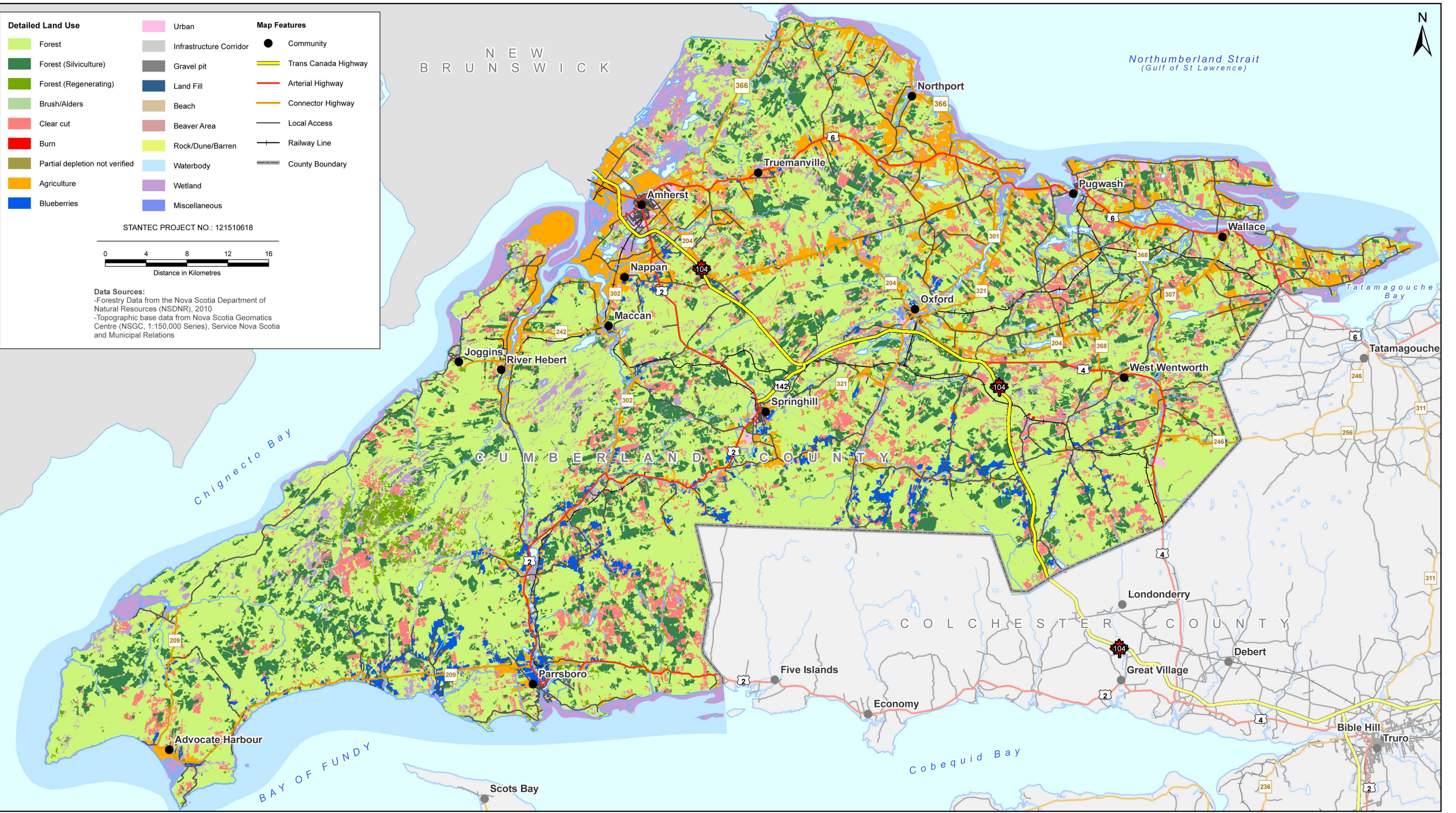
- Urban
- Infrastructure Corridor
- Gravel pit
- Land Fill
- Beach
- Beaver Area
- Rock/Dune/Barren
- Waterbody
- Wetland
- Miscellaneous
- Community
- Trans Canada Highway
- Arterial Highway
- Connector Highway
- Local Access
- Railway Line
- County Boundary

STANTEC PROJECT NO.: 121510618

Distance in Kilometres

**Data Sources:**

- Forestry Data from the Nova Scotia Department of Natural Resources (NSDNR), 2010
- Topographic base data from Nova Scotia Geomatics Centre (NSGC, 1:150,000 Series), Service Nova Scotia and Municipal Relations



DATE: 2011/02/29

PREPARED BY: C. Shupe

Cumberland County Environmental Master Plan

Land Use / Forestry

FIGURE NO.: 1

Path: V:\1215\active\121510618-Cumberland MPS\geomatics\mapping\MXD\ReportFigures\fig\_cumberland\_forestry\_landuse\_11x17\_20110221.mxd

## CUMBERLAND COUNTY BACKGROUND

**Table 2.1 Prominence of Land Use Types within Cumberland County**

Land Use	Area (ha)	Percentage of County
Agriculture	30,528	5.9%
Urban	6,268	1.2%
Beach	147	<0.1%
Beaver Area	2,861	0.6%
Blueberries	8,933	1.7%
Brush / Alders	7,158	1.4%
Burn	25	<0.1%
Clear Cut	33,980	6.6%
Forest	251,282	48.7%
Forest (Regenerating)	27,950	5.4%
Forest (Silviculture)	50,385	9.8%
Gravel Pit	415	0.1%
Infrastructure Corridor	4,447	0.9%
LandFill	11	<0.1%
Miscellaneous	367	0.1%
Rock / Dune / Barren	616	0.1%
Rock/Dune/Barren	80	<0.1%
Waterbody	54,351	10.5%
Wetland	35,712	6.9%
Total	515,517	100.0%

With a diverse mix of land uses in the area, the need to develop a comprehensive plan for land use management is important to the County. Additionally Cumberland County faces environmental challenges that are both common and unique to Nova Scotia communities. Identifying and addressing these environmental issues is imperative in developing a sustainable approach to land use planning.

The report is divided into three sections: land, water and natural resources. These categories are further divided into sub categories of key issues identified during literature research, strategic interviewing and desktop analysis (See Appendix C for a complete list of identified issues). These categories include:

- 1) Land
  - a. Ecological Land Classifications
  - b. Restricted Land Use
  - c. Wetlands
  - d. Wildlife
- 2) Water
  - a. Groundwater
  - b. Surface Water
  - c. Coastal Areas
  - d. Flooding

CUMBERLAND COUNTY BACKGROUND

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- 3) Natural Resources
  - a. Agriculture
  - b. Forestry
  - c. Mining
  - d. Energy

For each category, the Project Team identified background to the identified issues within Cumberland County, concerns expressed through strategic interviewing and/or research, management constraints, management opportunities, potential land use conflicts and municipal cooperation opportunities. This analysis provides the baselines for the development of recommendations and policies amendments for land use planning in Cumberland County.

## 3.0 LAND

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### 3.1 ECOLOGICAL LAND CLASSIFICATION

#### 3.1.1 Background

To understand the underpinnings of the environmental landscape within the County, Ecological Land Classification (ELC) was researched to identify areas of similar ecology, and to describe the physical and biological environment (NSDNR, 2003). The ELC for Nova Scotia is a hierarchical mapping of the province's forest ecosystems and was designed to support a broad range of ecosystem management planning issues and scales (Table 3.1). This mapping tool identifies and describes areas of similar enduring physical attributes and is based on features such as climate, elevation, topography, bedrock formation, and vegetation. Information is presented and mapped within a hierarchy where broad to specific levels of detail are presented on a series of scale dependant maps. The ELC is intended to be a useful tool for landscape level planning and sustainable management of forests, conservation, wildlife and other land use issues. NDSNR has developed a number of ELC-related tools to aid in the assessment of such themes. Information on the character of the ecological units identified in the ELC are available and include descriptions of the physical and biological environment affecting the ecological structures, processes, and biodiversity.

**Table 3.1 Management Applications for the Ecological Land Classification for Nova Scotia**

EcoUnit	Management Application
Ecozone	The province is entirely contained within the "Acadian Forest" Ecozone, a continental unit used for developing and coordinating strategic policies at regional, national, and international levels.
Ecoregion	Nine provincial climatic regions support distinctive vegetation communities and physiographic patterns. Ecoregions will be used to roll up landscape plans produced for ecodistricts into "master" landscapes to address coarse scale issues related to habitat conditions, timber flow, etc.
Ecodistrict	Thirty-nine ecodistricts are characterized by distinctive patterns of vegetation, landform, and ecological processes. These provide the landscape units used for tactical planning.
Ecosection	Consistent physical conditions support repeating vegetation communities and successional responses. The pattern of repetition across ecodistricts imparts character and shapes landscape processes. Ecosections provide the fundamental unit for describing landscape structure and analyzing functions. This level of classification includes Natural Disturbance Regime and Potential Climax Forest interpretations, as well as non-forest communities.
Ecosite	Ecosites have not yet been mapped, and are expected to be similar to the ecotypes described in the forest ecosystem classification guidebooks (FEC). These units will support operational planning and fine scale conservation.

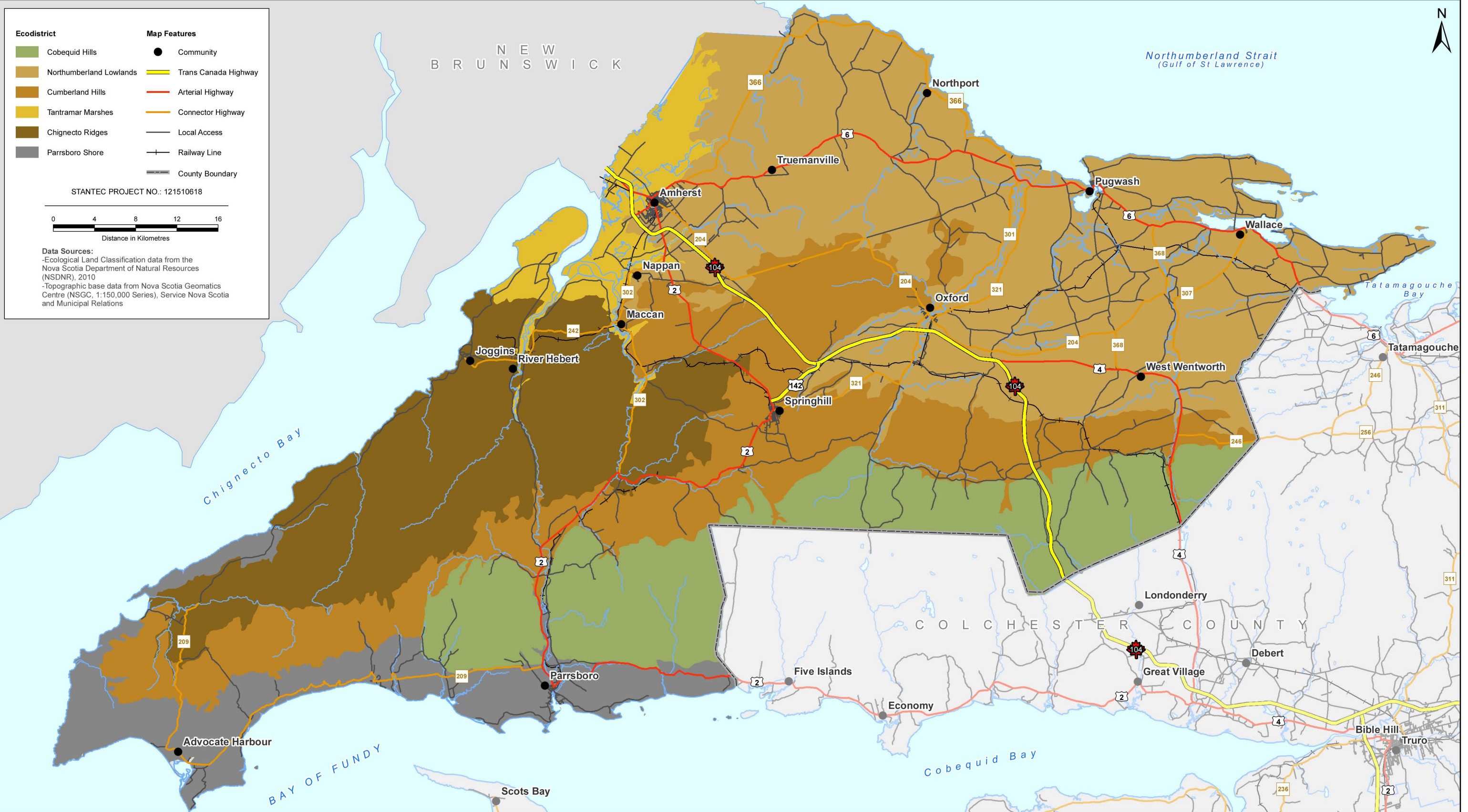
Source: Stewart and Neily 2008

## LAND

Three ecoregions are represented within Cumberland County: the Northumberland Bras d'Or Lowlands, Nova Scotia Uplands, and the Fundy Shore (Figure 2). Most of the County is encompassed by the Northumberland Bras d'Or Lowlands Ecoregion which is distinguished as a sheltered lowland area with a climate moderated by its proximity to a relatively warm body of salt water (*i.e.*, the Northumberland Strait). The Nova Scotia Uplands Ecoregion occurs at elevations of 150 - 300 m above sea level and is characterized by warm summers and long cold winters. Owing to its proximity to the Bay of Fundy, the Fundy Shore Ecoregion is distinguished by a coastal climate (Neily *et al.*, 2003). These three ecoregions encompass six ecodistricts within Cumberland County, including the Northumberland Lowlands, Cumberland Hills, Tantramar Marshes, and Chignecto Ridges Ecodistricts (all within the Northumberland Bras d'Or Lowlands Ecoregion), the Cobequid Hills Ecodistrict (within the Nova Scotia Uplands), and the Parrsboro Shore Ecodistrict (Fundy Shore Ecoregion) as identified in Table 3.2.

**Table 3.2 Ecodistricts Represented within Cumberland County and Information on their Area, Elevation, Climate / Weather, and General Topography**

Ecodistrict Name	Percent Land Area of County	Elevation	Climate / Weather	General Topography
Northumberland Lowlands	35%	Generally < 50 m	Relatively sheltered and dry; good growing conditions	Low-lying ridged area in close proximity to the Northumberland Strait
Chignecto Ridges	17%	Generally <120 m	Some influence by Bay of Fundy but generally inland climate	Ridged plain which tilts towards Chignecto Bay
Cobequid Hills	15%	Relatively high (up to 335 m)	Relatively dry but receives heavy snowfall	Range of hills running east-west
Cumberland Hills	15%	Generally <150 m	Cooler and more moist than Northumberland Lowlands	Moderately hilly area between lowlands and Cobequid Mountains
Parrsboro Shore	8%	Generally <125 m	Influenced by cold waters of Bay of Fundy - cool and foggy summers	Rolling hills dissected by watercourses from Cobequids; includes outwash plains along Bay of Fundy
Tantramar Marshes	4%	Close to sea level	Windy and cool due to proximity to water	Flat terrain on imperfectly-poorly drained soils derived from tidal sediments



**Ecodistrict**

- Cobequid Hills
- Northumberland Lowlands
- Cumberland Hills
- Tantramar Marshes
- Chignecto Ridges
- Parrsboro Shore

**Map Features**

- Community
- Trans Canada Highway
- Arterial Highway
- Connector Highway
- Local Access
- Railway Line
- County Boundary


STANTEC PROJECT NO.: 121510618

0 4 8 12 16  
Distance in Kilometres

**Data Sources:**  
 -Ecological Land Classification data from the Nova Scotia Department of Natural Resources (NSDNR), 2010  
 -Topographic base data from Nova Scotia Geomatics Centre (NSGC, 1:150,000 Series), Service Nova Scotia and Municipal Relations

DATE: 2011/11/25


PREPARED BY: C. Shupe



Cumberland County Master Plan

**Ecological Land Classification**

FIGURE NO.: 2



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LAND

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**Northumberland Lowlands Ecodistrict**

The Northumberland Lowland Ecodistrict comprises approximately 35% of Cumberland County. This ecodistrict seldom exceeds 50 m in elevation, receives the lowest annual mean precipitation in the province at 1128 mm, and has one of the best growing climates in Nova Scotia. The surficial till of the ecodistrict is derived from the underlying Carboniferous sediments, the most prominent being the fine red sandstones which are conspicuous on the cliffs along the Northumberland shore. Occurrences of gypsum and salt are also scattered along the coast. The ecodistrict is characterized by imperfectly drained soils found on compact, slowly permeable, basal tills derived primarily from red sandstones and shales. As a result of the compacted nature of the subsoil, most water must be removed laterally or through evapotranspiration. Imperfectly drained, reddish brown sandy loams, loams, and clay loams occupy extensive areas of the undulating to rolling plain. Better drained soils are found on the upper slopes on permeable sandy loam tills. Ridged topography, usually with a thick veneer of till, is prominent throughout the ecodistrict (Neily *et al.*, 2003).

The ecodistrict is dominated by coniferous forest, with black and red spruce being dominant, while a number of early successional hardwood and softwood species are abundant in areas regenerating from disturbance. Although the upper slopes and hilltops, which have better drainage, support some tolerant hardwoods, such stands are generally rare throughout the ecodistrict. Due to its warm summers and low moisture levels, fire is a significant natural disturbance in the ecodistrict and those areas with a history of fire (such as near Oxford and Springhill) have contain prominent stands of Jack pine and black spruce. Wind throw is also a significant disturbance process as many forests are comprised of shallow rooted trees on imperfectly or poorly drained soils (Neily *et al.*, 2003).

**Chignecto Ridges Ecodistrict**

The Chignecto Ridges Ecodistrict occupies 17% of Cumberland County and may be characterized as a plain tilting towards Chignecto Bay. Elevation within this ecodistrict seldom exceeds 120 m above sea level. This ecodistrict is underlain by coarse and fine grained Carboniferous sandstones which are coal bearing. These are exposed in some locations and overlain by sandy tills in others. Soils are predominantly shallow, imperfectly drained, and derived from sandstones. In many of the soil landscapes, drainage is influenced by the haphazard arrangement of the bedrock which creates a pattern of imperfectly and poorly drained soils (Neily *et al.*, 2003).

This ecodistrict is bordered on its west by the Bay of Fundy and although this feature exerts some moderate influence on forest growth where in close proximity, the effect is not reflected very far inland. Repeated wildfires have resulted in stands of jack pine, black spruce, red maple and white birch on ridged portions of the ecodistrict and would be expected to include red spruce, white pine and hemlock with successional development. Fire and glacial activity have

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resulted in large areas of thin soils and exposed bedrock in this ecodistrict. The steep slopes along the Bay of Fundy and the better drained, deeper soils inland support stands of red spruce whereas stands of tolerant hardwoods are found on the upper slopes and crests of well-drained areas (Neily *et al.*, 2003).

**Cobequid Hills Ecodistrict**

The Cobequid Mountains separate two lowland ecodistricts to the north and south and contain the highest points on the mainland. The ecodistrict defined by these hills accounts for approximately 15% of Cumberland County. Compared to other areas within the Nova Scotia Upland Ecoregion, the ecodistrict is relatively dry, with only 1182 mm of precipitation per year. However, this ecodistrict receives the greatest snowfall on the mainland with over 300 cm of snow in an average year (Neily *et al.*, 2003).

The Cobequid Hills ecodistrict has a complex geological history. Most of the strata are precarboniferous and are resistant to erosion. Many faults are expressed throughout the ecodistrict, with the most prominent, the Cobequid fault, on the south extending from Truro to Cape Chignecto. Soils are dominated by coarse gravelly to stony sandy loams derived from igneous and metamorphic rocks. In many areas, the soils are shallow to bedrock, especially on the well drained, coarse textured soils found on hilly topography (Neily *et al.*, 2003).

Stands of tolerant hardwoods are common throughout the Cobequid Hills. Extensive flats of imperfectly drained coarse textured soils are found between these hills and are dominated by red and black spruce. Also characteristic of the ecodistrict are the steep-sided ravines with well drained coarse to medium textured soils where forests of shade tolerant species including hemlock, white pine, white ash and ironwood are found. The growth potential of the hardwood forests is seriously limited on the upper elevations where damage caused by snow and ice breakage reduces height and stem quality. However, on the sheltered lower slopes, hardwood potential is improved as the exposure to winds is diminished. Stands of white spruce are prominent within the ecodistrict, where they are particularly associated with abandoned farmland (Neily *et al.*, 2003).

**Cumberland Hills Ecodistrict**

The Cumberland Hills Ecodistrict, which comprises approximately 15% of the County, rises above the lowlands of the Northumberland Lowlands Ecodistrict but is still in the shadow of the Cobequid Mountains. These rounded hills seldom exceed 150 m above sea level, except near Springhill and Leicester where elevations are just over 180 m (Neily *et al.*, 2003). The climate of the ecodistrict is slightly cooler and receives more moisture than the adjacent lowlands. The bedrock geology is generally of Carboniferous era sedimentary rocks and the majority of soils in this ecodistrict are derived from sandstones and conglomerates creating well drained, coarse textured, sandy loams. Finer textured soils such as clay loams have developed from shales and

LAND

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mudstone, and are imperfectly drained. The upland sites are a mixture of tolerant softwood and hardwood stands whereas imperfectly drained sites are occupied by black spruce. Areas with coarse textured soils are prone to moisture deficits in the summer and are susceptible to fire. Along with fire, blowdown and insect mortality are prominent natural disturbances, particularly on some of the better drained portions of the ecodistrict (Neily *et al.*, 2003).

**Parrsboro Shore Ecodistrict**

The Parrsboro Shore Ecodistrict is located on the north shore of the Minas Basin and stretches from Economy Mountain in the east to Cape Chignecto in the west. This ecodistrict accounts for approximately 8% of Cumberland County and may be best characterized as a series of small rolling hills dissected by the steep-sided canyons of rivers and streams flowing from the Cobequid Mountains. Several outwash plains are interspersed throughout this ecodistrict, such as at Parrsboro and Advocate (Neily *et al.*, 2003). Overall, the elevation seldom exceeds 125 m above sea level, but the rapid descent to sea level affords the impression of a more significant rise. The local climate of the ecodistrict is significantly affected by its proximity to the cold waters of the Bay of Fundy. The ecodistrict has three major faults running its length, with a series of minor faults throughout. These have created a varied landscape with resistant basalts and erodable sandstones side by side. The lowlands are underlain by soft sandstone but where it is capped by basalt, high, steep-sided hills like Economy Mountain are formed. The predominant shale-derived, sandy loam soils cover the steep slopes from Five Islands to Advocate. On the lowlands, finer textured, imperfectly drained soils are found around Parrsboro. The outwash valleys are underlain with rapidly drained, coarser textured soils, often with a high content of gravel. Most of the freshwater in the ecodistrict occurs primarily in fast flowing, narrow streams and rivers running off the Cobequids (Neily *et al.*, 2003).

**Tantramar Marshes Ecodistrict**

The Tantramar Marshes comprise the smallest and one of the most distinctive ecodistricts in Nova Scotia, and account for approximately 4% of Cumberland County. Providing a natural boundary between Nova Scotia and New Brunswick at the Isthmus of Chignecto, this ecodistrict is comprised of flat terrain on tidal sediments and is occupied by extensive grasslands which have replaced the salt water marshes that were dyked long ago by early Acadian settlers from the tidal waters of the Bay of Fundy (Neily *et al.*, 2003). The ecodistrict receives strong winds and experiences cooler than normal temperatures than elsewhere in the ecoregion due to its proximity to the bay. This ecodistrict is also predominantly comprised of imperfectly drained to poorly drained soils and approximately half of its area is covered by peat lands. The peat lands are often about one meter thick and have formed in the low lying depressions of the ecodistrict. Mineral soils reclaimed from the salt marshes are mainly silty clay loams whereas those adjacent to the peat lands are usually poorly drained sandy loams. Sections of the ecodistrict which are inland from the dykelands and marshes are typically occupied with black, red or

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hybrid spruce, red maple and tamarack, whereas some tolerant mixedwood are found along the Fort Lawrence ridge (Neily *et al.*, 2003).

**3.1.2 Identified Concerns**

There are a number of conservation-related concerns within the province which are also of concern within Cumberland County, including:

- **Protection of wildlife.** Habitat fragmentation and loss along with other stressors have had negative impacts on many wildlife species within the province. Although the protection of wildlife is important throughout Cumberland County, it is currently being considered an issue of specific concern in the Chignecto Isthmus Wilderness Area.
- **Protection of wetlands.** Loss of wetlands to development is an important issue throughout the County but has been identified as being of particular concern along the Northumberland Shore.
- **Lost Acadian Forest Attributes.** Past management practices have resulted in a degradation of many structural, composition, and functional attributes of the Acadian Forest within Nova Scotia and elsewhere.
- **Climate change** could potentially cause a large number of ecological changes within the region, including higher risk of fire, pests, drought, and species' distributions.
- **Conservation of Representative Landscape Units.** Continued loss of ecological integrity across the landscape has highlighted the need for a system of protected areas that encompass the natural variation of the province.
- **Variation in Ecological Character.** Cumberland County exhibits variation in ecological character throughout its extent and it therefore also varies with respect to the types and intensities of environmental constraints which may be prominent within any particular region. For example, the Tantramar Marshes Ecodistrict is a low-lying area that has historically been comprised of large amounts of wetland habitat and this attribute is likely to complicate development in the area.

**3.1.3 Management and Protection Opportunities**

- **Ecological Land Classification.** The ELC provides a foundation for ecosystem-based management / planning through its identification of hierarchically-related ecosystem units. These mapped units may be used for a variety of planning initiatives, such as to identify where multi-jurisdictional communication is particularly important or for assessing variation in ecological stress (*i.e.*, stress to ecosystems due to development pressure *etc.*) across the landscape.

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Ecological Landscape Analyses are ecodistrict-level descriptions (based on NSDNR's ELC) of enduring and existing ecological properties and they are intended to provide a foundation for ecologically informed landscape planning and design. They do so by helping decision makers develop an understanding of the landscape as an ecological system by exploring the relationship between structure and function. They describe current landscape conditions, highlight the existing features and functions, and use NSDNR's ELC to provide context with regards to a "natural" state. For example, comparisons of existing and historical conditions may help identify the character of naturally intact systems and highlight major landscape changes. Results of the analyses include spatial mapping of the major findings, and are supported by summary tables and text. In particular, the *Ecological Landscape Analyses* summarizes information on the following themes (Stewart and Neily, 2008):

- Landscape structure (matrix, patch, and corridor ecosystems are defined) and relationships between landscape functions and structure;
- Connectivity and fragmentation;
- Special Features (rare, uncommon, and threatened species, sites, habitats, and other sub-landscape scale features);
- Ecological Representation (i.e., the distribution of ecological units and communities within reserve systems);
- Road Ecology (using a road index tool to quantify and map the relative ecological influence of the transportation network and identify potential intersections with ecological systems);
- Landscape Composition (the landbase classification from the forest model is used to summarize the current distribution of vegetation communities, age classes, and successional stages); and
- Ecological Emphasis Classification (provides an indication of the degree to which land management practices within an ecosystem are directed towards conserving natural ecosystems by calculating an index of land-use intensity).

By providing a new perspective on ecosystem structure and function, these landscape analyses may serve an important role in helping planning specialists develop integrated plans and landscape designs that achieve multiple strategic objectives.

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## 3.2 RESTRICTED LAND USE

### 3.2.1 Background

There a variety of designations that highlight, protect, and/or limit activities on lands identified as being of particular importance for conservation, ecological, resource management, or heritage purposes, as identified by data provided by the *Restricted Land-use Database* (Figure 3). Lands that are included in this data layer include a variety of designations within Cumberland, including Water Supply Areas, Ramsar Wetland Sites, Indian Reserve Lands, National Migratory Bird Sanctuaries, and Protected Beaches.

Nova Scotia Environment plays an integral role in protecting the natural heritage in Nova Scotia by planning and managing Nova Scotia's wilderness areas, nature reserves and heritage rivers (Nova Scotia Environment, 2010). Economy River and the Portapique River Wilderness areas fall partly within Cumberland County (Figure 3) and are protected under the *Wilderness Areas Protection Act*. This Act aims to conserve significant natural areas, protect important habitats, improve air quality, create and protect soils, store carbon and provide clean water (Nova Scotia Environment, 2010). Protection under the *Act* restricts residential, commercial, agricultural and renewable energy developments from occurring in these specified areas by prohibiting energy resource development, forestry, aquaculture, agriculture, or developments that alter the surface of the land, remove, destroy or damage natural flora or fauna (Wilderness Protection Act, 1998). The Chignecto Isthmus Wilderness Area (not currently included in the *Restricted Land-use Database* presented in Figure 3) is also located in Cumberland County. The Chignecto Wilderness Area improves the protection of the Town of Amherst's water supply area by prohibiting development in the designated area. Additionally, the Chignecto Game Sanctuary is a 220 km<sup>2</sup> area that is currently being considered as part of a proposed Chignecto Wilderness Area.

A number of other lands within Cumberland County are provided protection by the province and include parks, wildlife management areas, non-designated parks / reserves, and special places. Provincial parks vary considerably in character and range from small picnic areas to large and relatively natural ones. Cape Chignecto is the largest provincial park within Cumberland County but a number of others are also present and include Amherst Shore, Five Islands, Fox Harbour, Gulf Shore, Heather Beach, Northport Beach, Shinimicas, Tidnish Dock, and Wentworth Provincial Park. Additional non-designated parks/ reserve include those at Fenwick, Fox Harbour, Joggins Fossil Cliffs, Newville Lake, and Treen Point. Only one provincial Wildlife Management Area is present within Cumberland County, at Maccan River, whereas two areas are protected under the *Special Places Act* (1981), including Joggins Fossil Cliff and the Parrsboro Fossil Site.



DATE: 2011/02/29  
 PREPARED BY: R. Sutcliffe



Cumberland County Environmental Master Plan

**Restricted Land Use Lands**

FIGURE NO.: 3

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Lands which are recognized nationally and internationally as important ecological areas are also present in the County. In particular, wetlands encompassed by the John Lusby Salt Marsh and Amherst Point Bird Sanctuary are recognized both nationally and internationally as an important staging area for migratory waterfowl. The area is considered a National Wildlife Area, Migratory Bird Sanctuary, and is on the Ramsar List of Wetlands of International Importance.

Certain private properties within Cumberland County are also provided a protective status. For example, the Nature Conservancy of Canada owns and/or has conservation easements on a number of estuarine properties in the Pugwash area. Additionally, a number of privately owned properties are protected under the *Beaches Protection Act*, including at Fox Point, Partridge Island, Port Greville, Riverside, Sand River, and West Apple River.

The Eastern Habitat Joint Venture is collaborative group focused on developing public-private partnerships to conserve wetland resources. Primary Partners in Nova Scotia include NSDNR, Environment Canada - Canadian Wildlife Service, Ducks Unlimited Canada, the Nature Conservancy of Canada, and Wildlife Habitat Canada. Other supporters include corporate and private landowners, government agencies, conservation organizations and individuals. A number of properties within the County are protected through this initiative, including those at Amherst Marsh, Barronsfield, East Amherst, Edgetts Beach (West Apple River), Goat Island (Pugwash), Halfway River, Henderson Settlement, Maccan, Minudie, and Missaguash/Fort Lawrence.

Other lands with restricted land uses within the County include Indian reserve lands, properties designated for a pipeline corridor, and non-designated rail corridors.

**3.2.2 Identified Concerns**

The distribution and character of restricted land use parcels across the landscape is relevant to a number of issues that are of concern within Cumberland County and are similar concerns as identified in the ecological land classifications section (Section 3.1.2), including:

- **Protection of wildlife.** Habitat fragmentation and loss along with other stressors have had negative impacts on many wildlife species within the province. Although the protection of wildlife is important throughout Cumberland County; it is currently being considered an issue of specific concern in the Chignecto Isthmus Wilderness Area.
- **Protection of wetlands.** Loss of wetlands to development is an important issue throughout the county but has been identified as being of particular concern along the Northumberland Shore. For example, the proposed residential development of Sandpiper Ridge on the Northumberland Shore is located in wetland habitat.

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- **Conservation of Representative Landscape Units.** Continued loss of ecological integrity across the landscape has highlighted the need for a system of protected areas that encompass the natural variation of the province.
- **Maintenance of cultural and heritage resources** are recognized throughout the County, province, and elsewhere as being of important value.
- **Restricted Land-use Database lands** may have land-use restrictions due to legislation, orders in council, cabinet decree, or other legal means. Whereas development on such properties will be constrained by their protective status, activities on or adjacent to others may require special consideration in order to minimize influence on the valued features.

**3.2.3 Management and Protection Opportunities**

- **Restricted Land Use Identification.** The dataset can be used to identify sensitive areas that may be affected by development or to highlight collaborative opportunities with other jurisdictions and/or parties (*e.g.*, for protected areas management). It does not include all protected or restricted use land in Nova Scotia and information for some private lands has not been included at the request of property owners or the information owners (NSDNR, 2009).
- **Intergovernmental Cooperation.** Intergovernmental Cooperation is important for promoting many of the themes represented by the various restricted land use designations, including the conservation of resources, heritage, and ecological values. Properties with restricted land uses may be delegated a number of local, provincial, national, and/or international designations and municipal cooperation with the respective parties may be required for municipal planning initiatives.

**3.3 WETLANDS****3.3.1 Background**

In Nova Scotia, wetlands are protected under the Activities Designation Regulations (Activities Designation Regulations (2007) made pursuant to the provincial *Environment Act* (1995). Any project with the potential to alter a wetland (filling, draining, flooding or excavating), including direct and indirect impacts, requires a Water Approval from Nova Scotia Environment prior to starting the work, as described in the Operational Bulletin Respecting the Alteration of Wetlands (2006). If alterations exceed 2 hectares of any wetland, the project is also subject to registration under the Environmental Assessment Regulations (2009). The Province of Nova Scotia has also committed to establishing a policy to prevent the net loss of wetlands under the *Environmental Goals and Sustainable Prosperity Act* (2007).

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Wetland conservation is federally promoted by the Federal Policy on Wetland Conservation. The objective of this policy is to “promote the conservation of Canada’s wetlands to sustain their ecological and socio-economic function, now and in the future.” Coordination of implementation of the policy is the responsibility of Environment Canada, specifically the Canadian Wildlife Service and the Environmental Conservation Branch. Although there is no specific federal legislation regarding wetlands, they may be protected federally under the *Species At Risk Act* if they contain critical habitat for Species At Risk, the *Migratory Birds Convention Act, 1994* if they contain nests of migratory birds, and/or the *Fisheries Act* if the wetland contributes to an existing or potential fishery.

As indicated by provincial mapping sources, wetlands are prominent throughout Cumberland County (Figure 4). Estimates of the amount of wetland habitat within the County differ depending on the data source referenced, but information from the *Nova Scotia Wetlands Inventory* suggests that approximately 5% of the County is comprised of wetland habitat, with 90% (23,395 ha) of this being freshwater wetland and 10% (2,652 ha) of this being salt marsh (in contrast, *Nova Scotia Forestry Data* indicate that close to 7% of the county is comprised of wetland habitat). However, as indicated by *WAM*, wetland habitat is expected to be much more abundant within Cumberland County than current sources indicate. For example, over 7% of the county is identified by *WAM* as having a depth to water table of less than 10 cm from the surface and it is within 50 cm for an additional 11% of its area (indicating a hydrology that may support wetland formation). *WAM* depicts particularly high concentrations of potential wetland areas within the northern half of the County (Figure 5). In particular, the depth to water table is <0.5 m for much of the Tantramar Marsh Ecodistrict, reflecting the historical condition of much of the area as wetland habitat. In contrast, relatively little of the water table within the Cobequid Hills Ecodistrict is at or near the surface.

Some of the wetlands within Cumberland County are known to be of high ecological importance. Of particular importance from a wildlife perspective, those encompassed by the John Lusby Salt Marsh and Amherst Point Bird Sanctuary are recognized both nationally and internationally as an important staging areas for migratory waterfowl. The area is considered a National Wildlife Area, Migratory Bird Sanctuary, and is on the Ramsar List of Wetlands of International Importance.

**Wetlands**

- Fresh water wetland (NSDNR 2007)
- Salt marsh (NSDNR 2007)
- Coastal habitat areas (NSDNR 2010)
- Lake wetland (NSDNR 2010)
- Open bogs (NSDNR 2010)
- Treed bogs (NSDNR 2010)

**Map Features**

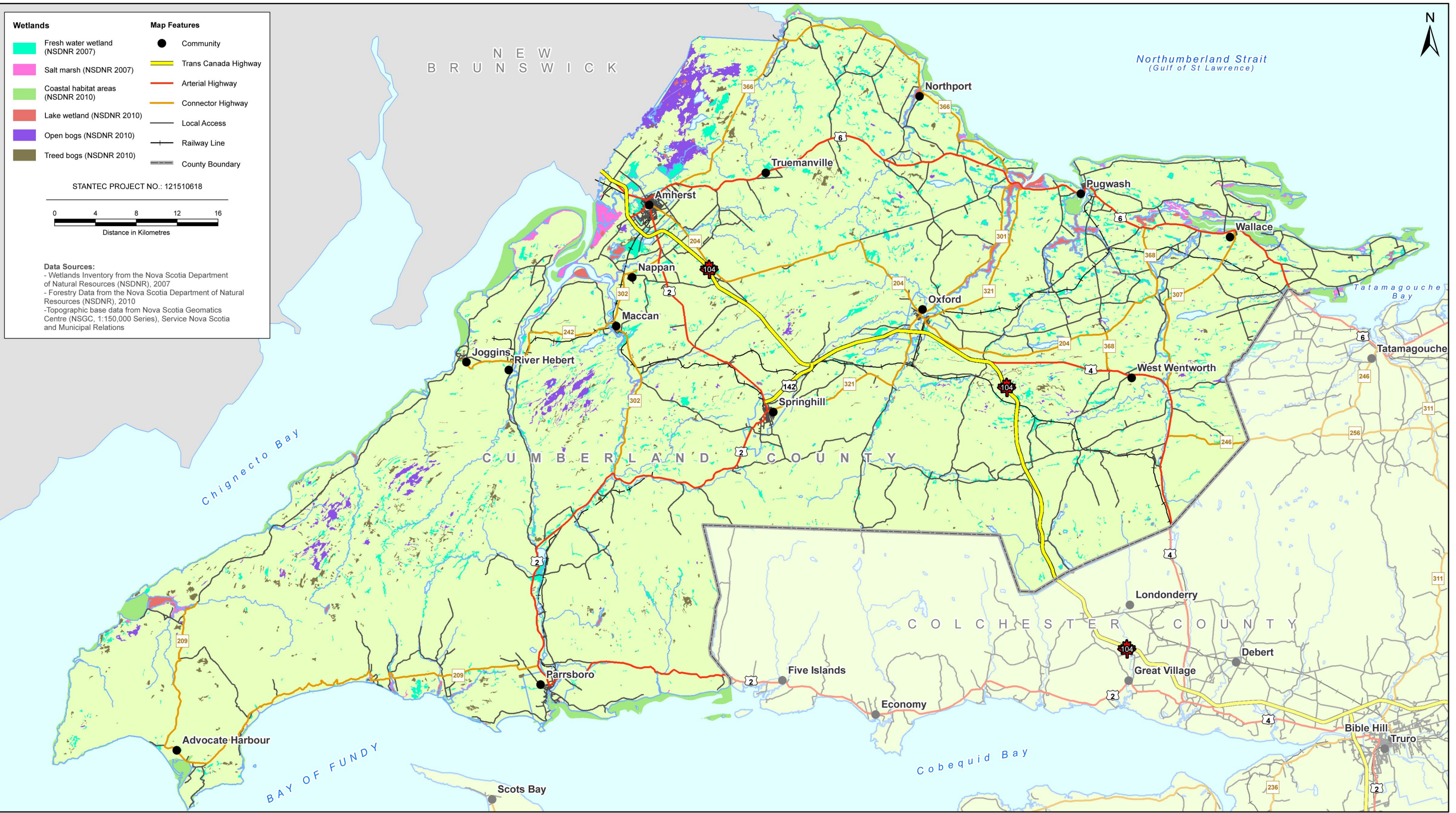
- Community
- Trans Canada Highway
- Arterial Highway
- Connector Highway
- Local Access
- Railway Line
- County Boundary

STANTEC PROJECT NO.: 121510618

Distance in Kilometres

**Data Sources:**

- Wetlands Inventory from the Nova Scotia Department of Natural Resources (NSDNR), 2007
- Forestry Data from the Nova Scotia Department of Natural Resources (NSDNR), 2010
- Topographic base data from Nova Scotia Geomatics Centre (NSGC, 1:150,000 Series), Service Nova Scotia and Municipal Relations



DATE: 2011/02/29

PREPARED BY: M. Huskins-Shupe

Cumberland County Environmental Master Plan

**Wetlands**

FIGURE NO.: 4

Path: V:\1215\active\121510\121510618-Cumberland MPS\geomatics\mapping\MXD\ReportFigures\fig\_cumberland\_wetlands\_11x17\_20110221.mxd

**Depth to Water Table**

**Depth (metres)**

- 0 - 0.10 m
- 0.11 - 0.50 m
- 0.51 - 2 m
- 2.01 - 10 m
- > 10 m

**Map Features**

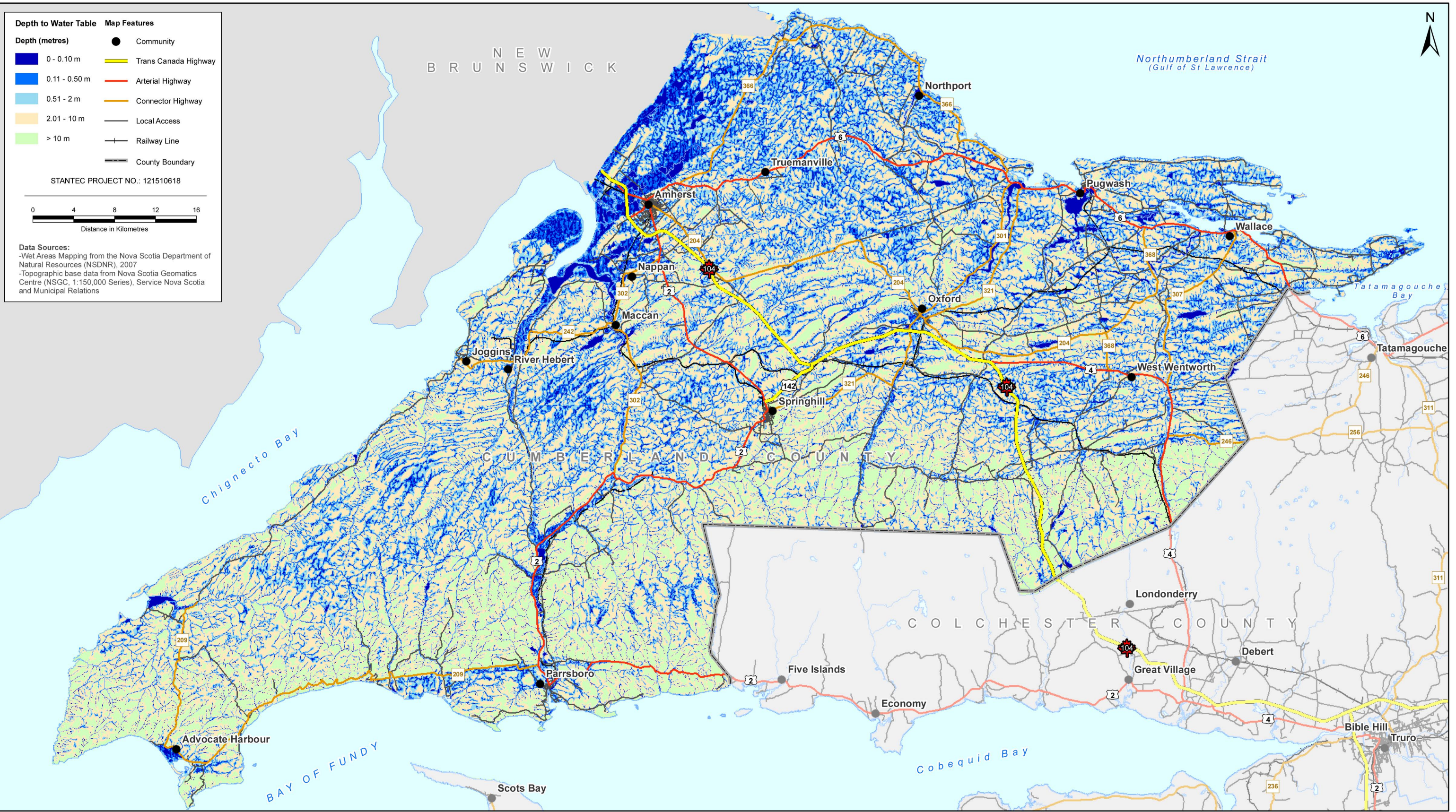
- Community
- Trans Canada Highway
- Arterial Highway
- Connector Highway
- Local Access
- Railway Line
- County Boundary

STANTEC PROJECT NO.: 121510618

0 4 8 12 16  
Distance in Kilometres


**Data Sources:**

- Wet Areas Mapping from the Nova Scotia Department of Natural Resources (NSDNR), 2007
- Topographic base data from Nova Scotia Geomatics Centre (NSGC, 1:150,000 Series), Service Nova Scotia and Municipal Relations



DATE: 2011/02/29


PREPARED BY: C. Shupe



Cumberland County Environmental Master Plan

**Wet Areas Mapping (WAM)**

FIGURE NO.: 5



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### 3.3.2 Identified Concerns

- **Historic and ongoing loss of coastal wetlands.** Loss of wetlands to development is an important issue throughout the county but has been identified as being of particular concern along the Northumberland Shore. Wetlands provide services in the watershed. Development pressures threaten the quality and quantity of wetlands globally.
- **John Lusby Salt Marsh and the Amherst Point Bird Sanctuary.** These marshes form a National Wildlife Area protected under the Wildlife Area Regulations of the Canada Wildlife Act.
- **Developments affecting wetlands require provincial approval.** With few exceptions, wetland alterations require prior approval by Nova Scotia Environment. Applications for approval require supporting documentation of wetland character by a qualified professional, as well as detailed justification of the unavoidable nature of the proposed alterations. The application and approval process can take several months to years.
- **Wetland alterations require compensation.** Any losses of wetland habitat, either through direct infilling or indirectly through alteration of wetland hydrology, requires compensation to replace the wetland functions lost as a result of the wetland alterations.
- **Incremental losses of wetlands may impede future development.** Approvals may not be awarded for alteration of wetlands that occur in a watershed if a substantial amount of wetland loss has already occurred in that watershed, or if a substantial proportion of that same wetland type has been historically affected. It is important to consider wetland distribution and land availability when planning development so that wetland alteration approvals do not affect the achievement of development goals.
- **Wetland restoration.** Wetland restoration and creation projects are typically required to take place in the same watershed as wetland alteration. It is important to consider the timelines and cost burdens of compensation obligations when development is planned in an area inhabited by wetlands.

### 3.3.3 Management and Protection Opportunities

- **Integration of Provincial Wetland Mapping.** Protection of wetlands is most efficient when their occurrence, extent and character are known. In areas where development is planned, detailed wetland mapping studies can be completed to support avoidance and mitigation planning. This reduces both the environmental impact of a development, but also the technical difficulties and cost and timeline impediments that commonly arise during the wetland alteration approvals process. The key to preserving wetlands and their values is to consider wetlands in land-use planning decisions. The Nova Scotia Wetlands Inventory is a provincial database of wetland habitat in the province. It was developed by NSDNR through

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an interpretation of 1:10,000 aerial photographs, which in Cumberland County, were taken in 1985 and 1995. The dataset identifies dominant freshwater wetlands and coastal habitat features which are >0.5 ha in size and also provides information on wetland type.

Freshwater wetland types include bog, fen, deep and shallow marsh, seasonally flooded flat, meadow, lakeshore wetland, shrub and wooded swamp whereas coastal habitat designations include salt marsh, saline pond, dune, beach, cliff, island, impoundment, dykeland, estuarine and marine flats. Multiple designations are assigned to those wetlands having more than one contiguous type of 2.0 ha or greater in size. Additional data assigned to wetlands identified by the inventory includes information on their dominant vegetation character (*i.e.*, “wetland subclass”), percent vegetation cover, vegetation distribution, vegetation interspersion, and whether natural or anthropogenic impoundments are present. Data which accompanies coastal habitat features includes information on their substrate composition, density of ponds/panes (within salt marshes), tidal activity, exposure, accessibility and use.

- **Wet Areas Mapping.** The Nova Scotia Wetlands Inventory is a useful tool for identifying major wetlands but the dataset does not include wetlands <0.5 ha in size. Additionally, because it has been developed using air-photo interpretation, it has limited utility for identifying the location and extent of treed wetland types, which are abundant in the province. However, when combined with data from the Wet Areas Mapping and/or additional air-photo interpretation efforts, a more reasonable estimate of the location, extent, and character of wetland habitat may be achieved. Field surveys, however, are required for comprehensive evaluations of the extent and character of wetland habitats within any particular area.
- **Identification of Local Compensation Opportunities.** By identifying degraded and converted wetlands in the region, a host of readily available compensation opportunities can be provided to facilitate developments that necessitated wetland alterations. Identifying appropriate compensation opportunities to support wetland alteration applications can be a significant impediment and unforeseen cost to many developments.
- **Intergovernmental Cooperation.** Nova Scotia Environment is establishing a policy to prevent the net loss of wetlands under the *Environmental Goals and Sustainable Prosperity Act* (2007). Although wetlands are currently protected under the *Environment Act*, a specific Wetland Conservation Policy for the province will provide more transparent regulations and higher standards of management to facilitate appropriate development with no net loss of wetland. By maintaining communication with Nova Scotia Environment on this policy, issues arising that may affect development in the County may be anticipated and managed efficiently. The County may also provide input on the implementation of the policy to ensure that the needs of the local environment and economy can be met harmoniously.

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- **Local Wetland Stewardship.** By working with local community groups and NSDNR, degraded and converted wetlands may be identified for potential restoration or enhancement. Restoring and enhancing degraded wetlands provides numerous environmental benefits, such as reducing the demand on stormwater management facilities, improving groundwater recharge and groundwater quality, and improving water quality in fish bearing streams. Providing these opportunities to developers (private or public) that have compensation obligations to meet as a result of wetland alterations will alleviate an obstacle to economic development in Nova Scotia.

### **3.4 WILDLIFE**

#### **3.4.1 Background**

The federal *Species at Risk Act (SARA)* provides protection to species listed in Schedule 1 of the *Act* as being “Endangered” or “Threatened”. As defined in *SARA*, “wildlife species” means a species, subspecies, variety or geographically or genetically distinct population of animal, plant or other organism, other than a bacterium or virus, that is wild by nature and (a) is native to Canada; or (b) has extended its range into Canada without human intervention and has been present in Canada for at least 50 years. The purpose of this *Act* is to protect wildlife Species at Risk and their critical habitat. *SARA* is administered by Environment Canada, Parks Canada Agency, and DFO. Those species listed as “Endangered” or “Threatened” in Schedule 2 or 3 of *SARA* may also be considered as Species at Risk, pending regulatory consultation. *SARA* listed species designated as “Special Concern” are not protected by the prohibitions of Sections 32-36 of *SARA*, but do require that provincial or regional management plans are developed to protect them.

Certain wildlife species are also protected under the Nova Scotia *Endangered Species Act*. Species identified as seriously at risk of extinction in the province are identified by a provincial status assessment process through the Nova Scotia Endangered Species Working Group. Once identified, they are protected under the *Endangered Species Act*. The conservation and recovery of species assessed and legally listed under the *Act* is coordinated by the Wildlife Division of NSDNR.

There is also a provincial General Status assessment process that serves as a first alert tool for identifying species in the province that are potentially at risk. Under this process, the populations of species which are native to the province are classified to be either “At Risk”, “May be at Risk”, “Sensitive” to human activities or natural events, or “Secure”. Species are ranked as “Undetermined” should there be insufficient data, information, or knowledge available to assess their status. Although species ranked under this process are not granted legislative protection, the presence of species whose populations are considered to be “At Risk”, “May be at Risk”, or “Sensitive” is an issue of concern for provincial regulators. Species whose populations are considered “Undetermined” by NSDNR may also be of concern. In addition to the population

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designations provided to wildlife species by the aforementioned government agencies, the Atlantic Canada Conservation Data Center (ACDC) provides population rankings. Although the designations provided by this organization do not have legal implications, they do require special consideration for the purposes of environmental assessments. In particular, species ranked as “S1” to “S3” (*i.e.*, rare – uncommon within the province) are generally considered of conservation concern.

Cumberland County provides habitat for at least 24 species which are afforded protection through either the federal *Species at Risk Act* (SARA) or the *Nova Scotia Endangered Species Act*. These species include 13 birds, four vascular plants, two lichens, and one mammal, herpetile, fish, butterfly, and mussel each (Table 3.3). In addition to these taxa, a large number of other species of conservation concern are found within the province. For example, the ACDC has assigned ranks of “S1” to “S3” (*i.e.*, rare – uncommon within the province) to 219 additional species that are known to reside within Cumberland County (ACDC, 2010). Although some data on the occurrences of species of conservation concern within Cumberland County is available through provincial mapping sources (Figure 6), this reference does not present a comprehensive overview of their distribution. Additional information on the distribution of species at risk can be obtained through review of the species summary reports prepared by the province and COSEWIC whereas further data on other species of conservation concern may be obtained from directed ACDC requests.

In addition to habitat for species that are at risk or otherwise of conservation concern, a number of other areas within Cumberland County are known to be ecologically important. For example, large parts of the southern part of the County provide deer wintering opportunities and habitats associated with the Tantramar Marshes are well known to be important for migratory birds (Figure 6). Additionally, the provincial Restricted Land Use Database identifies a number of areas within the County which are subject to unique management considerations, including several provincial parks, the Chignecto Game Sanctuary, two wilderness areas, and a municipal surface water supply area (Figure 6).

**Table 3.3 Federal (SARA) and/or provincially protected (*Endangered Species Act*) Species at Risk Known to Occur within Cumberland County**

Type	Common Name	Scientific Name	SARA	NS <i>Endangered Species Act</i>
Birds	Short-eared Owl	<i>Asio flammeus</i>	Special Concern	na
	Barrow's Goldeneye - Eastern pop.	<i>Bucephala islandica</i> ( <i>Eastern pop.</i> )	Special Concern	na
	Red Knot ( <i>rufa</i> ssp)	<i>Calidris canutus rufa</i>	Endangered	Endangered
	Whip-Poor-Will	<i>Caprimulgus vociferus</i>	Threatened	na
	Bicknell's Thrush	<i>Catharus bicknelli</i>	Special Concern	Vulnerable
	Chimney Swift	<i>Chaetura pelagica</i>	Threatened	Endangered
	Piping Plover	<i>Charadrius melodus melodus</i>	Endangered	Endangered
	Common Nighthawk	<i>Chordeiles minor</i>	Threatened	Threatened

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**Table 3.3 Federal (SARA) and/or provincially protected (*Endangered Species Act*) Species at Risk Known to Occur within Cumberland County**

Type	Common Name	Scientific Name	SARA	NS <i>Endangered Species Act</i>
	Olive-sided Flycatcher	<i>Contopus cooperi</i>	Threatened	na
	Rusty Blackbird	<i>Euphagus carolinus</i>	Special Concern	na
	American Peregrine Falcon	<i>Falco peregrinus anatum</i>	Special Concern	Vulnerable
	Roseate Tern	<i>Sterna dougallii</i>	Endangered	Endangered
	Canada Warbler	<i>Wilsonia canadensis</i>	Threatened	na
Vascular Plants	Ram's-Head Lady's-Slipper	<i>Cypripedium arietinum</i>	na	Endangered
	Prototype Quillwort	<i>Isoetes prototypus</i>	Special Concern	Vulnerable
	Eastern Lilaepsis	<i>Lilaepsis chinensis</i>	Special Concern	Vulnerable
	Eastern White Cedar	<i>Thuja occidentalis</i>	na	Vulnerable
Lichens	Boreal Felt Lichen	<i>Erioderma pedicellatum (Atlantic pop.)</i>	Endangered	Endangered
	Ghost Antler Lichen	<i>Pseudevernia cladonia</i>	Special Concern	na
Mammal	Moose	<i>Alces americanus</i>	na	Endangered
Herpetile	Wood Turtle	<i>Glyptemys insculpta</i>	Threatened	Vulnerable
Fish	Atlantic Salmon (Inner Bay of Fundy population)	<i>Salmo salar</i>	Endangered	na
Butterfly	Monarch Butterfly	<i>Danaus plexippus</i>	Special Concern	na
Mussel	Brook Floater	<i>Alasmidonta varicosa</i>	Special Concern	na

### 3.4.2 Identified Concerns

- **Protection of wildlife.** Habitat fragmentation and loss along with other stressors have had negative impacts on many wildlife species within the province. Although the protection of wildlife is important throughout Cumberland County; it is currently being considered an issue of specific concern in the Chignecto Isthmus Wilderness Area.
- **Balanced development.** - Maintaining a balance between development growth and the protection of wildlife provides an ongoing potential land use conflict because increased development results in the loss and fragmentation of wildlife habitat. Whereas local effects of development activities on certain wildlife may be immediately evident (e.g., on rare plants which reside in a specific project area) effects on other species (such as for mammals with large home ranges) may be less evident in the short term, but strongly expressed over time with cumulative development impacts.

### 3.4.3 Management and Protection Opportunities

- **Identification of Protected Species.** Planning initiatives that may result in the loss or degradation of habitats known to support species protected under either federal (SARA) or provincial (*Endangered Species Act*) initiatives require approval from the respective

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authorities. Furthermore, impacts to other species of conservation concern may also require special consideration.

Spatial data on the known distribution of species of special conservation concern and important habitats provides opportunities for integrating wildlife conservation into municipal management initiatives. A variety of spatial data sources may be used to map the distribution of species and habitats across the landscape, including the Significant Species and Habitats Database maintained by NSDNR (Figure 6) and Important Bird Areas identified by Birds Studies Canada (2010). Additionally, detailed data on the distribution of species of conservation concern may be obtained from the ACCDC. However, although such data provides information on the identities and distances (from a reference point) of wildlife it does not disclose GPS locations for these species except to approved federal employees or for federal projects or projects on federal or First Nation properties.

**Areas of Interest**


**Significant Habitat and Species**

- Moose Wintering
- Species of Concern
- Species at Risk
- Migratory Birds
- Other Habitat
- Deer Wintering Areas

**Map Features**

- Community
- Trans Canada Highway
- Arterial Highway
- Connector Highway
- Local Access
- Railway Line
- County Boundary

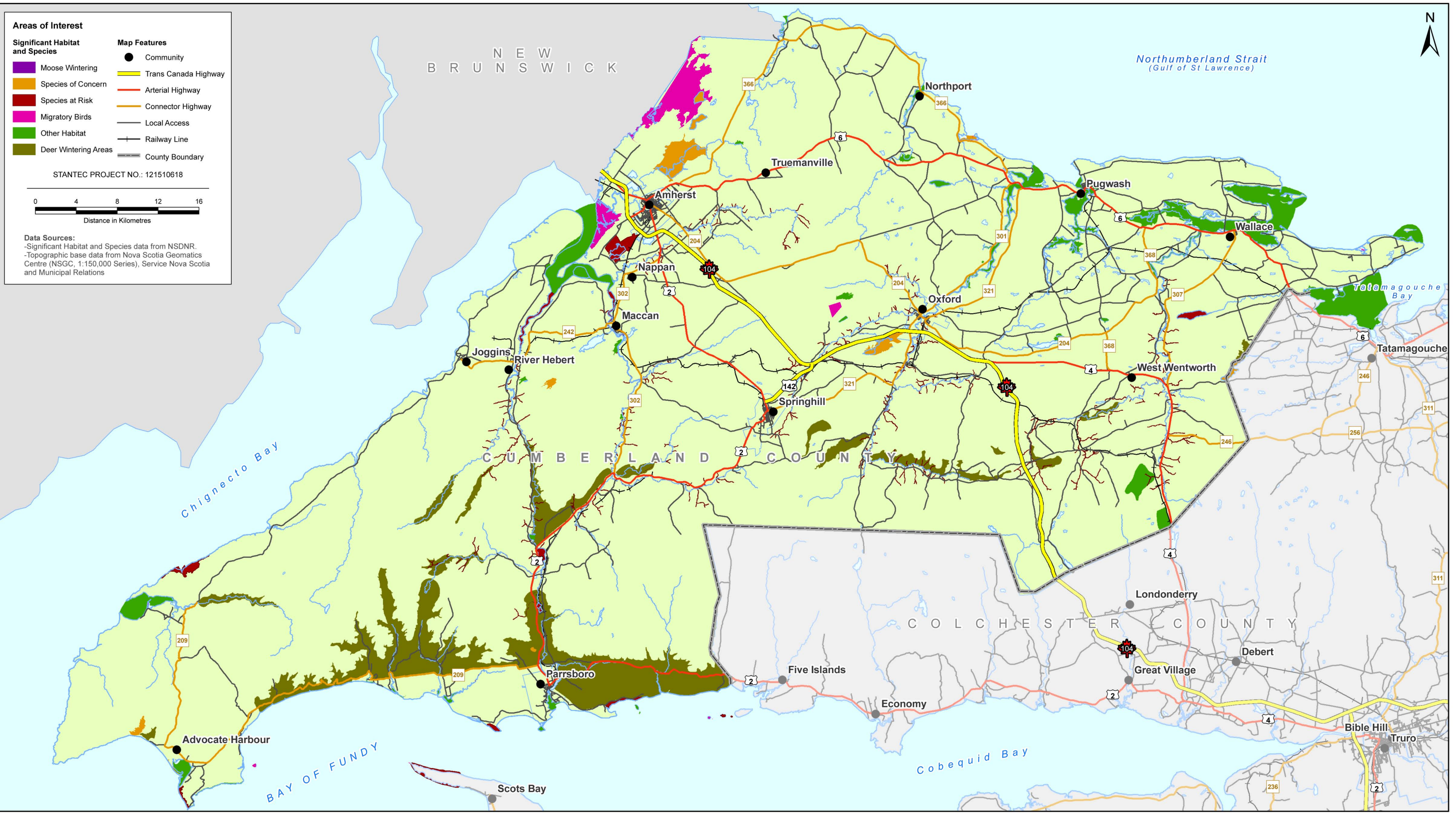
STANTEC PROJECT NO.: 121510618



Distance in Kilometres


**Data Sources:**

- Significant Habitat and Species data from NSDNR.
- Topographic base data from Nova Scotia Geomatics Centre (NSGC, 1:150,000 Series), Service Nova Scotia and Municipal Relations



DATE: 2011/02/29


PREPARED BY: R. Sutcliffe



Cumberland County Environmental Master Plan

**Significant Habitat**

FIGURE NO.: 6



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## **4.0 WATER**

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### **4.1 GROUNDWATER**

Up-to-date information on the existing and future groundwater development potential of the County will be essential elements in the long range environmental planning and direction of future growth throughout the County. An inventory and assessment of resources can provide insights into areas having natural or man-made water quality issues, and areas with potential excess capacity for larger scale water supply development. Included in this section is an overview of available groundwater-related data for the County area and an outline of how such data may be interpreted in a way that is relevant for planning initiatives.

#### **4.1.1 Background**

The Cumberland County ICSP identified that the quality of drinking water was one of the two most pressing priorities mentioned by the communities during consultation to sustain public health, quality of life, population retention and economy. There is a concern that without adequate water quality and quantity growth and development in the communities cannot go forward (Cumberland County Municipality Corporation, 2010a).

Tourism areas such as Pugwash Harbour/Marina, Cape Chignecto, Pugwash Peace Exchange; Parrsboro Band Hall; wilderness areas, beaches, parks, accommodations and coastal develop, play a key role in the economy of Cumberland County therefore identified as important areas to ensure adequate drinking water quality (Cumberland County Municipality Corporation, 2010a). Other communities such as Amherst Area, Collingwood, Wentworth and the Village of Pugwash identified that obtaining and maintaining good drinking water was a priority for the communities (Cumberland County Municipality Corporation, 2010a).

Four municipal areas derive their potable water supply from groundwater, including: the Town of Amherst North Tyndal Road well field, the Town of Oxford McElmon Brook well field, the Town of Parrsboro well field in MacAulay Lake watershed, and the Town of Springhill supply wells located in and south of the Town (Figure 7). While some of the individual production wells are located within the respective municipal boundaries, it should be noted that the capture area of these wells and well fields encompasses large areas of Cumberland County predominantly up-gradient of the well head locations.

Cumberland County has two water distribution facilities: Biggs Drive Registered Private Water Supply and Amherst Water Utility – County Service Area. They are deep well water sources with hypo-chlorination and gas chlorination treatment systems providing 2100 US Gallons Per Day (USgpd) and 90,685 USgpd respectively (Municipality of Cumberland County, 2009). The two water supplies combined serve an estimated population of 523 residents (Municipality of

WATER

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Cumberland County, 2009). Water for the two deep well distribution facilities is supplied by the North Tyndal Road Well field and the McElmon Brook Well field.

It is also noted that some of the County residents located in proximity to these large municipal supplies are connected to that supply. Examples include the Amherst Central Plan Area and the recent pipeline extension from Amherst to the Village of Nappan. Three Source Water Protection areas are identified at North Tyndal Road Well field, McElmon Brook Well field and MacAulay Lake Well field (Parrsboro). The four municipal units and the County need to cooperate in the long term sustainable management of their groundwater resources.

In 2005 CBCL performed a groundwater quality and quantity assessment in the communities of Joggins, River Hebert, Maccan and Pugwash. The assessment found that the majority of the wells tested were not constructed with proper casing and sealing and many were found to have to have improper well caps (Cumberland County Municipality Corporation, 2010a). As well other factors such as well position, installation, upkeep and surrounding land uses could potentially lead to reduced drinking water quality (Cumberland County Municipality Corporation, 2010a). Although the drinking water was tested and found to be sufficient there have been some reports of drinking water having a foul odor and/or taste (Cumberland County Municipality Corporation, 2010a). Poor groundwater quality in Pugwash area (CBCL, 2005; Porter Dillon, 1980, 1982) was also associated with saline intrusion and bedrock formation salt.

In Cumberland County, many of the rural residents have drinking water supplied by privately drilled wells that tap into underground aquifers (Cumberland County Municipality Corporation, 2010a). Through literature research and stakeholder interviews, poor water quality from drilled wells was identified as a concern throughout several communities within Cumberland County with reported experiences of foul odour and taste (CBCL, 2005).



- Well Field
  - Water Protection Area
- Map Features**
- Community
  - Trans Canada Highway
  - Arterial Highway
  - Connector Highway
  - Local Access
  - Railway Line
  - County Boundary


STANTEC PROJECT NO.: 121510618



**Data Sources:**  
 -Well Field locations created by Stantec Ltd, 2011  
 -Topographic base data from Nova Scotia Geomatics Centre (NSGC, 1:150,000 Series), Service Nova Scotia and Municipal Relations

DATE: 2011/02/29


PREPARED BY: M. Huskins-Shupe



Cumberland County Environmental Master Plan

**Well Fields**

FIGURE NO.: 7



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**4.1.2 Identified Concerns**

- **Poor groundwater quality** at rural communities of River Hebert, Maccan and Nappan (CBCL, 2005) is primarily associated with poor domestic well design and location.
- **Poor groundwater quality** in Pugwash area (CBCL 2005, Porter Dillon, 1980, 1982) is associated with saline intrusion and bedrock formation salt.
- **Dense development in North Shore cottage areas.** Concern has been raised respecting interaction between dug and shallow drilled wells and on-site septic systems in these older, small sized lots.
- **Old Deteriorating Septic Systems.** Septic systems in many areas are old and are likely to be deteriorating. This is particularly critical for the dense cottage areas on the Northumberland Shore because small lots as well as exacerbating the deterioration of systems may well not provide the space to allow for their replacement.
- **Sea water intrusion** has been an issue especially along the North Shore, Fox Harbour, Pugwash, and some low-lying areas of Cumberland Basin. Further changes in climate are expected to cause a rise in sea level and consequently cause increased intrusion of saltwater into coastal sources of fresh groundwater. With many cottages near the Northumberland Shoreline, potential for saltwater intrusion into groundwater could become a more prevalent issue.
- **Changes in precipitation,** in particular, increased precipitation is already causing increased flooding in various areas of the County. This has the potential to put groundwater wells in low lying areas susceptible to flooding at increased risk for contamination. Concern has been raised regarding the effects of climate change on domestic and commercial water supply wells located in low-lying coastal areas and within the 100 year flood elevation of major rivers.
- **Groundwater recharge** typically occurs in areas of higher elevation in the watershed and between (not adjacent to) watercourses and surface water bodies. Land development typically results in a replacement of vegetated areas with hard, impermeable surfaces. Water that otherwise would have infiltrated to groundwater is often directly routed to surface water discharge locations. This exacerbates the increased groundwater withdrawal that occurs if the developments are supplied by on-site wells or nearby central wells.
- **Mining occurring in the vicinity of major groundwater resources** can result in a major conflict between revenue generating uses such as aggregate quarries, and long term high capacity groundwater resources. Throughout Nova Scotia, many of the best sand and gravel aquifers have been impacted or destroyed by major aggregate mining. Very large deposits (> 60 m thickness) of sand and gravel are known to occur in the vicinity of Wentworth-Folly

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Lake and north of Parrsboro. Smaller, but potentially valuable resources are also present along major rivers and throughout the County. These should be identified, characterized for their water resources value, and then managed as either aggregate resources or water resources. There may be a possibility of accommodating both competing land uses under the right circumstances.

- **Land use conflicts.** An example of a proposed gasoline bar on the highly vulnerable aquifer supplying the Town of Parrsboro is another example of the need for stricter management of these valued resources.

#### 4.1.3 Management and Protection Opportunities

- **Identification of Groundwater Quality Vulnerability.** Certain bedrock types are considered to be constraints to groundwater development. These are usually associated with gypsum, anhydrite, halite, sylvite and limestone deposits within the Windsor Group, and to a lesser extent within the Cumberland Group (Pugwash and Malagash areas), and coal measures within the Springhill formation of the Cumberland Group (Springhill, Joggins, River Hebert, etc.). The Windsor Group bedrock contributes excessive hardness, TDS, sulphate and salt to the groundwater. The Coal areas contribute iron, manganese, ammonia, color and possibly methane to the groundwater. The mapping will show areas of potential groundwater quality issues. Options for water quality treatment will be discussed.
- **Identification of Groundwater Development Potential.** Over 180 identifiable rural communities are identified in the well log data base. For the larger communities, with existing problems or potential for growth in the short term, an assessment of groundwater development potential can be made, including expected well yields, water quality treatment needs, best well field locations, etc.
- **Identification of Sea Water Intrusion Risk.** Using an approach applied to Prince Edward Island (PEI) (Jacques Whitford, 1990), a map showing sea water intrusion risk can be prepared based on such criteria as: proximity to shoreline, morphology of the shoreline (parallel, peninsular, etc), landward elevation and topography within 500 m of well, and bedrock structure. For example, studies in the Tatamagouche area and PEI demonstrated a correlation between saline intrusion and bedrock strike and dip (greater if the dip is landward from the sea). Similar indications are noted at the Fox Harbour and North Wallace Peninsulas.

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- **Integrated Water Management.** In 2010 the Province of Nova Scotia developed a Water Resource Management Strategy which identifies a more comprehensive and integrated approach to water management, including management of human activities and their effects on the watershed and ecosystem . Recommendations which are strongly correlated to groundwater management include identifying ecologically significant water resources, such as wetlands and critical groundwater recharge areas; Assessing surface and groundwater in watersheds to develop water budgets on a priority basis; and Source Water Protection Planning.
- **Identification of Wastewater Management Districts.** Rural residential development in Cumberland County is generally far too dispersed to be economically serviced by piped networks. Many areas, by necessity, must be serviced using on-site disposal methods. In instances where onsite wastewater management is presenting environmental risks or threatening groundwater safety and supply, the Municipality has the ability to put in place a wastewater management district. Wastewater management districts can provide the municipality with the ability to mandate regular maintenance of systems, or can create the opportunity to develop a centralized management system in the instance that onsite treatment is failing. It is noted that centralized treatment has not been welcomed by landowners in the Northumberland Strait area because of the potential costs to landowners.
- **Intergovernmental Cooperation.** Intergovernmental cooperation is critical to ensure the sustainable management of ground water resources. Groundwater resources fall within more than one municipality and therefore shared services and land use planning require multi-jurisdictional cooperation and collaboration. In Cumberland County, the presence of the four Towns' wellfields within the County boundary, means it is imperative the municipalities work together to maintain groundwater quality and quantity. Land use occurring in the County will ultimately affect groundwater resources in the Towns.

## 4.2 SURFACE WATER

Surface water resources are important environmental features for a wide variety of biological, hydrological, social/cultural, and economic reasons. As such, it is important for development plans to have knowledge of their location and character should they continue to provide long-term value to ecological systems and society. Additionally, their protection through both provincial and federal legislation, as well as provincial regulations, requires that they be considered when making land-use decisions.

### 4.2.1 Background

Surface water includes lakes, ponds, rivers, streams and wetlands, representing five percent of the land areas in Nova Scotia (Nova Scotia Museum of Natural History). A key unit of analysis for surface water resources is the watershed. Watersheds are also known as drainage basins or

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river basins, and generally describe an area of land where all water flows down to the lowest point, through streams, rivers and underground, ultimately to the sea. (Nova Scotia Government, 2010)

The Nova Scotia Watershed Series is a system used to index watersheds in Nova Scotia that was created by the Water Resources Branch of the Water Survey of Canada which was adopted from that developed by the Dominion Water Power Branch of Canada, Department of the Interior in 1914. Nova Scotia ‘Primary’ watersheds represent one or more major watersheds and a number of smaller coastal streams that empty directly into the ocean. These can be further subdivided into ‘secondary’ and ‘tertiary’ sub-drainage areas.

Of the 46 primary watershed divisions in Nova Scotia, 7 primary watersheds intersect with the County of Cumberland land area. This is based on discharge harbors: River John, Phillip-Wallace-Pugwash and Tidnish-Shinimicas flowing north to Northumberland Strait, Missaguash and Kelley-Maccan-Hebert flowing west to Cumberland Basin, and the Parrsboro and Economy watersheds flowing south to Bay of Fundy (Nova Scotia Government, 2010). A map depicting Primary and Secondary Watersheds is shown in Figure 8. A description of each of the Watershed can be found in Table 4.1.

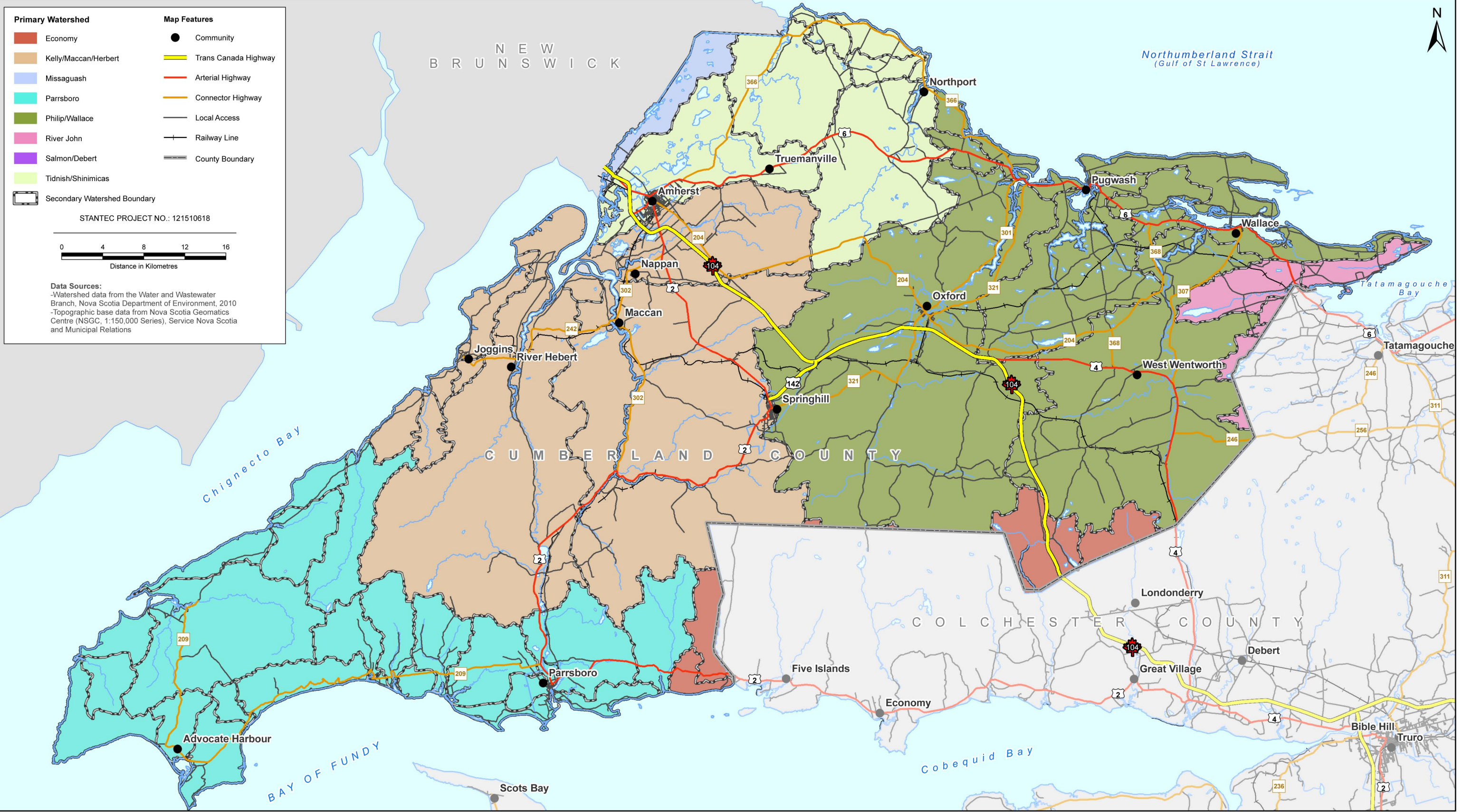
**Table 4.1 Primary Watersheds**

Primary Watershed Name/River	Flow Dir.	Primary Code	# of Secondary Subwatersheds *	Area in County (Ha)***	% of County ***	Approx. Total Area of Water (ha)***	Total Area (Ha)***
Missaguash	Cumberland Basin	1BT	1	4,108	1.0	254	4,114
Salmon/Debert	Bay of Fundy	1DH	14	28	0.0	801	117,390
Economy	Bay of Fundy	1DJ	17	11,858	2.8	385	77,966
Parrsboro	Bay of Fundy	1DK	23	85,438	19.9	1,352	85,960
Kelly/Maccan/Hebert	Cumberland Basin	1DL	12	126,641	29.6	2,281	128,548
Tidnish/Shinimicas	Northumberland Strait	1DM	8	48,282	11.3	1,810	48,387
Philip/Wallace	Northumberland Strait	1DN	11	143,489	33.5	2,642	148,808
River John	Northumberland Strait	1DO	16	8,472	2.0	2,609	109,063

\* Includes subwatersheds not in Cumberland County

\*\*\* Approximate only

Source: Nova Scotia Watershed Series



Cumberland County Environmental Master Plan

**Watersheds**

FIGURE NO.:

**8**



Stantec

DATE: 2011/02/29

PREPARED BY: C. Shupe



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## WATER

Surface water quality and quantity are influenced by natural conditions such as the underlying geology, topography, soils, response to precipitation, vegetation, and proximity to the ocean. These are further influenced by the history and continued evolution of human influences such as dams and ponds, agriculture use, forestry use, mining use, road and building construction, surface pollution inputs and discharges (*i.e.*, road salt, human waste, fertilizer), as well as efforts in conservation and restoration. The physical characteristics of a given water body and the quality of the water (chemical, biological and physical), and the quantity of water (during periods of average flow, drought and flooding) are all influenced by the interaction of these natural, social and cultural forces.

There is limited information available on surface water quality and quantity in Cumberland County. Research did not identify any long-standing water quality monitoring programs or watershed protection programs in the County, although there has been some work done in the River Philip Watershed by the Cumberland County River Enhancement Association (CCREA), through funding from Atlantic Canadian Opportunities Agency. In particular a grant was approved in 2008 for a Watershed Assessment and Preliminary Restoration Plan for the Little River, and further funding was contributed in 2009 for a River Philip Restoration Project. Main objectives of the CCREA include enhancement of the watersheds of Cumberland County and maintaining and improving the quality and environmental health of these watersheds.

Surface water quality is generally regulated through federal and provincial legislation, although through powers delegated under the *Municipal Government Act*, municipal units within Nova Scotia can also influence management of surface water through land use controls. The Canadian Council of Ministers of the Environment (CCME) established guidelines for the Protection of Aquatic Life for many water quality parameters (CCME 2007). While these are guidelines and not standards, it is generally accepted as best practice to undertake technical and economically feasible approaches to mitigate project activities to meet the objectives of the CCME Guidelines and all relevant updates.

**Table 4.2 Summary of Jurisdiction Related to Surface Water<sup>1</sup>**

<b>Act and Department of Authority</b>	<b>Surface Water Details (Freshwater)</b>
NS <i>Environment Act</i> , 1994-95, Nova Scotia Environment	Jurisdiction over watercourses broadly defined; includes requirement for Water Approvals (permit for work in a watercourse).
NS <i>Crown Lands Act</i> , 1989, Nova Scotia Department of Natural Resources	Jurisdiction over bed of watercourse as Crown Land.
NS <i>Beaches Act</i> , 1989 Nova Scotia Department of Natural Resources	Marine waters protections may be applied to shores of lakes.
NS <i>Municipal Government Act</i> , 1998, Service Nova Scotia and Municipal Relations	No jurisdiction over water; Planning and Development, and Subdivision parts of Act include watercourse; planning authority given for lands adjacent to watercourse.
Canada <i>Fisheries Act</i> , 1985, Fisheries and Oceans Canada	Jurisdiction of fisheries; applies to fish and fish habitat (containing fish or not).
Canada <i>Navigable Waters Protection Act</i> , 1985, Transport Canada	Approval may be required for structures over, across, through or under navigable waters.

## WATER

**Table 4.2 Summary of Jurisdiction Related to Surface Water<sup>1</sup>**

Act and Department of Authority	Surface Water Details (Freshwater)
<i>Canadian Environmental Protection Act, 1999</i> , Environment Canada	Establishment of environmental standards, codes of practice and environmental quality guidelines protective of water resources.

<sup>1</sup> Adapted from Dillon, 2002 and Jacques Whitford Stantec Limited, 2009

Other provincial regulations applicable to surface water protection include watercourse protection under the Nova Scotia *Environment Act* and the Activities Designation Regulations, which can require completion of an application for a Division I Water Approval for Watercourse Alterations. The approval is issued by Nova Scotia Environment. A Water Approval is required from Nova Scotia Environment if the project activities will cause alteration to the watercourses. An alteration is considered any project activities that affect the functioning of the watercourse, such as road crossing, channel alteration, and changes to flow volumes.

Fish habitat is also protected under the *Fisheries Act* and by DFO's Policy for the Management of Fish Habitat. The Policy for the Management of Fish Habitat is regulated by Sections 20, 21, 22, 30, 32, 35, 37, 40 and 43 of the *Fisheries Act* which is administered by DFO. This policy applies to all projects and activities in or near water which could result in the Harmful Alteration, Disruption, or Destruction (HADD) of fish habitat by chemical, physical, or biological means. The guiding principle of this policy is to achieve no net loss of the productive capacity of fish habitats.

In 2010 the Province of Nova Scotia developed a Water Resource Management Strategy which identifies the need for a more comprehensive and integrated approach to water management for the province, including human activities and their effects on the watershed and ecosystem (NS Water Resource Management Strategy, 2010). Recommendations relevant to surface water management include:

- Identifying ecologically significant water resources, such as wetlands and critical groundwater recharge areas;
- Assessing surface and groundwater in watersheds to develop water budgets on a priority basis;
- Using Geographic Information Systems (GIS) for sharing and analyzing data;
- Source water-protection planning;
- Assessing current and future use of setbacks from fresh and coastal water resources;
- Integrating water values in the selection, planning, and management of parks and protected areas;
- Updating current guidance for storm water management and sediment control to improve protection of water quality from land development activities;
- Developing tools to promote conservation and restoration of sensitive ecosystems and watershed features, such as wetlands; and

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- Evaluating and improving regulatory framework for private wastewater treatment systems, including on-site sewage disposal.

**4.2.2 Identified Concerns**

- **Watercourse quality** was raised as an issue for Dickey Brook which is the only watercourse identified to have water quality concerns. This Brook is currently the subject of a stream restoration planning process.
- **Lake water quality** for Blair Lake in Amherst was identified as 'eutrophic' as a consequence of urban development and agricultural activity in the area.
- **Watercourse buffering** has been identified as an area of concern in that better rationale is needed to determine the appropriate buffer setback for watercourses in the County.
- **Intensification of development** is a concern in both urban and rural areas where development, clear cutting and other changes to the landscape are resulting in a concentration of impervious surfaces and changes in vegetation which can impact surface water flow patterns and water quality. There is concern that these changes in land use have the potential to cause increased flooding and erosion, and are already causing increased flooding in some areas (*i.e.*: Nappan Watershed).
- **Dense development in North Shore cottage areas.** Concern has been raised respecting on-site septic systems on these older, undersized lots. Many of these cottage systems were built prior to regulations giving rise to concerns with environmental and drainage impacts. Failing systems can negatively impact surface water quality, particularly those in close proximity to water bodies.
- **Changes in climate** are expected to cause a rise in sea level and consequently an intrusion of saltwater into coastal sources of fresh surface water. Additionally climate change is expected to cause an increase in the intensity and frequency of storms which may influence surface water quantity and quality.
- **Agricultural Impacts** can contribute to water pollution through discharges of fertilizers, pesticides, and manure to surface water. Concern for potential water pollution from agricultural practices could be a problem for residents living downstream. Agricultural Use also generally depends on clean water and changes in supply or pollution of surface water or groundwater can influence farm and crop productivity. Increases in flooding and erosion also can crop cycles and soil or agricultural land quality. (*i.e.*, Nappan Watershed).

#### **4.2.3 Management and Protection Opportunities**

- **Integrated Water Management.** Planning communities based on watershed analysis is identified as a key step in protecting the environmental features and functions that sustain water quality and quantity in communities. The Nova Scotia Watershed Series classifies drainage areas at the primary, secondary, tertiary, and sub-tertiary levels. Such watersheds boundaries provide an essential framework for the development of water management strategies and for assessing impacts of land-use planning initiatives on water resources. By taking an approach to watershed management that considers ecosystem components as well as human components, a more robust management framework can be achieved. In addition, the watershed unit links coastal and inland water bodies, which is critical to effective management of surface water resources in Cumberland County.
- **Identification of High Risk Watersheds.** By identifying high risk watersheds, the County can engage in planning on a watershed basis in order to develop stronger controls to mitigate flooding or erosion impacts, which are closely linked to surface water movement and management. A Watershed Assessment Program (NSWAP) is being undertaken by Dalhousie University through funding from Nova Scotia Environment, which will identify key vulnerable watersheds in Nova Scotia. This information, when completed in 2011, can be used by Cumberland County in the planning strategy.
- **Identification of Water Quality Objectives.** The Canadian Council of Ministers of the Environment (CCME) established guidelines for the Protection of Aquatic Life for many water quality parameters (CCME 2007). While these are guidelines and not standards, it is generally accepted as best practice to undertake technical and economically feasible approaches to mitigate project activities to meet the objectives of the CCME Guidelines and all relevant updates.
- **Stormwater Best Management Practices.** Stormwater Best Management Practices (BMPs) can be implemented in both existing developments and new developments to ameliorate the issues identified in any given watershed. The selection of suitable BMPs can be made site specific, considering the watershed sensitivities, site features, space requirements, cost, BMP performance estimates, cumulative effects and acceptability by the public.
- **Intergovernmental Cooperation.** Cooperation is required for the management of surface water resources. Surface water resources fall within more than one municipality and therefore shared services and land use planning require multi-jurisdictional cooperation and collaboration. Land use occurring in one municipality will ultimately have an effect on the other municipalities. Flooding is a common concern in Cumberland County which can be

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caused by land use practices in other municipalities (*i.e.*, clear cutting upstream could increase flooding downstream). Watershed boundaries also fall within more than one municipal boundaries; development in one municipality could affect surface water quality and quantity in another municipality.

**4.3 COASTAL AREAS****4.3.1 Background**

Coastal areas have been an attractive site for development along much of Nova Scotia's coastline over the province's history when infrastructure development such as harbours, railways and road networks guided the coastal economy (Province of Nova Scotia, 2009). Today, a significant driver of coastal development is both permanent and seasonal residential building and not unlike the majority of Nova Scotia development, coastal areas are coveted locations for development in the County of Cumberland. Currently the Northumberland Shore consists of several older and newer cottage developments closely clustered together with further potential for residential development along the Shore as well as along the Bay of Fundy. With Cumberland County being a low, flat and marshy and coastal area there is a growing concern with flooding and erosion hazards. A combination of local topography and geography, potential hazards associated with climate change will exacerbate flooding and erosion in the region. The coastline along Cumberland County is mainly residential development, with some protected areas, agricultural and minor industrial uses (CBCL, 2009).

Climate change and associated impacts was a common concern outlined in the Municipality of the District of Cumberland County's Integrated Community Sustainability Plan and, as well, as a common concern discussed throughout the interviews. Both erosion and flooding are current issues several residents are faced with in Cumberland County and potential results of climate change that could potentially further affect coastal development. The potential outcome of climate change includes a rise in sea level and increased intensity and frequency of storm surges (Province of Nova Scotia, 2009). Coastal developments as well as residential developments and associated infrastructure further inland that normally would not be affected by storm surges could potentially be affected by the impacts of climate change. Consequences such as shoreline erosion and flooding could negatively impact current settlement trends along coastal areas forcing development to occur further inland.

Several residential properties along the coastal regions in the County of Cumberland have experienced erosion in the area and have resorted to using mitigation measures to prevent the effects of erosion. The Northumberland Shore has experienced intense cottage development along the shore and erosion is presently a problem in the area with several cottage developments forced to relocate further away from the shoreline. Armour stone walls have been developed to prevent sea water from washing away the shoreline, however, relocation and

WATER

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construction of armour walls are only temporary fixes and the coastline will continue to erode due to the nature of the soil in the area along with the increased storm surge intensity.

In 2006 the Nova Scotia Government, under the direction of the Provincial Oceans Network (PON), launched the initiative to develop an integrated approach to coastal management in Nova Scotia (CBCL, 2009). Following the development of a Coastal Management Framework in 2008, PON developed the State of the Coast Report to provide analysis of environmental conditions and trends, measuring progress towards sustainability and contributing to inform and open decision-making and public awareness (CBCL, 2009). Six priority issues were identified in the report including: coastal development, working waterfronts, coastal access, sea level rise and storm events, coastal water quality, and sensitive coastal ecosystems and habitats (CBCL, 2009).

Coastal development is managed through federal *CEAA*, the Nova Scotia *Environment Act* and the *Municipal Government Act* legislation. These processes have the authority to prohibit a proposed project from proceeding or allow a project to proceed with/without conditions (CBCL, 2009). The *Municipal Government Act* sets out Statements of Provincial Interest in which new planning policies are required to conform to. Currently the Provincial Interest Statements does not have specific policy around coast development; however, they attempt to limit development in vulnerable areas such as flood zones (CBCL, 2009).

#### 4.3.2 Identified Concerns

- **Storm surge.** The upper Bay of Fundy and the Northumberland Shore, both adjacent to Cumberland County, have the highest storm surges around Nova Scotia and are potentially at great risk for flooding (Cumberland County Municipality Corporation, 2010a). As well, the sensitivity of the coastlines to the expected rise in sea level (Cumberland County Municipality Corporation, 2010a). Large areas of Cumberland County (Tantramar Marshes, coastal areas) are only a few meters above mean sea level, and could be subject to inundation during very major storm events.
- **Coastal erosion.** Coastal developments and the associated infrastructure are increasingly susceptible to coastline erosion. The Northumberland Shore has experienced intense cottage development along the shore and erosion is presently a problem in the area with several cottage developments forced to relocate further away from the shoreline. Armour stone walls have been developed to prevent sea water from washing away the shoreline, however, relocation and construction of armour walls are only temporary fixes and the coastline will continue to erode due to the nature of the soil in the area along with the increased storm surge intensity.
- **Impacts from a changing climate.** Coastal development along the Northumberland Shore and Bay of Fundy are subject to potential impacts from climate change. Increased flooding,

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erosion and storm surges are examples of climate change impacts. It was noted in several interviews that the frequency of flooding and erosion in Cumberland has increased in recent years, resulting in damages to road infrastructure. Flooding in the Cumberland County is currently an issue especially along River Philip, Nappan River area and Advocate Harbour. Flooding impacts also include structural damage, saltwater flooding of dyked areas and agricultural lands, and sewer system backups and associated upstream flooding (Province of Nova Scotia, 2009). Flooding is discussed in greater detail in Section 4.4.

- **Public access to the coastline.** Issues related to public access are generally related to the people's ability to view, reach and move along the shoreline (CBCL, 2009). As coastal land uses change over time from local fisheries to tourism-based recreational use and leisure activities, people's perception of accessible coastline has decreased (CBCL, 2009). As development along the coast continues to increase, public access to the coast will become limited.

#### 4.3.3 Management and Protection Opportunities

- **Integrated Coastal Zone Management.** The State of Our Coast Report identifies an integrated resources management tool used by the Province to determine future uses of Nova Scotia's publicly-owned Crown lands (CBCL, 2009). Integrated resource management allows for all resource groups to work together balancing the economic, environmental and social requirements (CBCL, 2009). The *Municipal Government Act* allows municipalities in Nova Scotia have the ability to control coastal development aligning with the Provincial Statements of Interest. Through the development of municipal planning strategies and zoning bylaws, municipalities can regulate land use, but not activities (CBCL, 2009). Land use planning allows municipalities to development regulations protecting in sensitive areas, to impose buffers, and to use zoning for the protection of watercourses (which, under the stated definition, includes the ocean) (Coastal Coalition of Nova Scotia, 2008).
- **Identifying Areas at Risk to Storm Surge & Coastal Erosion.** An increased storm surge is a hazard for coastal development with potential for flooding and erosion. With significant infrastructure and residential development along the coast, conflicts with the effects associated with climate change could be a constraint for current and future development. It has been identified that global mean sea level may rise as a result of climate change (CBCL, 2009). An increase in sea level is a concern because the mean sea level is a carrier wave for the tide as well as storm surges (CBCL, 2009). The low lying topography of Cumberland County along with sandy loams, loams, and clay loams subsoils makes the coastal area vulnerable to an increase flooding and erosion. By identifying areas prone to such impacts, the County can implement land use controls and climate change adaptation plans to protect public health and safety from potential impacts.

## **4.4 FLOODING**

### **4.4.1 Background**

The County of Cumberland presents particular conditions with respect to its geographic location, weather regimes, topography and land use that make it vulnerable to flooding in some areas. Flooding events may occur as a consequence of heavy rainfall, storm surges and/or high tides; or a combination of all of these phenomena. Large rainfall events or the arrival of hurricanes from the Atlantic can also create conditions for all these factors to occur at the same time.

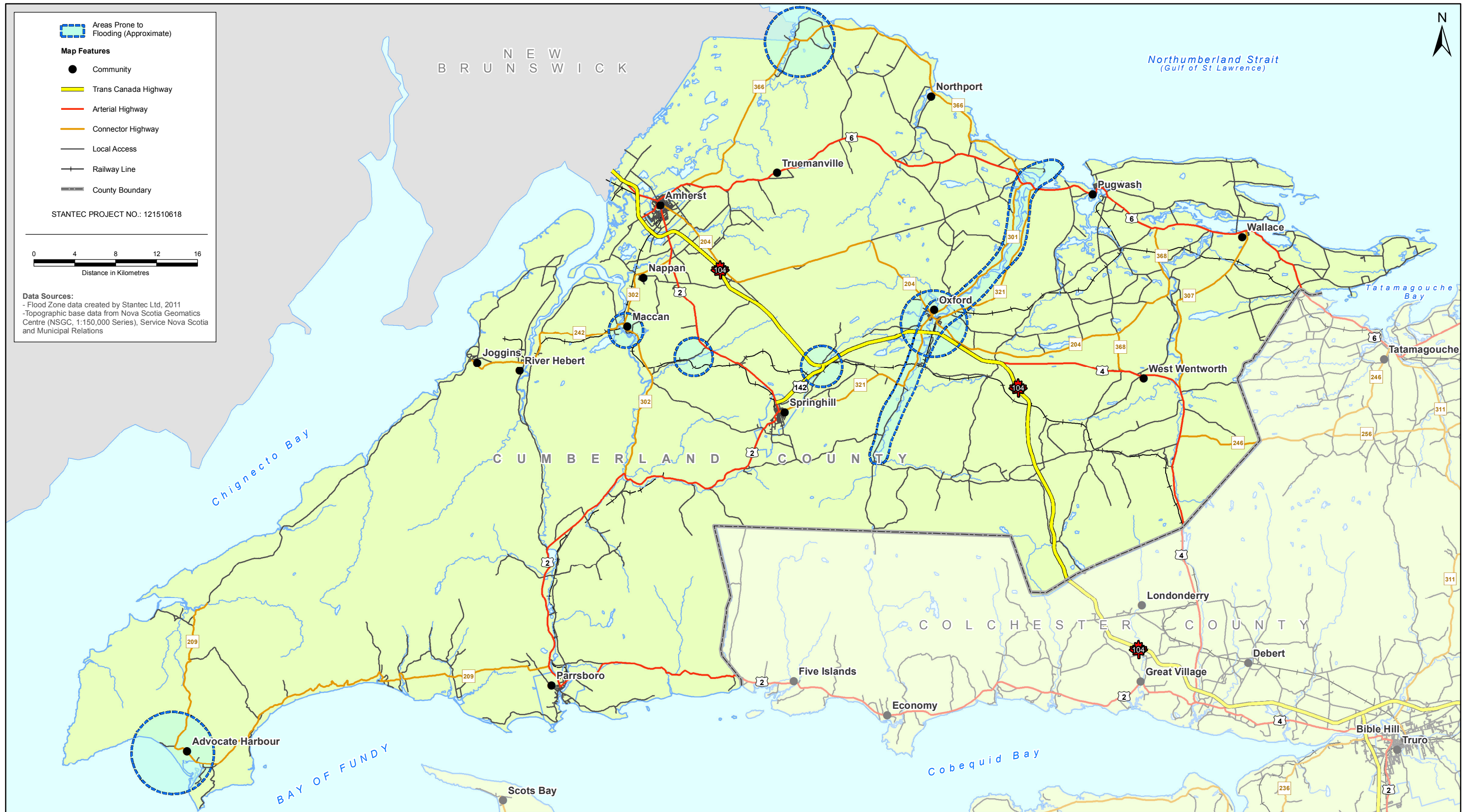
In particular, flooding from extreme precipitation events is a concern for coastal areas where the ocean level may impede stream drainage during high tide cycles. Since most high intensity rainfall events occur during a short period of time (*i.e.* less than 24 hours) high tide conditions can create a backwater effect that can aggravate flooding around the areas of tide influence including but not limited to floodplains and marshlands.


For inland areas where streams are not affected by the tide, high precipitation events can generate flooding along roads and within floodplains where development has occurred.

Added to previous flooding events, climate change and sea level rise is of particular interest as it is anticipated to modify weather patterns, and, among other effects, it is expected to create more intense and regular precipitation events. Therefore, the effect of flooding on the existing infrastructure as well as public and private property is a major concern for municipalities and local governments. As flooding is something that has always occurred and cannot be avoided, it is important to learn how to prepare and mitigate its potential effects and to include these measures during the development and/or modification of local policies and bylaws.


Based on the information review that was conducted, a series of regions within the County were identified which historically suffered the effects of flooding or are likely to be impacted by it. These areas are believed to cover the major flooding issues within the County, however it is recognized that smaller localized flooding issues likely exist and are not necessarily reflected here. Figure 9 demonstrates flood areas identified as known to currently or in the past experience flooding issues.

Within the County there are two large watersheds that have a high vulnerability to flooding; these are the Kelly, Maccan and Hebert River watershed and the River Philip watershed. The Maccan River watershed includes Maccan, Nappan and Amherst. Many of the areas at risk appear to have low elevations and include floodplains and marshlands. The Maccan River is a third-order stream that discharges into the Bay of Fundy, and as such, is subject to the influence of high tides ranging as much as 40 feet. Previous flooding events caused damage to roads and highways in the Maccan area and it is recognized that the effects of flooding in the Maccan March increased in recent years.



DATE:	2011/11/25
PREPARED BY:	M. Huskins-Shupe
	

Cumberland County Environmental Master Plan  
**Areas Prone to Flooding (Approximate)**

FIGURE NO.:	<b>9</b>
	

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WATER

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Flooding risk areas within the River Philip watershed includes the headwaters near Collingwood, the town of Oxford and the lower River Philip including Port Howe. The River Philip is a third-order stream that drains into the Northumberland Strait. Within its watershed, the Town of Oxford has severe potential flooding issues as indicated on the floodplain map developed by the Acadia University Applied Geomatics Research Group (Stiff *et al.* n.d.).

It has also been noted that as the County of Cumberland is a large agricultural producer, the requirements for new agricultural land may affect negatively downstream areas of the watersheds due to a decrease in evapotranspiration and interception amounts. Clear cutting activities within the River Philip watershed were reported to likely aggravate the flooding potential in recent years. Other areas reported to have flooding risk potential are the Tantramar Marsh near Amherst, the Parrsboro area and Advocate Harbour.

#### 4.4.2 Identified Concerns

- **Inland flooding** has been identified by the community as increasing in recent years. The increase in flooding has impacted local watersheds, roads, residences, agriculture land, industrial land and associated infrastructure. This may cause concern with potential overflow of sewage and the effect on water resources downstream if wastewater facilities are inadequate.
- **Relationship between inland flooding and coastal storm surge.** A potential rise in sea level may cause storm surges to reach further inland (CBCL, 2009). This has the potential for flooding to occur in areas that would normally not be affected by storm surges. Agricultural land, residential lands and other infrastructure may become exposed to inland flooding. Flooding impacts also include structural damage, saltwater flooding of dyked areas and agricultural lands, and sewer system backups and associated upstream flooding (Province of Nova Scotia, 2009).
- **Dykelands.** Potential sea level rise will cause dykes to be more exposed to damage and the lands protected by the dykes could also be flooded (CBCL, 2009). Dykelands in Cumberland County prevent flooding of agricultural lands, residential lands and infrastructure. If the dykes are not properly maintained to account for sea level rise these land uses may become vulnerable to flooding. Flooding of surface water could potentially cause a number of other issues in the County. Flooding could affect current residential developments causing residents to relocate or affect the location of new developments having to avoid floodplain areas. Agricultural practices can and have been affected by flooding of farm land; yielding crop productions and/or contaminating livestock. Although many farmers practice nutrient management, potential contaminate runoff from agricultural uses could affect surface water quality and quantity.

**4.4.3 Management and Protection Opportunities**

- ***Flood Zone Mapping.*** The sensitivity of river regions to climate change, although not different than much of the Atlantic coast, has heightened river vulnerability in the face of climate change and flooding (Cumberland County Municipality Corporation, 2010a). The region is faced with predicted increases to in-stream flow which in turn may cause increased flooding and river erosion. Efforts made by the Nova Scotia Atlantic Climate Adaptation Solutions Project (NS ACAS) and by the Atlantic Land and Infrastructure Resiliency Assessment Project (ALIRA) have components related to flooding potential within the County of Cumberland. For example, flood plain mapping highlighting the flooding hazards can be used as a planning tool to identify areas unsuitable for development. River Flood Risk Zones have been identified for the area surrounding Oxford. Ultimately the delineation can assist the County to make better decisions and to plan for future development.

## **5.0 Natural Resources**

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### **5.1 AGRICULTURAL AREAS**

Information on soils and other geological properties are essential for land-use planning because they provide invaluable insight into land-use limitations and hazards. Data sources including *Nova Scotia Soils Survey*, *Forest Soil Types of Nova Scotia*, *Canada Land Inventory*, and *Wet Areas mapping*, may be used, singly and together, to provide a number of interpretations relating to soil hazards and land-use suitability, including: soil compaction hazard, rutting hazard, erosion hazard, frost heave hazard, and windthrow hazard.

#### **5.1.1 Background**

Within Nova Scotia, the County of Cumberland has the largest area of arable land with over half of the lands consisting of Canadian Land Inventory (CLI) classes 2, 3 and 4 soils most suitable for agricultural production (Figure 10) (Nova Scotia Agricultural Land Review Committee, n.d.). There is approximately 30,500 hectares of land within the County of Cumberland in agricultural production with 7% of the County's land area dedicated to farming (Nova Scotia Agricultural Land Review Committee). The County has 8,900 hectares of wild blueberry production making the County the largest producer of wild blueberries in the Province (Nova Scotia Agricultural Land Review Committee, n.d.).

The Municipality of the County of Cumberland Municipal Planning Strategy recognizes that agricultural activity is an integral part of the County economy. Although the agriculture industry has suffered over the past years, there is anticipation within the community that it may become a sustainable resource again (Cumberland County Municipality Corporation, 2010a). The Central Planning Area is the only one of the three secondary planning strategies which sets objectives to preserve and promote a vibrant and sustainable agriculture industry while trying to avoid land use conflicts between agricultural practices and non-agricultural developments (Cumberland County Municipality Corporation, 2010b). Agricultural practices within the Central Planning Area are designated Rural Resource on the Future Land Use Map of the Secondary Planning Strategy for the Central Planning Area (Cumberland County Municipality Corporation, 2010b). Cumberland County MPS, Joggins Secondary Strategy and Pugwash Secondary Strategy do not designate an agricultural use zone; however, agricultural practices are permitted in the general zone, residential zone and village residential zone, respectively (Cumberland County Municipality Corporation, 2010b).

Protection of agricultural land is also regulated at the provincial level as identified in the *Municipal Government Act* Statements of Provincial Interest. The Statement of Provincial Interest regarding agriculture reads "to protect agricultural land for the development of viable and sustainable agriculture and food industry" (Service Nova Scotia and Municipal Relations, 2006). Although the Statement of Interest focuses on sustainable agriculture and protecting the agri-food industry, it also recognizes that is not always possible nor in the best public interest to

NATURAL RESOURCES

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protect all lands capable of agriculture production (Service Nova Scotia and Municipal Relations, 2006).

A challenge Cumberland County faces, as like much of Nova Scotia, is retaining a compatible relationship between agriculture and non-agriculture developments on farmland. In Cumberland County approximately 88% of urban development is occurring on good agricultural soils with 35% of urban development occurring on the most suitable soils for agriculture, CLI class 2 soils (Nova Scotia Agricultural Land Review Committee). Approximately 30% of urban development occurs on CLI 3 soils, 22% on CLI 4 soils and 12% on less than CLI 4 soils (Nova Scotia Agricultural Land Review Committee). Approximately 22 percent of agricultural practices are occurring on premium agricultural land and therefore this land is not highly utilized (Nova Scotia Agricultural Land Review Committee). Figure 11 illustrates current land uses on agricultural soils.

From an environmental perspective, the potential effects of agriculture production on the surrounding areas could be a concern if agricultural practices are not properly maintained. Agriculture practices can contribute to water pollution through discharges of fertilizers, pesticides, and manure to surface and/or groundwater (Ecology Action Centre, 2010). With approximately 73,025 hectares of farmland in Cumberland County (Statistics Canada, 2006) concern for potential water pollution from agricultural practices could be a problem for residents living downstream. In addition, agricultural practices can also be a victim of poor water quality and water management. Polluted or contaminated water can reduce production yields, contaminate crops and transmit disease to farm animals (Ecology Action Centre, 2006). Extreme flooding events in the Nappan watershed have already caused damage to agricultural lands.

Through communications with local farming interests, it was identified that the majority of farmers in the area follow nutrient management plans, preventing pollution to and from surface and groundwater. Land use planning can also be used to mitigate the effects of water pollution. The creation of riparian buffers along watercourses allows the ecosystem to recover from floods, droughts, or human activity (Ecology Action Centre, 2010). Erosion and sediment contamination may also decrease with the addition of a buffer between a watercourse and agricultural practices.

**Canadian Land Inventory (CLI)  
Agricultural Class**

- Class 2
- Class 3
- Class 4

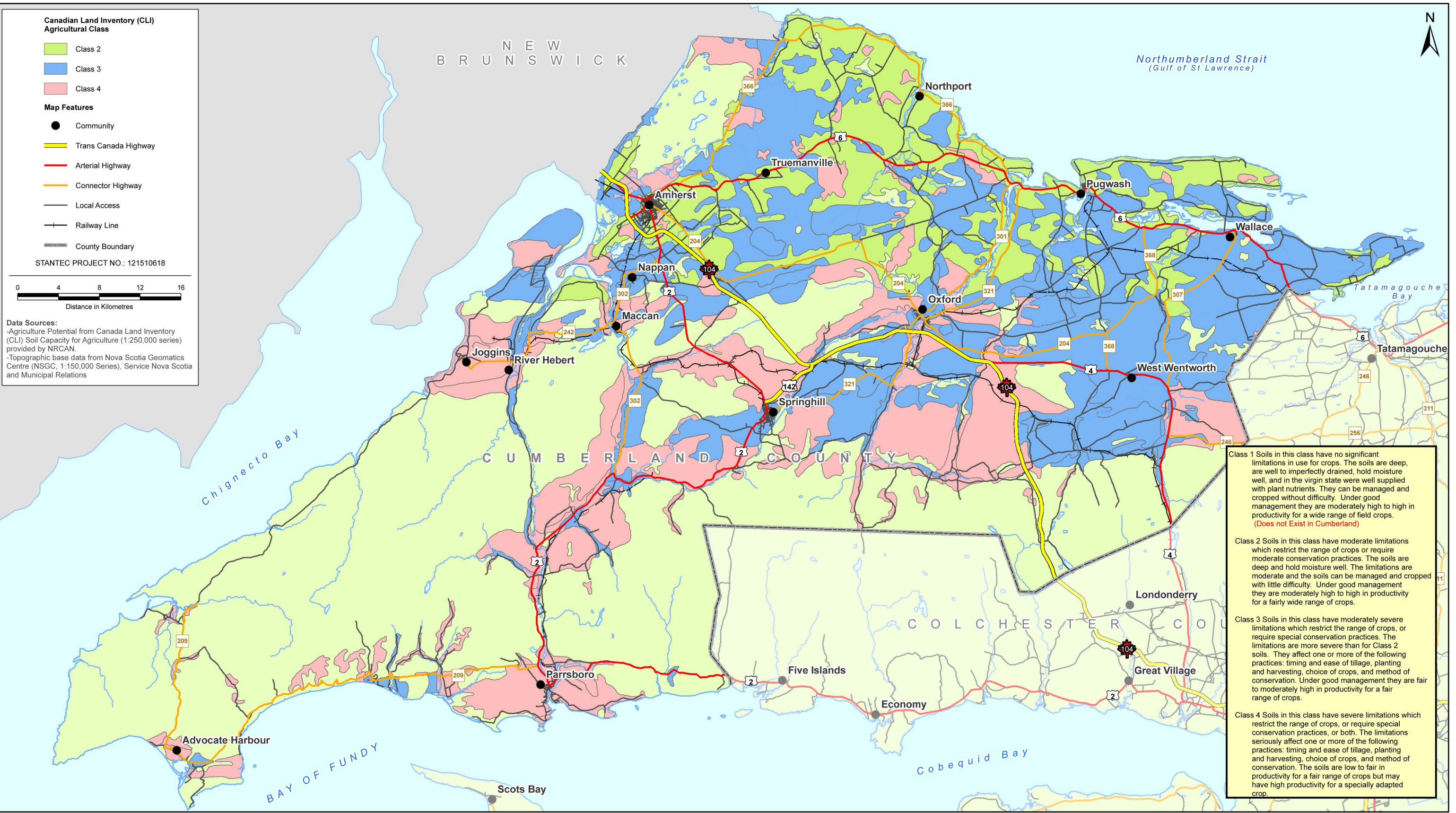
**Map Features**

- Community
- Trans Canada Highway
- Arterial Highway
- Connector Highway
- Local Access
- Railway Line
- County Boundary

STANTEC PROJECT NO.: 121510618



**Data Sources:**  
 -Agriculture Potential from Canada Land Inventory (CLI) Soil Capacity for Agriculture (1:250,000 series) provided by NRCAN.  
 -Topographic base data from Nova Scotia Geomatics Centre (NSGC, 1:150,000 Series), Service Nova Scotia and Municipal Relations



**Class 1** Soils in this class have no significant limitations in use for crops. The soils are deep, are well to imperfectly drained, hold moisture well, and in the virgin state were well supplied with plant nutrients. They can be managed and cropped without difficulty. Under good management they are moderately high to high in productivity for a wide range of field crops.  
*(Does not Exist in Cumberland)*

**Class 2** Soils in this class have moderate limitations which restrict the range of crops or require moderate conservation practices. The soils are deep and hold moisture well. The limitations are moderate and the soils can be managed and cropped with little difficulty. Under good management they are moderately high to high in productivity for a fairly wide range of crops.

**Class 3** Soils in this class have moderately severe limitations which restrict the range of crops, or require special conservation practices. The limitations are more severe than for Class 2 soils. They affect one or more of the following practices: timing and ease of tillage, planting and harvesting, choice of crops, and method of conservation. Under good management they are fair to moderately high in productivity for a fair range of crops.

**Class 4** Soils in this class have severe limitations which restrict the range of crops, or require special conservation practices, or both. The limitations seriously affect one or more of the following practices: timing and ease of tillage, planting and harvesting, choice of crops, and method of conservation. The soils are low to fair in productivity for a fair range of crops but may have high productivity for a specially adapted crop.

DATE: 2011/02/29

PREPARED BY: R. Sutcliffe

Cumberland County Environmental Master Plan

**Agriculture Lands Capacity**

FIGURE NO.: 10

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**Agricultural Lands**

- Agriculture
- Blueberries
- Urban

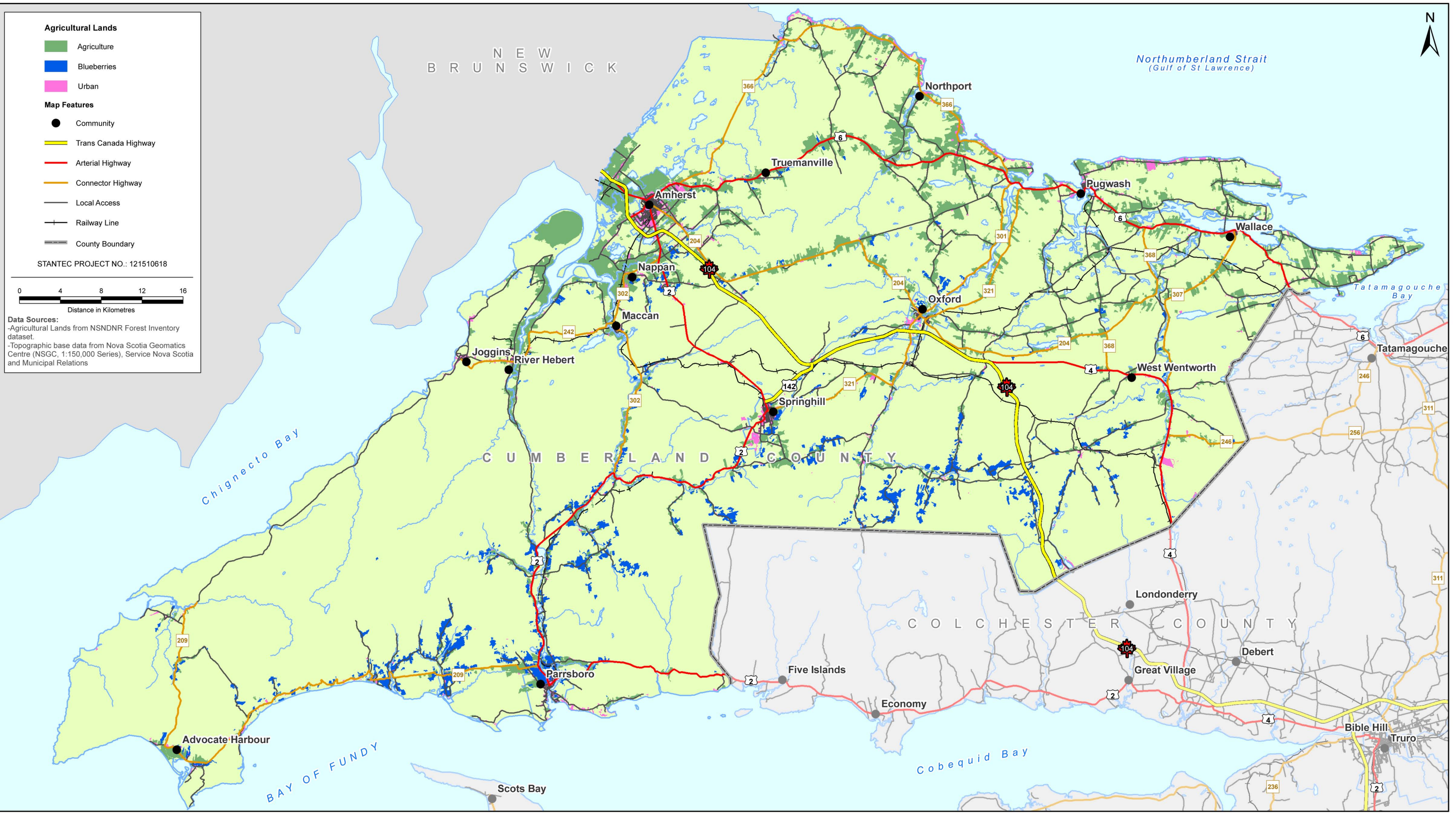
**Map Features**

- Community
- Trans Canada Highway
- Arterial Highway
- Connector Highway
- Local Access
- Railway Line
- County Boundary

STANTEC PROJECT NO.: 121510618



**Data Sources:**  
 -Agricultural Lands from NSNDNR Forest Inventory dataset.  
 -Topographic base data from Nova Scotia Geomatics Centre (NSGC, 1:150,000 Series), Service Nova Scotia and Municipal Relations



DATE: 2011/02/24
PREPARED BY: R. Sutcliffe

Cumberland County Environmental Master Plan

**Agriculture Lands (Land Use)**

FIGURE NO.:	<b>11</b>

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### 5.1.2 Identified Concerns

- **Urban development on prime agricultural lands.** Loss of agricultural land is an unequivocal outcome of development and the agricultural land is often permanently and irreversibly developed for urban uses. The challenge of maintaining the balance between agricultural and non-agricultural has been identified as an issue that Cumberland County faces.
- **Potential land use conflicts** between agricultural uses and non-agricultural uses are a common concern through Nova Scotia. Maintaining the balance between sustaining agricultural practices while allowing non-agricultural growth to occur. Residential developments occurring near active agricultural practices are exposed to the odours and noises of the farms. This causes conflict between the agricultural practice that currently exists and potential development in the area.
- **Potential water pollution.** Agriculture practices can contribute to water pollution through discharges of fertilizers, pesticides, and manure to surface and/or groundwater (Ecology Action Centre, 2010). With approximately 73,025 hectares of farm land in Cumberland County (Statistics Canada, 2006) concern for potential water pollution from agricultural practices could be a problem for residents living downstream.
- **Climate Change** impacts and rise in sea level is a potential concern for agricultural lands. Cumberland County has several farm lands protected by dykelands from salt water intrusion and flooding. With an increase in sea level these areas become vulnerable to flooding causing decrease in crop yields and possible livestock contamination.

### 5.1.3 Management and Protection Opportunities

- **CLI Land Classification.** Although CLI data is old and more accurate information is available for some areas as part of more recent soil surveys, the interpretations are still largely valid, and many jurisdictions still use CLI data for land use planning purposes (Agriculture and Agri-Food Canada 2010).
- **Revised Universal Soil Loss Equation for Application in Canada.** Additional land-use specific evaluations of soil capabilities may be obtained with further interpretation of data sources. For example, methodology and data outlined by the Revised Universal Soil Loss Equation for Application in Canada (RUSLEFAC) (Wall et al. 2002) may be used to refine soil erosion susceptible predictions for agricultural lands within Cumberland County. In particular, predicted soil losses from water erosion on agricultural lands may be obtained for the purposes of conservation farm planning and are based on data for rainfall and runoff, soil erodibility, slope, crop / vegetation, and management practices. Although generating predicted amounts of soil loss in the county may be outside the scope of municipal planning

NATURAL RESOURCES

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initiatives, the aforementioned data may also be used for developing relative soil erosion susceptibility maps for agricultural lands. Furthermore, water storage capacity for agricultural purposes may be obtained through an assessment of soil descriptions provided by the Nova Scotia Soils Survey (particularly soil texture class), estimated rooting depths, and documented relationships between soil texture and water field capacity. Water storage capacity may also be modelled for additional interests (such as water discharge) and relayed as mapping for Cumberland County.

**5.2 FORESTRY****5.2.1 Background**

The province of Nova Scotia is 80% forested and forestry activities dominate most of the land base (NSDNR 1999a). As a result, there are many forestry-focused planning tools and systems which have and are being developed by NSDNR. In particular, NSDNR's Integrated Resource Management strategy is intended to promote synergy between the management of multiple values, and encourages the modification of forestry practices for use as efficient tools to meet other management objective, such as conservation (Stewart and Neily, 2008).

According to NSDNR data, approximately 70% of the county is forested. Whereas much of the forested area is comprised of "natural" stands, considerable areas have recently been clearcut, or are otherwise in an early successional stage following human activities, and others are subject to silvicultural activities.

Information on the distribution of forested maturity classes within Cumberland County is provided in Figure 12. According to the data, 19% of forest cover in the County is in a "regeneration" phase (*i.e.*, equal to or less than 1 meter in height and less than 20 years of age), 15% is "young" (*i.e.*, less than 40 years of age and 6 meters or less in height), 5% is "immature" (*i.e.*, less than 40 years of age and with a volume of less than or equal to 60 cubic meters per hectare and greater than 6 meters in height), 50% is in the "pole" stage (*i.e.*, 40 to 60 years for stands dominated by early successional species or 40 to 100 years for those comprised of late successional species or less than 40 years of age with a volume greater than 60 cubic meters per hectare). Four percent of the forest cover is mature (*i.e.*, 60 to 70 years of age for stands dominated by early successional species or 101 to 150 years of age for those comprised predominantly of late-successional ones), less than 1% is regarded as "overmature" (*i.e.*, greater than 70 years of age for early stands of early successional species and more than 150 years for late successional ones), and 6% of the forest cover has an "uneven" age structure.

The distribution of forest cover types within Cumberland County is presented in Figure 13. Land cover data obtained from NSDNR indicate that forested areas which have been assigned a cover type are primarily softwood (55%), followed by mixedwood (27%), and hardwood (18%). Whereas softwood cover is extensive throughout much of the County, stands containing high

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











proportions of hardwood are primarily located within the southern portions of the County, particularly in the Cobequid Mountains (Figure 13).

**5.2.2 Identified Concerns**

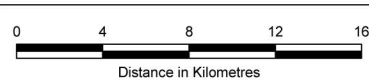
- **Intensification of development** is a concern in both urban and rural areas where development, clear cutting and other changes to the landscape are resulting in a concentration of impervious surfaces and changes in vegetation which can impact surface water flow patterns and water quality. There is concern that these changes in land use have the potential to cause increased flooding and erosion, and perhaps are already causing increased flooding in some areas (e.g., Nappan Watershed).

**5.2.3 Management and Protection Opportunities**

- **Forest Soils Type Mapping** *Forest Soil Types of Nova Scotia* is an on-site guide for identifying and interpreting forest soils in Nova Scotia. It describes all currently recognized soil types in the province, as identified by the Forest Ecosystem Classification (FEC), and provides management interpretations for these. Using survey descriptions, the guide also provides a correlation between the FEC soil types and those identified by the *Nova Scotia Soils Survey*. In doing so, the *Forest Soil Types of Nova Scotia* document is valuable for providing management interpretations for soil series mapped by the *Nova Scotia Soils Survey*. Specifically, hazard rankings are provided for soil compaction, rutting, erosion, frost heave, windthrow, and sensitivity to forest floor loss. All hazards are influenced to varying degrees by soil texture, soil moisture content, soil organic matter content, soil depth, and stoniness. Overall susceptibility ratings for each hazard type (low, moderate, high, and very high) are based on the condition of the soil types and are meant to alert users to the potential for soil damage or negative off-site impacts.

- | Forest Maturity Class (NSDNR)  | Map Features   |
|--|--|
|  1 - Regeneration |  Community            |
|  2 - Young        |  Trans Canada Highway |
|  3 - Immature     |  Arterial Highway     |
|  4 - Pole         |  Connector Highway    |
|  5 - Mature       |  Local Access         |
|  6 - Overmature   |  Railway Line         |
|  7 - Uneven       |  County Boundary      |

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Data Sources:  
 -Forestry Data from the Nova Scotia Department of Natural Resources (NSDNR), 2010  
 -Topographic base data from Nova Scotia Geomatics Centre (NSGC, 1:150,000 Series), Service Nova Scotia and Municipal Relations

NEW BRUNSWICK

Northumberland Strait  
(Gulf of St Lawrence)



CUMBERLAND COUNTY


COLCHESTER COUNTY

BAY OF FUNDY

Cobequid Bay

DATE: 2011/02/29


PREPARED BY: R. Sutcliffe



Cumberland County Environmental Master Plan

Forest Maturity

FIGURE NO.: 12



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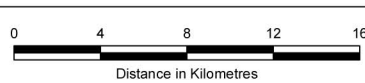
Forest Land Cover (NSDNR)

- Softwood
- Mixedwood
- Hardwood

Map Features

- Community
- Trans Canada Highway
- Arterial Highway
- Connector Highway
- Local Access
- Railway Line
- County Boundary

STANTEC PROJECT NO.: 121510618



Data Sources:  
 -Forestry Data from the Nova Scotia Department of Natural Resources (NSDNR), 2010  
 -Topographic base data from Nova Scotia Geomatics Centre (NSGC, 1:150,000 Series), Service Nova Scotia and Municipal Relations



NEW BRUNSWICK

Northumberland Strait  
(Gulf of St Lawrence)

Chignecto Bay

CUMBERLAND COUNTY

COLCHESTER COUNTY

BAY OF FUNDY

Cobequid Bay

Cumberland County Environmental Master Plan

Forest Cover Type

FIGURE NO.:

13

DATE: 2011/02/29

PREPARED BY: R. Sutcliffe



## 5.3 MINING

### 5.3.1 Background

Mining is a resource-based industry which has been, and still is, prominent in Cumberland County (Figure 14; Cumberland County Municipality Corporation, 2010a). Mining began as a fuel source for farmers prior to 1870 and by 1889 the Cumberland Railway and Coal Company had begun mining coal from four separate coal seams which expanded to seven seams by the 1900s (Town of Springhill, 2011). In 1958 the disastrous “Big Bump” led to the end of coal mining in Springhill (Town of Springhill, 2011). Springhill was made famous by the miraculous recovery of miners trapped underground due to the explosion. Soon after coal mining ended, groundwater was allowed to fill the abandoned coal mines which was naturally heated by the earth’s powers providing Springhill geothermal energy resource which is currently used by numerous businesses in Springhill (Town of Springhill, 2011).

Coal mining was not the only type of mining occurring in Cumberland County. In 1912 salt was discovered in a well at Malagash; leading to the opening of Canada's first underground rock-salt mine in 1918. This salt mine was open until 1959 when problems with ore quality and mine operations forced closure (Government of Nova Scotia, 2011). Salt was also discovered in Pugwash in 1953 revealing immense underground reserves which went into production to replace the decommissioned Malagash mine (Government of Nova Scotia, 2011). Additionally salt brine was discovered in a well at Nappan in 1927. Testing for oil lead to the discovery of huge underground salt deposits instead and has been worked by solution mining since 1947 (Government of Nova Scotia, 2011).

### 5.3.2 Identified Concerns

- **Subsidence.** Underground mines, both known and unknown, cause subsidence concerns for many land uses including residential, infrastructure and agricultural land uses.
- **Groundwater.** Coal areas contribute iron, manganese, ammonia, color and possibly methane to the groundwater.
- **Intense land use.** Although economically beneficial; mining is an intense land use and can cause potential negative effects on the surrounding land uses in the area including surface water runoff, subsidence and loss of habitat.

**Abandoned Mine Openings (by Mineral)**

- Asenic
- Coal
- Copper
- Iron
- Manganese
- Salt
- Strontium

**Map Features**

- Community
- Trans Canada Highway
- Arterial Highway
- Connector Highway
- Local Access
- Railway Line
- County Boundary

STANTEC PROJECT NO.: 121510618

Distance in Kilometres

**Data Sources:**  
 -Abandoned Mine Openings (AMO) from the Nova Scotia Department of Natural Resources (NSDNR)  
 -1:150,000 Topographic Base data from Nova Scotia Topographic Database (NSTDB), provided by Service Nova Scotia and Municipal Relations, Nova Scotia Geomatics Center.



DATE: 2011/02/29

PREPARED BY: R. Sutcliffe

Cumberland County Environmental Master Plan

**Abandoned Mine Locations**

FIGURE NO.: 14

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### **5.3.3 Management and Protection Opportunities**

- **Abandoned Mine Mapping.** Although mapping has been developed for abandoned mines in the Cumberland County area, there is still concern regarding illegal or unidentified mines. NSDNR maintains a database of all known abandoned mines in Nova Scotia; however, the mine openings are not surveyed and therefore locations are approximate, not all mine openings are examined, new mine openings may have been developed due to deterioration of abandoned mine openings and conditions may have changes since an opening has been examined (NSDNR, 2011). Additionally undocumented abandoned mine openings resulting from small scale illegal mining, particularly related to coal, are only added to the inventory when they are report (NSDNR, 2011).

## **5.4 ENERGY**

### **5.4.1 Background**

Provincial legislation such as the Nova Scotia's Renewable Electricity Plan (REP) encourages the harnessing of greener, more local sources of energy in Nova Scotia (Nova Scotia Department of Energy, 2010). In the REP, Nova Scotia has set a renewable electricity standard of 25% renewable electricity by 2015 and 40% renewable electricity by 2020 by encouraging and focusing on new, local renewable energy sources. The REP focuses on four main principals: renewable sources of energy, energy efficiency, locally produced cleaner fuels and providing economic and environmental opportunities (Nova Scotia Department of Energy, 2010). Renewable sources identified include: tidal energy, biomass, wind, and solar. In addition, new opportunities in the REP for community scale renewable energy generation, such as the Community Based Feed-in Tariff and the net metering programs may present opportunities for municipalities to become wind energy producers.

Along with the provincial legislation encouraging the production of renewable resources, the region's geography, low population density and local natural assets, such as the highest winds, tides and sunshine hours, provides the County of Cumberland with ample opportunity to develop a renewable energy sector (ISCP, 2010). The Cumberland County Integrated Community Sustainability Plan identifies the importance of developing renewable resources to position the Municipality as a "self-sufficient, forward-thinking leader" in the sustainability industry (Cumberland County Municipality Corporation, 2010a). Green initiatives in Cumberland County have already begun with the development of a Regional Energy Strategy for Cumberland County prepared by the Municipality, Town of Springhill and CREDA (Cumberland County Municipality Corporation, 2010a). The Regional Energy Strategy identifies the following goals:

- Position and promote Cumberland County as a strategic location for investment in the renewable and alternative sector;

NATURAL RESOURCES

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- Establish a commitment to increase renewable and alternative energy capacity including tidal, wind, mine water and ground source geothermal, solar, coal bed methane, etc. ;
- Increase understanding of options for the development of the Springhill mine water geothermal resource;
- Promote energy efficiency; and
- Be consistent with existing strategic, environmental and planning objectives throughout Cumberland County (AECOM, 2010).

Renewable energy resources currently developed in Cumberland County include; geothermal, wind, solar, bio energy and natural gas (AECOM, 2010).

Additionally, Cumberland County generates approximately 5.8 MW of power from wind with more wind projects in the development, approval or proposal stages (Cumberland County Municipality Corporation, 2010a). Tidal, geothermal and solar energy projects are also initiatives undertaken by the Municipality.

**5.4.2 Identified Concerns**

- **Potential impacts to the landscape.** It has been recognized in the Regional Energy Strategy that large scale wind and solar projects can require significant land use areas, resulting in concerns to related land ownership and loss or damage of ecological diversity, especially in the presence of sensitive wildlife habitat or endangered species (AECOM, 2010).

**5.4.3 Management and Protection Opportunities**

- **Supporting Land Use Mapping.** The Regional Energy Strategy recommends that the development of a GIS database of environmental and socio-economic constraints and land uses will provide developers with all available land use information to assist in the completion of environmental assessments and permitting as needed to develop a renewable resource project (AECOM, 2010). Information such as infrastructure, significant habitats, restricted land use, surficial and bedrock geology, wetlands and wet areas and municipal zoning can be used to support renewable resource development while protecting the environment and public (AECOM, 2010).

## **6.0 Current Areas of Environmental Study**

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There are currently a number of studies occurring in the County, which are outlined below.

### **6.1.1 Nova Scotia Atlantic Climate Adaptation Solutions Project (ACAS)**

The federal Regional Adaptation Collaboratives (RAC, also known as ACAS) Climate Change Program is a three-year (2009-2012), \$30 million, cost-shared federal program aimed at stimulating climate adaptation planning and decision-making (Natural Resources Canada, 2011). This is being achieved by an approach involving six regional based programs throughout Canada, each of which involves partnerships between the federal government, provinces and territories, local governments, communities, industry, business, academia, and Aboriginal and non-governmental organizations. The ACAS program is being led by Natural Resources Canada (NRCan).

The ACAS program is centered on activities that contribute to four major tasks. These are: integrating adaptation into community planning, focusing on three theme areas (coastal land use risk and vulnerability; inland land use risk and vulnerability; infrastructure placement and design); managing groundwater resources; capacity building in Atlantic Canada; and coordination, integration and management (Natural Resources Canada, 2011).

The Applied Geomatics Research Group of the Nova Scotia Community College (NSCC) has undertaken the collection of data (LiDAR and aerial photography) and is applying digital elevation models (DEM) to assess and analyze flood risk from storm surge and sea-level rise for five rural ACAS case study areas. Two of these areas are in Cumberland County and include the Tantramar marsh area and the River Phillip Area as shown on Figure 15. This work is expected to be completed in 2012 (Natural Resources Canada, 2011).

### **6.1.2 Northumberland Straight Coastal Erosion Cottage Owner Study**

The Ecology Action Centre (EAC) in partnership with Mineral Division, NSDNR and Southern Gulf of St. Lawrence Coalition on Sustainability are working to adapt to climate change by changing people's attitude and behavior towards managing coastal erosion. EAC is working to complete a needs assessment on how to communicate climate change adaptation to cottage owners along the Northumberland Strait (Pictou, Colchester and Cumberland Counties) involving a telephone survey and key informant interviews. The project includes several steps such as background research, survey design, telephone surveys, key informant interviews, focus group, data analysis, communications strategy development, and the preparation and distribution of the final report, which is expected to be completed in March 2011. The goal of this report is to create awareness to coastal land owners on potential impacts of climate change and to increase the effectiveness and usefulness of future government and environmental organization climate change adaptation effects.

**6.1.3 Atlantic Land and Infrastructure Resiliency Assessment Project (ALIRA)**

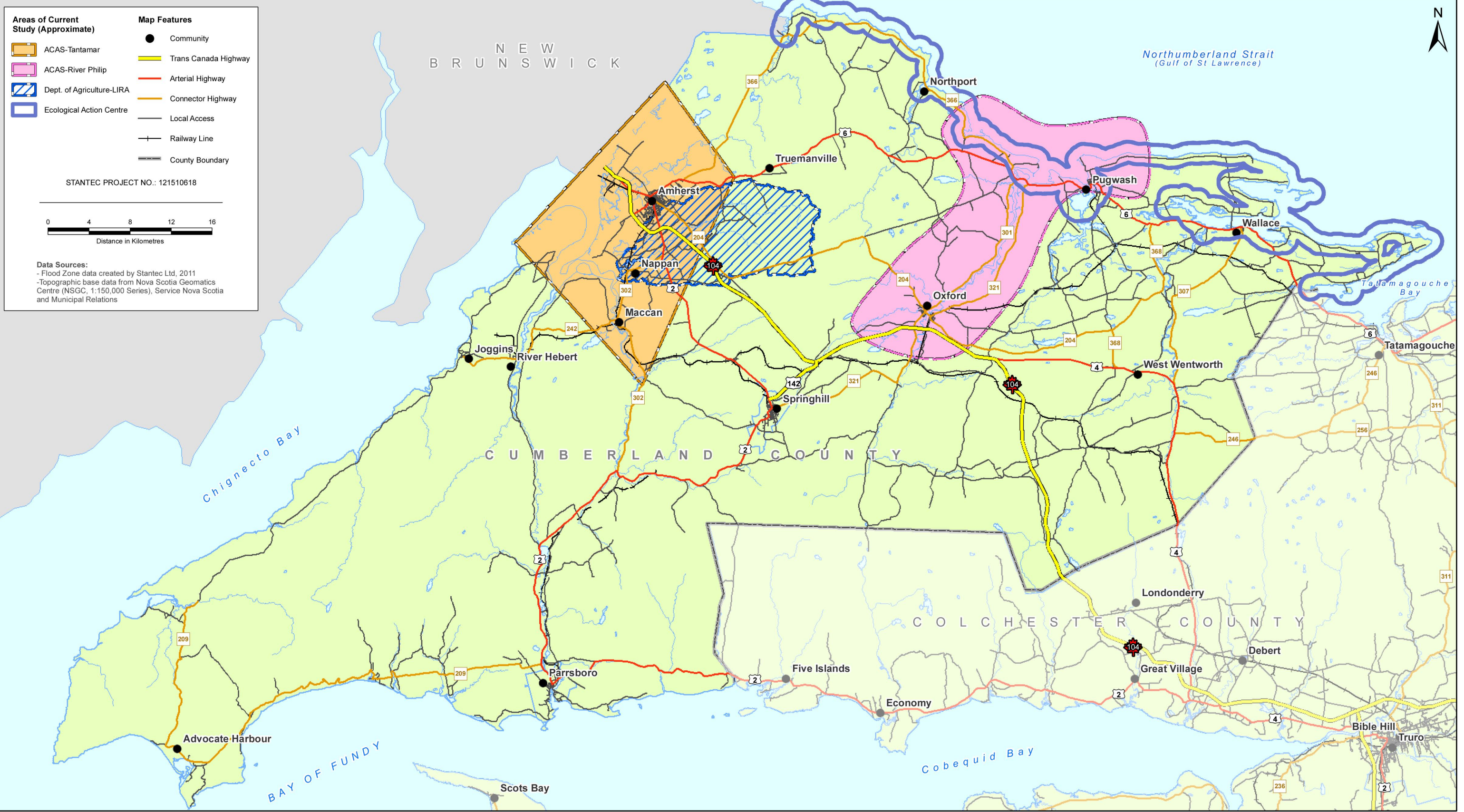
The goal of the Atlantic Land and Infrastructure Resiliency Assessment Project (ALIRA) is to standardize a methodology to help communities and regions to assess their risk to infrastructure systems and the environment to storm surge and/or extreme rainfall events, and develop ranking adaptation responses that reduce socioeconomic and environmental costs.

This project is designed to be a planning study that will identify “hotspots” where more detailed analysis should occur and will assess flooding vulnerability of a region to provide a general idea of where flooding and damage will occur, and a better understanding of where high value/high risk areas are “hot spot” locations. The project will develop an economic analysis to potentially be used to justify infrastructure investment in an area, assessing in particular potential future impacts or costs resulting from vulnerability of agricultural lands to flooding.

ALIRA will incorporate future growth/community planning to act as management framework and will tie in community-based activities such as watershed planning into municipal plans. The ALIRA project in Cumberland County is expected to be completed in late 2011.

**6.1.4 Nova Scotia Watershed Assessment Program (NSWAP)**

The Dalhousie University Hydrologic Systems Research Group at Dalhousie University, in collaboration with Nova Scotia Environment, has designed and initiated a Nova Scotia Watershed Assessment Program (NSWAP). With a \$19,000 grant from Nova Scotia Environment, this project will provide a first survey of the major watersheds of Nova Scotia of their impacts from land cover change, water availability, and vulnerability to climate change (Nova Scotia Government, 2010). One key output of the NSWAP is to develop a Nova Scotia Water Geodatabase that will facilitate the dissemination of vital watershed information to the researchers, government, and community stakeholders. A second key output are watershed analysis models that will evaluate the watersheds across the province for their health and risks to human impacts, and will identify priority watersheds. It is anticipated that preliminary watershed report cards and watershed map information will be available by Summer 2011 (Nova Scotia Government, 2010).



DATE: 2011/02/29  
 PREPARED BY: M. Huskins-Shupe

Cumberland County Environmental Master Plan  
**Areas of Current Study (Approximate)**

FIGURE NO.: 15

Path: V:\1215\active\121510xxx\121510618-Cumberland MPS\geomatics\mapping\MXDI\Report\Figures\fig\_cumberland\_Areas\_of\_Current\_Study\_11x17\_20110221.mxd

## **7.0 Planning in Cumberland County**

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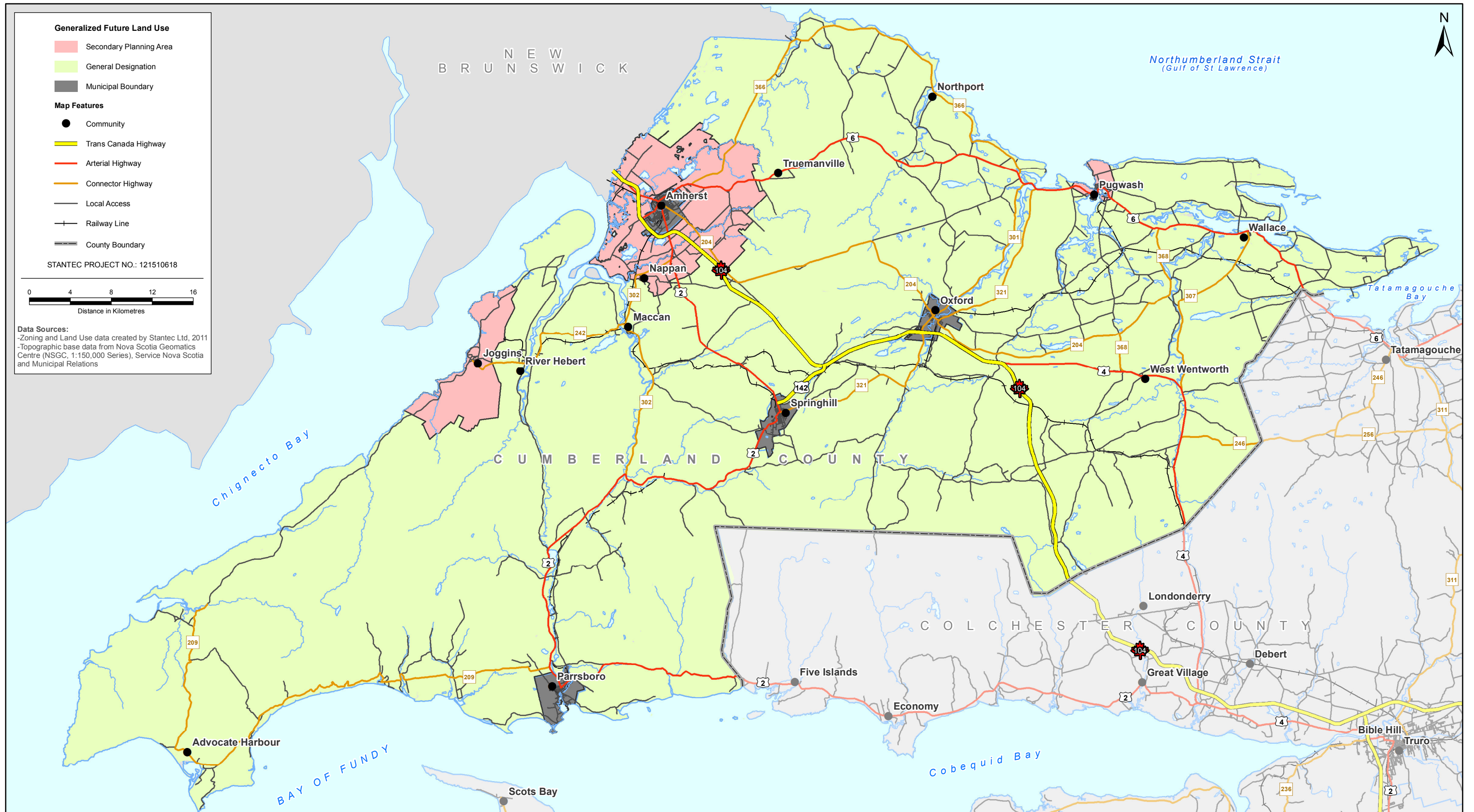
The Municipal Planning Strategy (MPS) identifies goals, objectives and policies focused on general land designation and municipal-wide planning issues for the County of Cumberland excluding the Town of Amherst, Oxford, Parrsboro and Springhill (Cumberland County Municipality Corporation, 2010b). Secondary Planning Strategies have been developed for specific areas such as Joggins, Central Planning Area and the Village of Pugwash using the framework provided in the County MPS. Figures 16 to 19 illustrate current land use zoning in Cumberland including the three secondary planning districts. The aforementioned planning documents were thoroughly reviewed to better understand current planning policies as well as identify areas of improvement. A review of the past Cumberland County MPS and the present MPS policies are provided below.

### **7.1 BACKGROUND OF THE MUNICIPAL PLANNING STRATEGY FOR CUMBERLAND COUNTY**

The provision of planning services to the County of Cumberland has evolved through a number of models. From 1976 to 1997 planning services were provided to all five local municipal units by the Cumberland District Planning Commission, which also managed solid waste services and other responsibilities assigned to it. The Commission itself evolved from a Joint Planning Advisory Committee formed by the Town of Amherst and the County in 1973.

Despite the presence of a Planning Commission, like many rural areas in Nova Scotia, the County of Cumberland has been slow to implement a full planning policy and bylaw framework. Although the Town of Amherst had a Zoning Bylaw in place from 1946 and in 1978 adopted a Municipal Development Plan prepared by the Commission, the first Municipal Planning Strategy for the Municipality of the County of Cumberland was not created until 20 years after the creation of the Commission.


While the Commission initially hoped to develop a comprehensive plan to regulate land use throughout the County, the Plan, as adopted, was focused on the regulation salvage yards and small lot development on the Northumberland Shore. It was adopted by County Council and approved by the Minister of Municipal Affairs on July 6, 1993. In the same period the Commission reviewed the Town of Amherst plan and the plan adopted by Springhill in 1985, as well as preparing plans for Oxford and Parrsboro. The Oxford MPS was approved by the Province in 1992 and the Parrsboro MPS and revised Amherst and Springhill MPSs were approved in 1993.



STANTEC PROJECT NO.: 121510618

0 4 8 12 16  
Distance in Kilometres

Data Sources:  
 -Zoning and Land Use data created by Stantec Ltd, 2011  
 -Topographic base data from Nova Scotia Geomatics Centre (NSGC, 1:150,000 Series), Service Nova Scotia and Municipal Relations

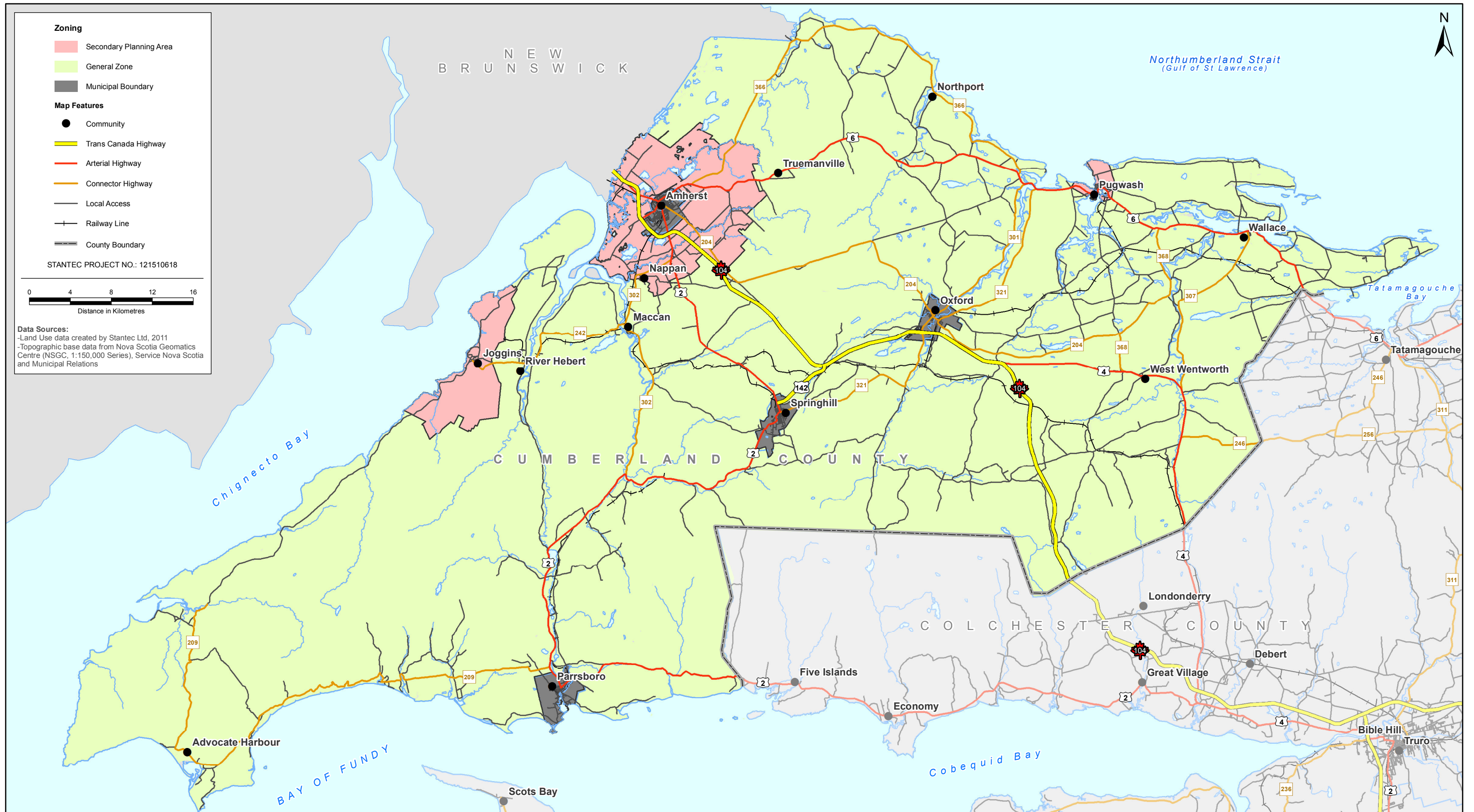
DATE:	2011/02/29
PREPARED BY:	C. Shupe
	

Cumberland County Environmental Planning Framework

**Generalized Future Land Use Map**

FIGURE NO.:	16a
	

Stantec Ltd. 2011 ©



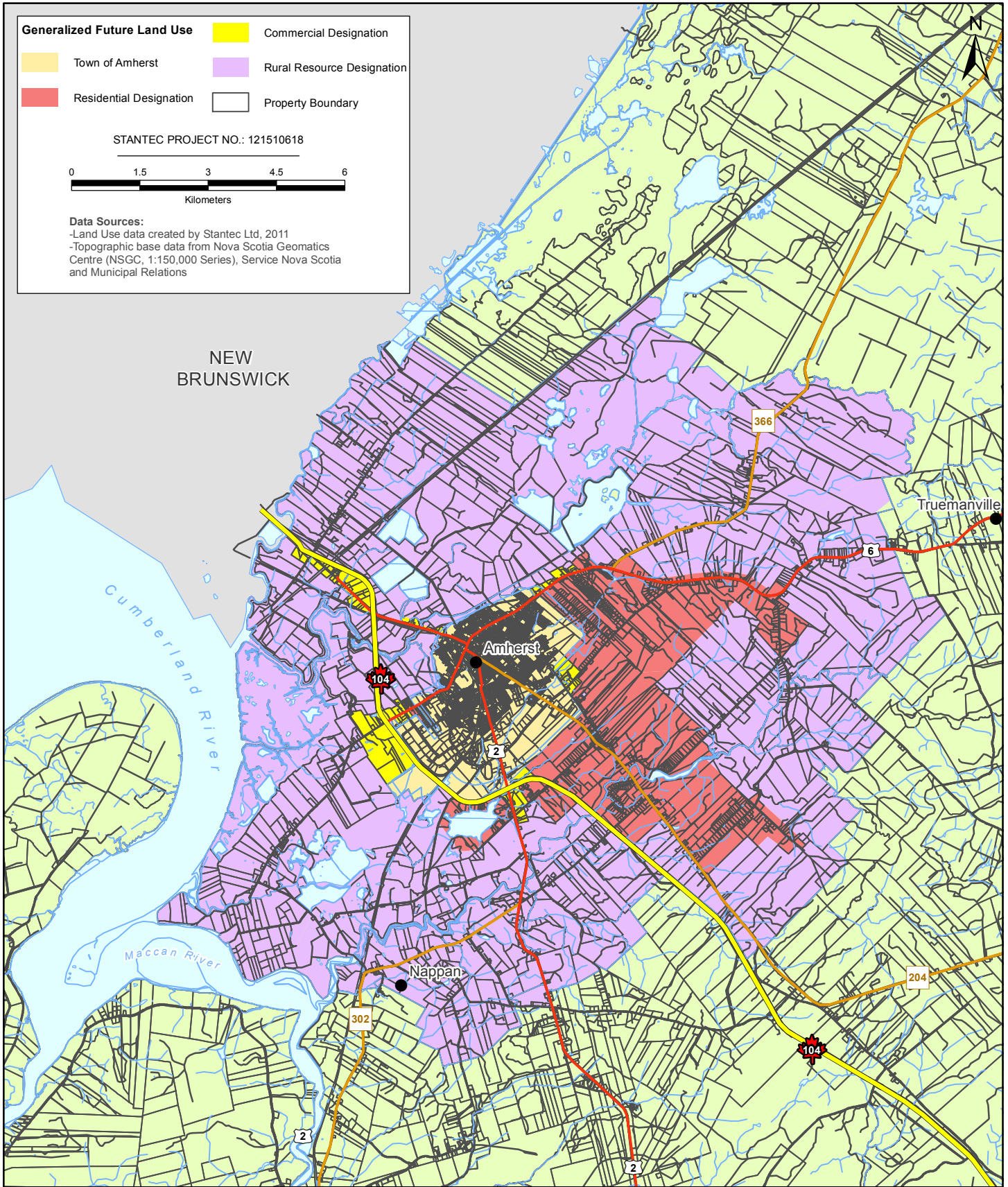
DATE: 2011/02/29  
 PREPARED BY: C. Shupe



Cumberland County Environmental Planning Framework  
**Cumberland County General Zoning Map**

FIGURE NO.: **16b**

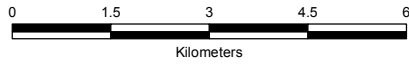
Stantec Ltd. 2011 ©



**Generalized Future Land Use**

- Commercial Designation
- Town of Amherst
- Residential Designation
- Rural Resource Designation
- Property Boundary

STANTEC PROJECT NO.: 121510618



**Data Sources:**  
 -Land Use data created by Stantec Ltd, 2011  
 -Topographic base data from Nova Scotia Geomatics Centre (NSGC, 1:150,000 Series), Service Nova Scotia and Municipal Relations

NEW BRUNSWICK

Cumberland River  
 Maccan River

Amherst

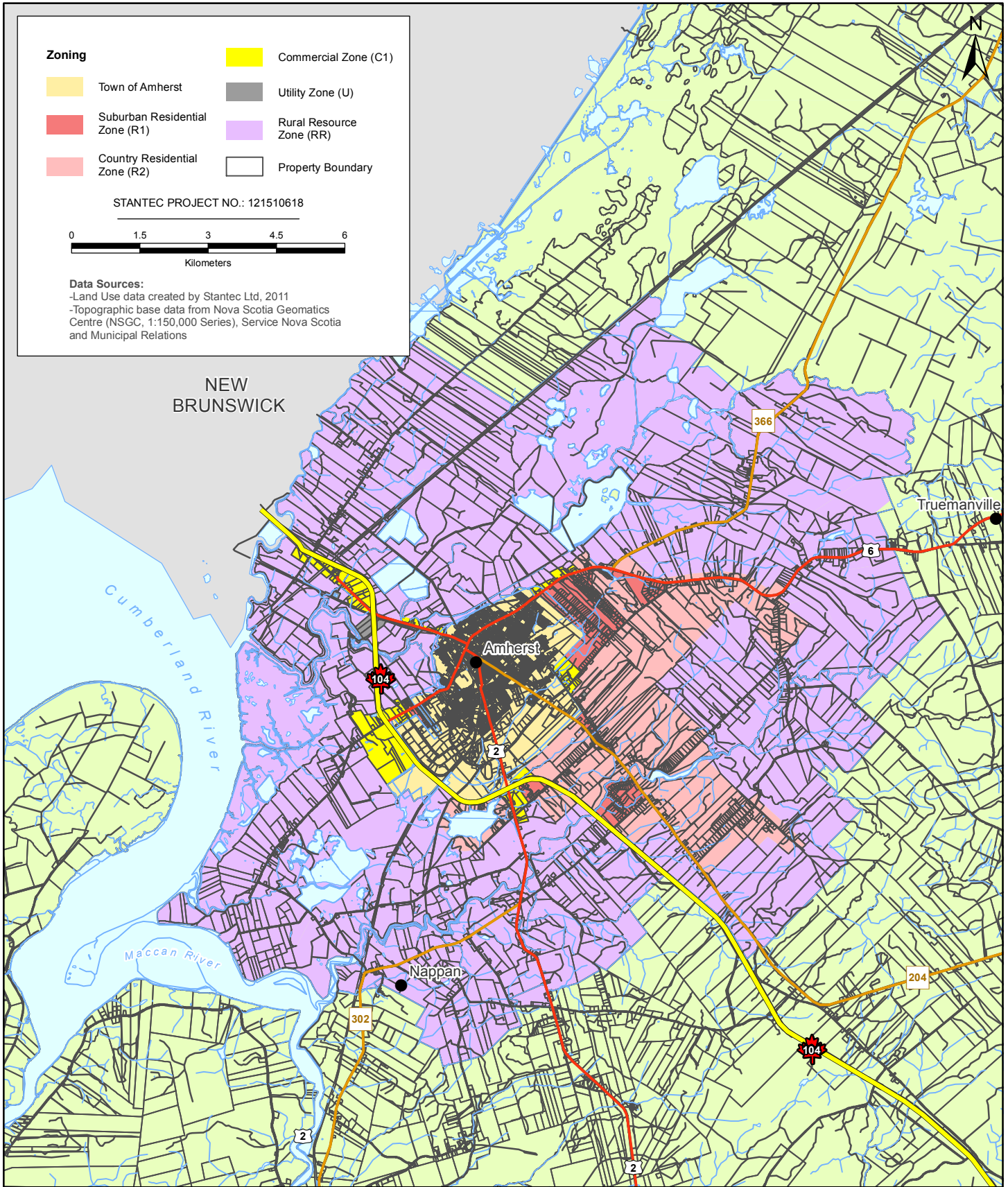
Nappan

Truemanville

DATE:	2012/03/30
PREPARED BY:	M. Huskins-Shupe


Cumberland County Environmental Planning Framework  
**Generalized Future Land Use Map**  
**Central Planning Area**

FIGURE NO:	<b>17a</b>



DATE: 2012/03/30


PREPARED BY: M. Huskins-Shupe



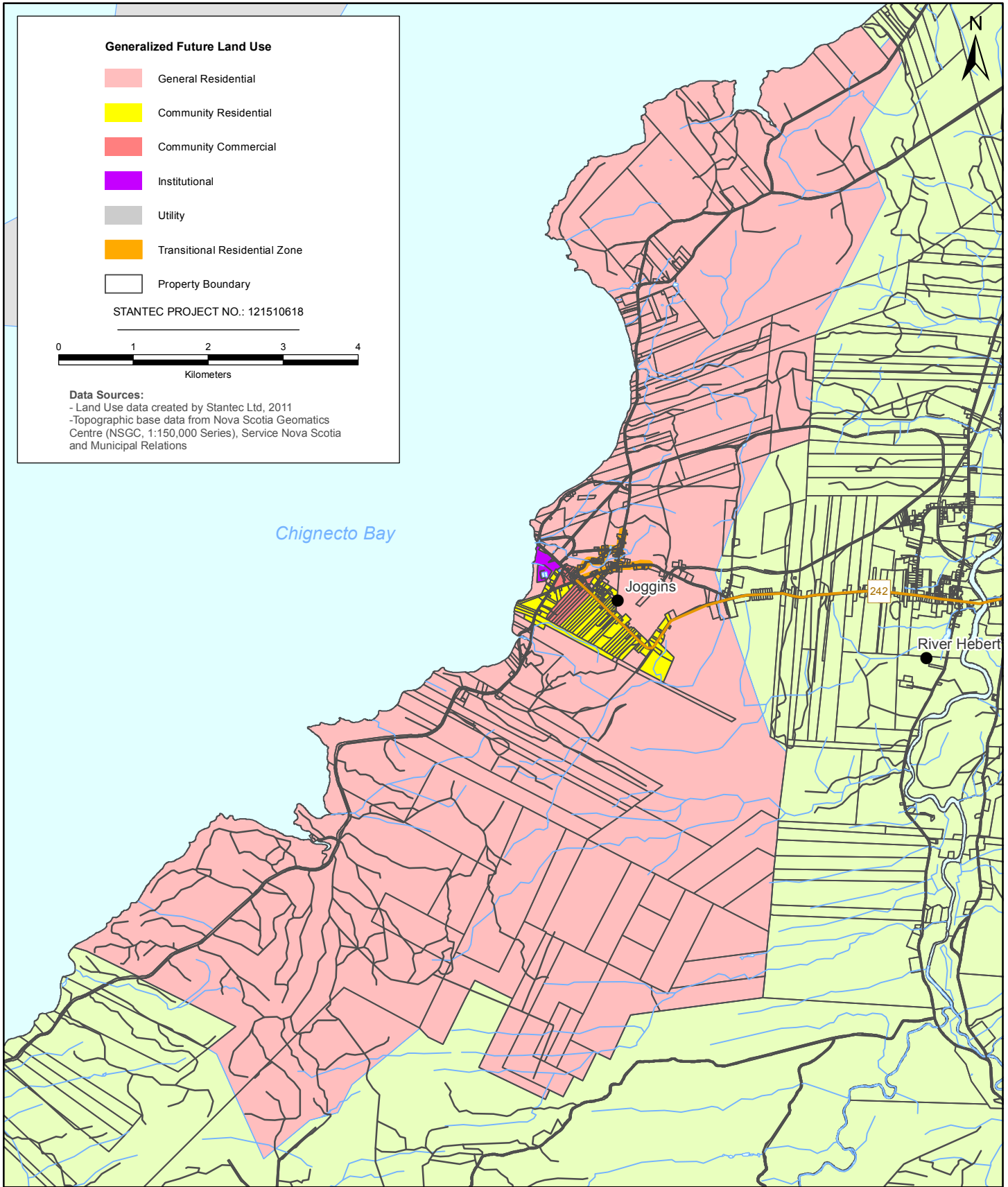
Cumberland County Environmental Planning Framework


## Zoning Map Central Planning Area

FIGURE NO: 17b



Stantec Ltd. 2011 ©



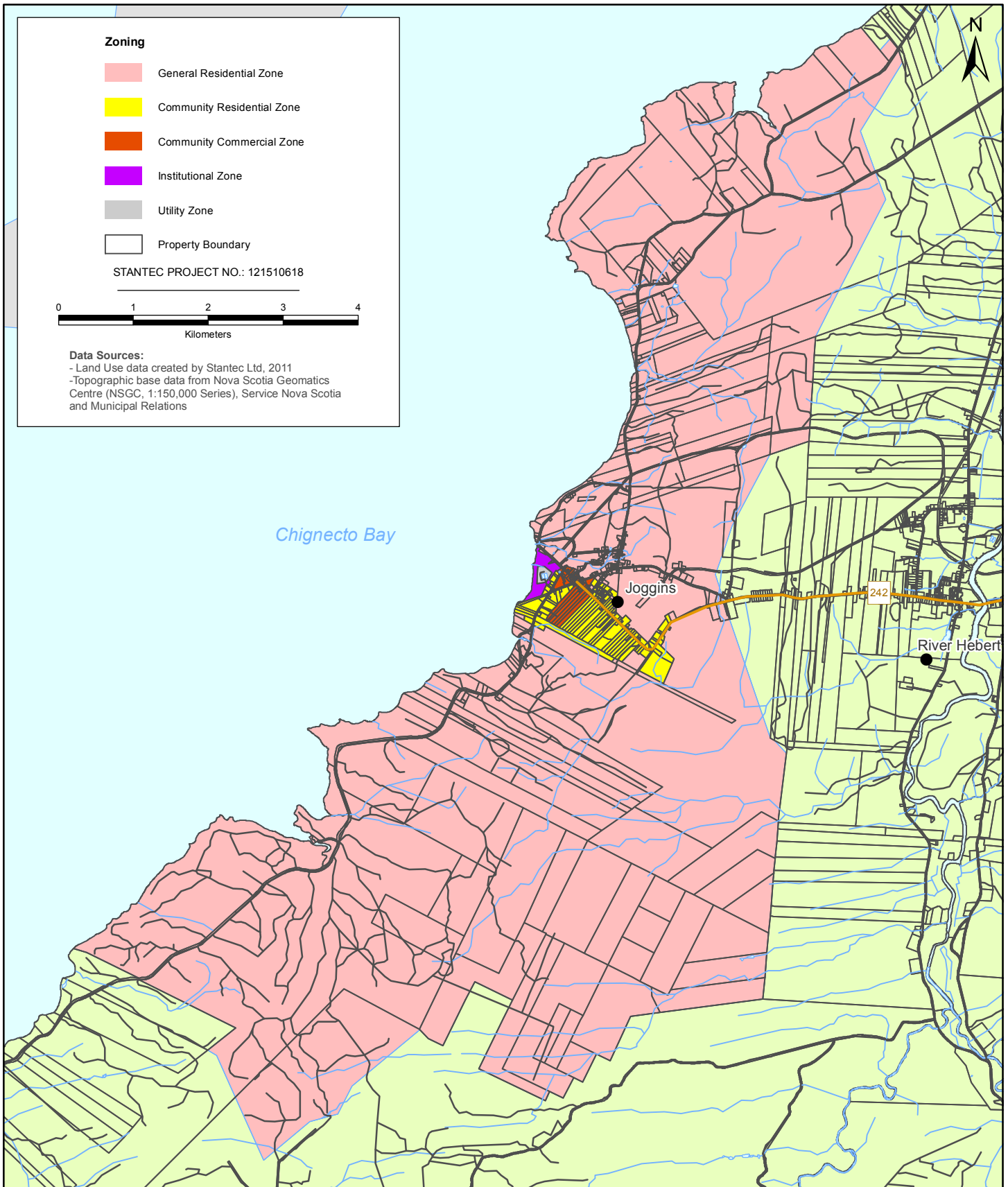
DATE:	2012/03/30
PREPARED BY:	M. Huskins-Shupe
	


Cumberland County Environmental Planning Framework

## Generalized Future Land Use Map Joggins Planning Area

FIGURE NO:	18a
	


Stantec Ltd. 2011 ©



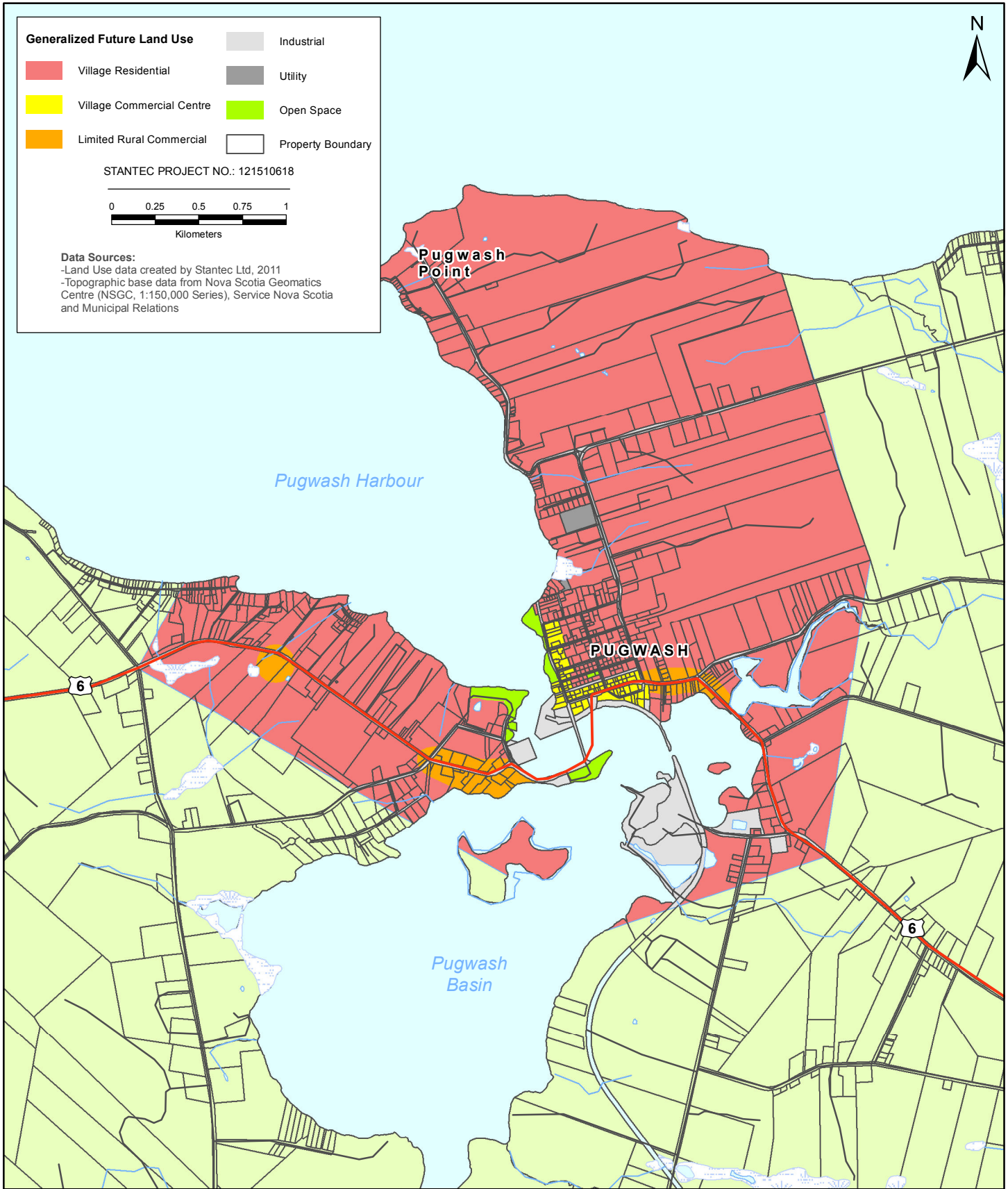
DATE:	2012/03/30
PREPARED BY:	M. Huskins-Shupe
	

Cumberland County Environmental Planning Framework

## Zoning Map Joggins Planning Area

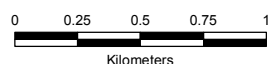
FIGURE NO:	18b
	

Stantec Ltd. 2011 ©




Generalized Future Land Use	
<span style="display:inline-block; width:15px; height:15px; background-color:red; border:1px solid black;"></span> Village Residential	<span style="display:inline-block; width:15px; height:15px; background-color:lightgrey; border:1px solid black;"></span> Industrial
<span style="display:inline-block; width:15px; height:15px; background-color:yellow; border:1px solid black;"></span> Village Commercial Centre	<span style="display:inline-block; width:15px; height:15px; background-color:darkgrey; border:1px solid black;"></span> Utility
<span style="display:inline-block; width:15px; height:15px; background-color:orange; border:1px solid black;"></span> Limited Rural Commercial	<span style="display:inline-block; width:15px; height:15px; background-color:lightgreen; border:1px solid black;"></span> Open Space
	<span style="display:inline-block; width:15px; height:15px; border:1px solid black;"></span> Property Boundary

STANTEC PROJECT NO.: 121510618



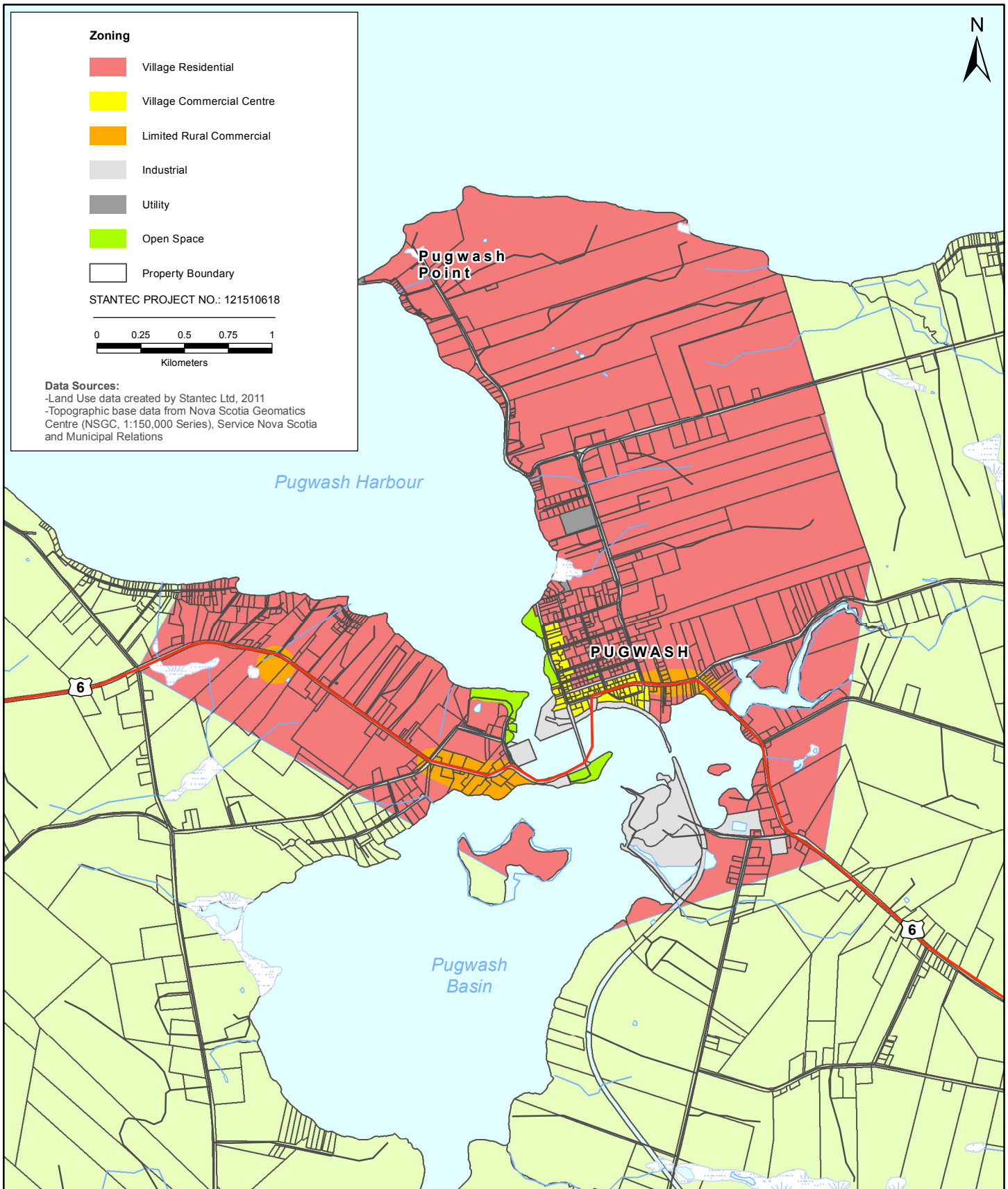
**Data Sources:**  
 -Land Use data created by Stantec Ltd, 2011  
 -Topographic base data from Nova Scotia Geomatics Centre (NSGC, 1:150,000 Series), Service Nova Scotia and Municipal Relations

DATE:	2011/02/24
PREPARED BY:	M. Huskins-Shupe
	

Cumberland County Environmental Planning Framework  
**Generalized Future Land Use Map**  
**Pugwash Planning Area**


FIGURE NO:	19a
	

Stantec Ltd. 2011 ©



DATE: 2011/02/24


PREPARED BY: M. Huskins-Shupe



Cumberland County Environmental Planning Framework

**Zoning Map**  
**Pugwash Planning Area**

FIGURE NO: 19b



The plans for the County, and Amherst, Oxford, and Parrsboro were all reviewed from 2000 to 2002. Springhill continues to apply the Plan and LUB approved in 1993. According to the introduction in the current County MPS, the revision was undertaken because the Province had replaced the 1989 *Planning Act* (under which the MPS was prepared), with the current *Municipal Government Act*, which the Province adopted in 1999. No doubt, this was also part of the rationale for reviewing the other plans, although it is also worth noting that all of the plans were approximately 10 years old at the time that their replacements were approved by the Province. The current County MPS also states that an objective of Plan revision at the time was to develop land use regulations to protect the North Tyndal Wellfield and the McElmon Brook Wellfield, which supply drinking water, respectively, to the Towns of Amherst and Oxford, as well as to some adjacent areas of the County. Both towns participated in this aspect of the County's review.

In 2002, pursuant to the revised MPS, but also in response to pressure from the Town of Amherst brought to bear through its initiative to annex suburban lands from the County (Connor Architects and Planners, 1999), the County developed the Central Planning Area Plan. The Central Planning Area Plan encircles Amherst and was prepared by planning staff with the Town of Amherst. It was adopted in November 2003, according to the Cumberland Partnership Study prepared by the consulting firm SGE Acres (SGE Acres, 2005).

A Plan for Joggins was added in 2005 to address issues raised by the valuable fossil resources in the area, which were nominated for designation as a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage site. This included construction of the associated Fossil Cliffs Interpretive Centre, which required extension of existing service networks in the area. Also in 2005, the County's planner, who was hired shortly beforehand, prepared the Pugwash and Area Plan, which developed land use policies and designations for the village, which among other features includes the Cyrus Eaton Thinkers Lodge, residence, and environs. The three area Plans or Secondary Planning Strategies all incorporate much more detailed policies than the overall County of Cumberland MPS and support zoning in each area as opposed to the balance of the County MPS, which zones only the wellfield areas, cemeteries, and utility uses, and applies select regulations to the balance of the County area through the General Zone.

## **7.2 WASTEWATER INFRASTRUCTURE**

Sewage and wastewater collection treatment facilities are located in Cumberland County at Amherst Marsh, Biggs Drive, Joggins, Maccan, Pugwash, River Hebert East, River Hebert West and Wallace (Figure 20; Table 7.1). These facilities are lagoons with the exception of Biggs Drive (tricking filter) and Pugwash (sequencing batch reactor). Combined, the wastewater collection and treatment facilities serve an estimated 2,688 residents.

**Table 7.1 Current Wastewater Collection Treatment Facilities**

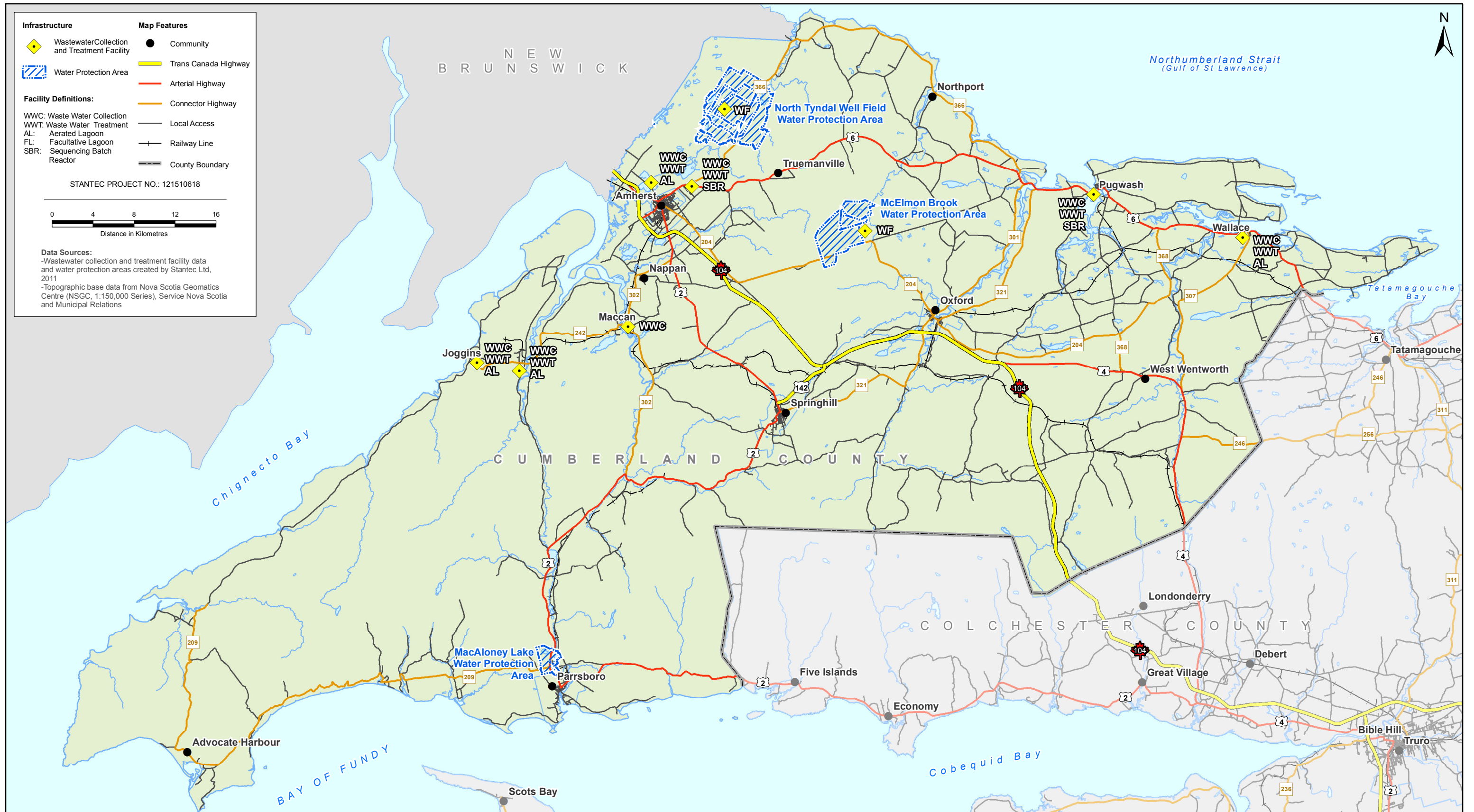
Community	Treatment Type	WWT Capacity (usgpd)	Estimated Population Served
Amherst Marsh	2 Cell Aerated Lagoon	70,000	146
Biggs Drive	Trickling Filter	2,500	35
Joggins	2 Cell Aerated Lagoon	84,000	396
Maccan	N/A	0	148
Pugwash	Sequencing Batch Reactor	500,000	964
River Hebert East	Single Cell Facultative Lagoon with Wetland	20,706	230
River Hebert West	2 Cell Aerated Lagoon with Wetland	100,000	460
Wallace	2 Cell Aerated Lagoon	42,000	309


Source: The Municipality of Cumberland County Municipal Infrastructure Inventory, 2009

The Village of Pugwash identifies specifically the need to improve wastewater services in order to further develop into a tourist destination. The Pugwash and Area Community Master Plan, developed for Pugwash in 2010 to synthesize various existing plans and proposed projects, identifies the need to expand current wastewater services to unserved areas (Pugwash Community Master Plan, 2010). Limited water systems in Pugwash have forestalled several developments in the area according to the Master Plan. Although the development and expansion of wastewater systems is costly, Cumberland County – particularly Pugwash – has the opportunity for future development if adequate services can be provided. The Secondary Planning Strategies for the Central Planning Area, Joggins and Pugwash identified, to varying degrees, policies to improve infrastructure services to the respective areas (Cumberland County Municipality Corporation, 2010b).

At the same time, the community has recognized in its ICSP that wastewater collection and treatment facilities are too costly to build and maintain in rural communities. Nevertheless, older septic systems and the associated environmental effects were also identified as a concern in the ICSP, particularly, in several closely clustered cottage developments along the Northumberland Shore. Although these cottage areas are intimate and in many ways attractive, their lots are generally under-sized. Many were created years ago, prior to the implementation of regulations governing lot size and setbacks, and septic field construction, and have not been surveyed.

The concern with cottage development was central to the County's original MPS and is echoed in the recent Pugwash Master Plan. Most cottagers, however, are only seasonal residents and have been resistant to wastewater management initiatives. Increased precipitation and associated hazards, such as increased flooding, may cause concern with potential overflow of sewage and the effect on water resources downstream.



DATE:	2011/11/25
PREPARED BY:	M. Huskins-Shupe
	

Cumberland County Environmental Master Plan

**Infrastructure**

FIGURE NO.:	20
	

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### 7.3 DEMOGRAPHICS

The Municipality of the County of Cumberland has the seventh largest population among 21 rural counties in Nova Scotia. The population of the County has declined steadily since Confederation, losing numbers in nearly every Census taken by the Government of Canada. Immediately after the formation of Canada, it appears that the rural portion of the county lost population to the towns as the population of the “total county” (*i.e.*, including the Towns of Amherst, Oxford, Parrsboro, and Springhill) increased substantially as the population of the rural area fell. From 1921 when the total Cumberland population peaked at just over 41,000, the towns have experienced shrinking populations at a very similar rate to the surrounding County.

This pattern has more or less held in recent census periods, as represented in Table 7.2. In both cases, population fell moderately between 1991 and 1996, and 2001 and 2006, and more substantially from 1996 to 2001. Overall, the share of Cumberland population living in the rural area stayed steady, roughly equivalent to the total population of the four towns.

The Census divides Cumberland into four sections that are convenient for tracking population shifts. These are Cumberland A, which takes in the southwestern portion of the County between Chignecto Bay and Cobequid Bay west of Parrsboro; Cumberland B, which lies east of Parrsboro and extends north and east, roughly to Highway 104; Cumberland C, which encircles Amherst and extends along the New Brunswick border north of Chignecto to the Northumberland Shore; and Cumberland D, which includes areas east of Oxford, north to the Northumberland Shore and east to the border of Cumberland and Colchester.

The growth among these areas has varied considerably. Cumberland C has grown fairly strongly and now has 325 more residents than it had in 1991. The other three areas, however, have all lost population with Cumberland A being most notable. Cumberland A, which includes Joggins and Advocate lost between 5 and 10 per cent of its population in each Census period and now has 21 per cent fewer residents than it had in 1991.

**Table 7.2 Population and Change, Cumberland Census Subdivisions, 1991-2006**

Subdivision	1991	1996	% Change	2001	% Change	2006	% Change
Cumberland A	2,853	2,699	-5.4%	2,471	-8.4%	2,261	-8.5%
Cumberland B	4,337	4,215	-2.8%	4,015	-4.7%	3,781	-5.8%
Cumberland C	5,200	5,412	4.1%	5,216	-3.6%	5,525	5.9%
Cumberland D	4,761	4,647	-2.4%	4,481	-3.6%	4,454	-0.6%
<b>Municipal County</b>	<b>17,151</b>	<b>16,973</b>	<b>-1.0%</b>	<b>16,183</b>	<b>-4.7%</b>	<b>16,021</b>	<b>-1.0%</b>
Town of Amherst	9,742	9,669	-0.7%	9,470	-2.1%	9,505	0.4%
Town of Oxford	1,384	1,352	-2.3%	1,332	-1.5%	1,178	-11.6%
Town of Parrsboro	1,634	1,617	-1.0%	1,529	-5.4%	1,401	-8.4%
Town of Springhill	4,373	4,193	-4.1%	4,091	-2.4%	3,941	-3.7%
<b>Census County</b>	<b>34,284</b>	<b>33,804</b>	<b>-1.4%</b>	<b>32,605</b>	<b>-3.5%</b>	<b>32,046</b>	<b>-1.7%</b>

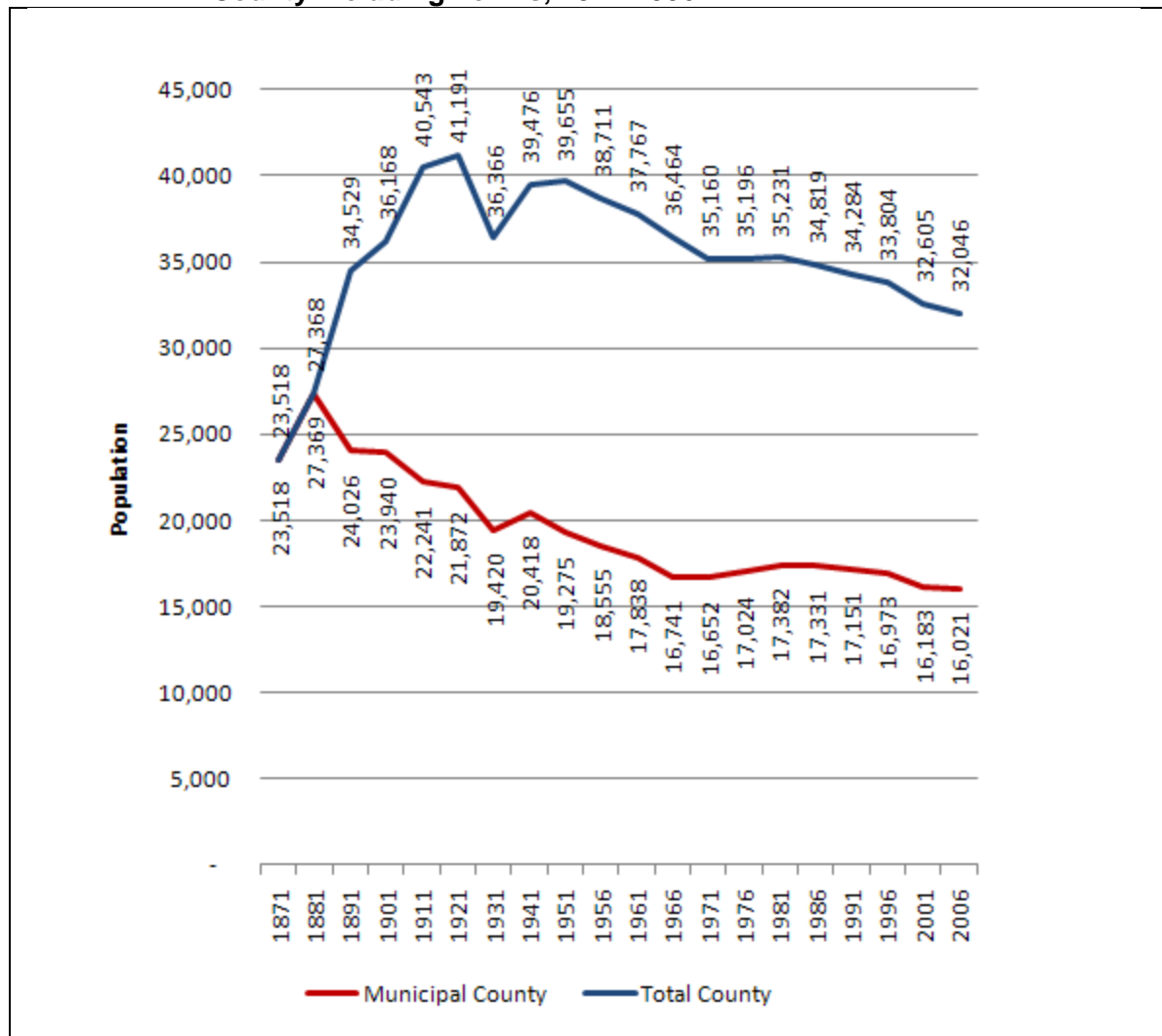
**MUNICIPALITY OF CUMBERLAND COUNTY ENVIRONMENTAL ISSUES AND ANALYSIS REPORT**

PLANNING IN CUMBERLAND COUNTY

The towns have all lost population also. Amherst has experienced the least decline and its overflow is probably the main source of additional population in County Subdivision C. The other three towns have all lost population in all three of the Census periods shown, with Oxford experiencing the most substantial losses, as it lost 15 per cent of its residents over 15 years.

Population in the area is also relatively mature. The median age in Cumberland combined with the four towns is 45.4 years compared to 41.8 for all of Nova Scotia and 39.5 for all of Canada. In Cumberland A the median age is 50.1 years. Like most areas of rural Nova Scotia, Cumberland has a disproportionate number of elderly residents and relatively few young people.

**Figure 21 Population, Municipal County of Cumberland and Cumberland County including Towns, 1871-2006**



**7.4 CURRENT CUMBERLAND MUNICIPAL PLANNING STRATEGY**

The current MPS for the Municipality of the County of Cumberland was adopted by County Council and was approved by the Minister of Municipal Affairs on July 6, 1993. The document was the subject of a review in 2001 that resulted in major amendments related to the creation zoning to protect the North Tyndal Wellfield and the McElmon Brook Wellfield, as noted above.

Although the MPS is clearly not a comprehensive document governing land use across the County it addresses a reasonably broad range of environmental concerns. In addition to the environmental goals set out by the Municipality, the Secondary Planning Strategies for the Central Planning Area, Joggins, and Pugwash have developed policies in line with the environmental concerns addressed in Section 3.0. Objectives and policies identified in the Cumberland County MPS, Central Planning Area Secondary Strategy, Joggins Planning Area Secondary Strategy and the Pugwash Planning Area Secondary Strategy are identified below in Table 7.3.

**Table 7.3 Cumberland County Municipal Planning Strategy and Secondary Planning Strategies**

<b>Issue</b>	<b>Cumberland MPS</b>	<b>Central Planning Area Secondary Strategy</b>	<b>Joggins Planning Area Secondary Strategy</b>	<b>Pugwash Planning Area Secondary Planning Strategy</b>
<b>Land</b>				
Ecological Land Classification	Not addressed specifically in MPS	Not addressed specifically in plan	Not addressed specifically in plan	Not addressed specifically in plan
Restricted Land Use Areas	Not addressed specifically in MPS	Protect the natural environment	Not addressed specifically in MPS	Protect sensitive environmental areas
Wetlands	Land use controls are developed in areas near wetlands to help protect the quality of water resources	Not addressed specifically in plan	Protect areas adjacent to watercourses, coastlines and wetlands in accordance to the municipal wide provision	
Wildlife	Land use controls are developed to protect wildlife habitat as well as the natural character and aesthetic value of the area.	Not addressed specifically in plan	Not addressed specifically in plan	Not addressed specifically in plan
<b>Water</b>				
Groundwater	Municipal Water Supply designation for Cumberland County to protect the integrity of the municipal drinking water supplies in both the short and long-term time	Discourage development that may impact groundwater resources	Not addressed specifically in plan	Not addressed specifically in plan

MUNICIPALITY OF CUMBERLAND COUNTY ENVIRONMENTAL ISSUES AND ANALYSIS REPORT

PLANNING IN CUMBERLAND COUNTY

**Table 7.3 Cumberland County Municipal Planning Strategy and Secondary Planning Strategies**

Issue	Cumberland MPS	Central Planning Area Secondary Strategy	Joggins Planning Area Secondary Strategy	Pugwash Planning Area Secondary Planning Strategy
	frames (MPS, 2010). Development and land use in this designation is controlled in order to ensure that the land use does not negatively impact the drinking water recharge area.			
Surface Water	Environmental protection techniques to maintain adequate distance between development and waterbodies and in flood plain areas to sustain and restore shoreline buffers.	Not addressed specifically in plan	Protect areas adjacent to watercourses, coastlines and wetlands in accordance to the municipal wide provision	Not addressed specifically in plan
Coastal Areas	The development of buffers between development and coastlines to maximize the maintenance of natural landforms and native vegetation and the use of “hard” shoreline stabilization methods where necessary in coastal erosion-prone areas	Not addressed specifically in plan	Protect areas adjacent to watercourses, coastlines and wetlands in accordance to the municipal wide provision	Direct development away from natural and other hazards
Flooding	The application of generally accepted environmental planning principles to flood-prone areas will help people cope with and adapt to the effects of climate change (e.g. flooding due to rises in sea level and frequency of storm surges).	Not addressed specifically in plan	Not addressed specifically in plan	Direct development away from natural and other hazards
<b>Natural Resources</b>				
Agricultural Areas	Agricultural uses are permitted in the General Designation and light intensity agricultural uses are permitted in the Municipal Water Supply Designation	To protect existing agriculture while minimizing land use conflicts between agricultural and residential uses	Permitted in residential designations	Permitted in village residential designations and limited rural commercial designations
Forestry	Some areas of the Municipality are dominated by logging	Specifically all existing forestry operations, as well	Not addressed specifically in plan	Not addressed specifically in plan

**MUNICIPALITY OF CUMBERLAND COUNTY ENVIRONMENTAL ISSUES AND ANALYSIS REPORT**

PLANNING IN CUMBERLAND COUNTY

**Table 7.3 Cumberland County Municipal Planning Strategy and Secondary Planning Strategies**

<b>Issue</b>	<b>Cumberland MPS</b>	<b>Central Planning Area Secondary Strategy</b>	<b>Joggins Planning Area Secondary Strategy</b>	<b>Pugwash Planning Area Secondary Planning Strategy</b>
	and forestry operations - the residents of the area understand the land use impacts each use will have on the other and feel these impacts are acceptable in the rural environment in which they live	as all existing residential uses shall be permitted to continue and expand in the commercial designation area.		
Mining	Not addressed specifically in MPS	Not addressed specifically in plan	Not addressed specifically in plan	Not addressed specifically in plan
Energy	Promote renewable energy as a part of a sustainable community development	Not addressed specifically in plan	Not addressed specifically in plan	Support renewable energy and green or sustainable development

The current MPS for the Municipality of the County of Cumberland was adopted by County Council and was approved by the Minister of Municipal Affairs on July 6, 1993. The document was the subject of a review in 2001 that resulted in major amendments related to the creation zoning to protect the North Tyndal Wellfield and the McElmon Brook Wellfield, as noted above.

## 8.0 References

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REPORT**

**APPENDIX A**

**PowerPoint Presentation to Council**

# Cumberland County Environmental Master Plan

## Presentation Outline

October 13, 2010

### Slide 1 Overview

- Environmental Master Plan - focus on identifying and analyzing Environmental Features
- Update to Municipal Planning Strategy, Land Use Bylaw, Secondary Plans - focus on mapping and recommendations for amendments
- Long-term View – short-term changes, long-term policies, regulations and actions

### Slide 2 Purpose

- **Build** on the established priorities reflected in current municipal and strategic plans while recognizing current constraints and opportunities;
- Help reinforce **understanding** of environmental features and management of these features through the corresponding land use framework through detailed technical analysis and identification of best management practices;
- Identify **realistic** opportunities to improve community land use, infrastructure and services;
- Integrate and apply current **GIS technology** to facilitate planning analysis of environmental features.
- Create a framework for **evaluation** of plans and policies based on their impact on community **sustainability** and **resiliency**; and
- Provide **a framework that reflects the strength of the landscape and communities comprising MOCC**, while maintaining a realistic management structure

### Slide 3 Project Schedule

- Phase 1 Beginning the Project
- Phase 2 Environmental Features Analysis;
- Phase 3 Planning Analysis ; and
- Phase 4 Finalizing Land Use Framework,

### Slide 4 Detailed Schedule

Work Plan: Cumberland County		August	September	October	November	December	January	February	March
<b>Task</b>	<b>Milestone/Critical Element/Task</b>								
	Awarding of Contract								
<b>Phase 1: Beginning the Project</b>									
1a	Project Initiation								
1b	Municipal Familiarization Tour								
1c	Professional Licenses								
1d	Review Plans and Studies								
1e	Strategic Information								
<b>Phase 2: Environmental Feature Analysis</b>									
2a	Municipal Data Mapping and Data								
2b	Technical Drawing Review								
2c	Issues and Analysis Report								
2d	Additional Consultation (Optional)								
<b>Phase 3: Planning Analysis</b>									
3a	Environmental Feature Analysis								
3b	Coastal Management Analysis								
3c	General Land Use Analysis								
<b>Phase 4: Land Use Framework</b>									
4a	Land Development Strategy								
4b	Review and Revise Draft MPS and LUP Recommendations								
4c	Review Environmental Features and Land Use Mapping								
4d	Draft Report Review Meeting								
4e	Draft Strategy for Public Consultation								
4f									

### Slide 5 About Us

# Areas of Practice



ENVIRONMENT



INDUSTRIAL & PM



BUILDINGS



TRANSPORTATION



URBAN LAND

...providing services throughout the entire life cycle of a project.

Planning



Design



Construction



Maintenance

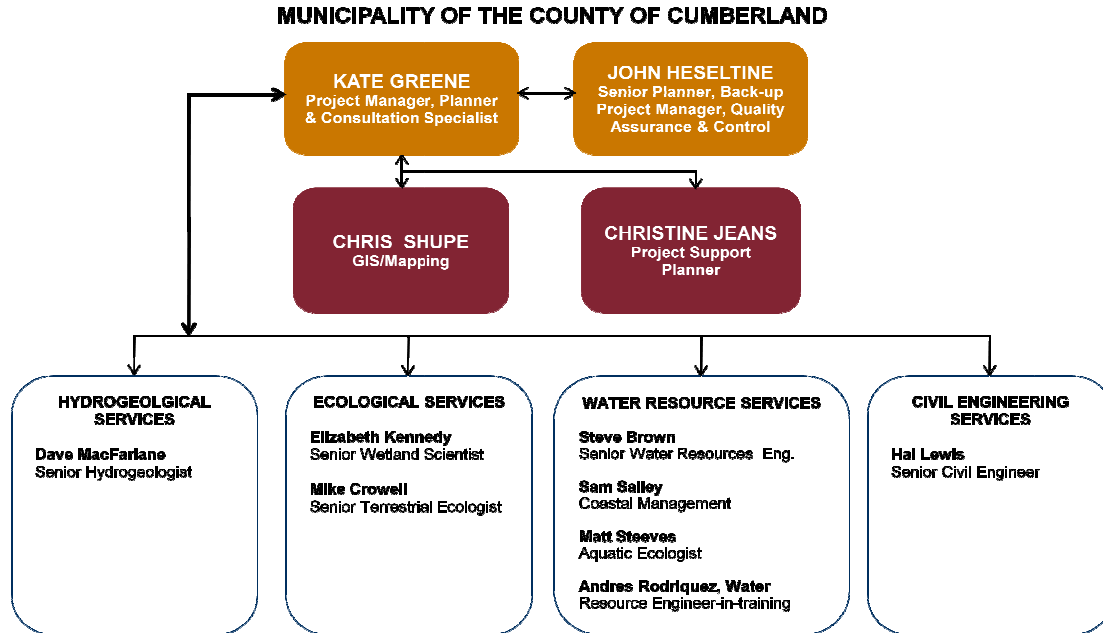


Decommissioning





## Slide 6 Project Team



## Slide 7 Council Engagement

- Presentation
- Strategic Interviews
- Council Presentation

## Slide 8 Potential Questions for Council

Of the following coastal management issues, which do you think are the most critical for the County?

- Identification/delineation of wetlands/sensitive areas
- Identification /delineation of dyke lands
- Identification/delineation of streams and water bodies
- Identification/delineation of floodplains or other areas prone to flooding/storm surges

Where are some of the most vulnerable areas?

Are there other environmental issues or features you feel we should be considering in the Plan process?

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REPORT**

**APPENDIX B**

**Literature Review**

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**Maps Reviewed**

Central Area Poster Plan

Cumberland County Map of Listed Roads (hard copy)

Cumberland County Nova Scotia Bedrock Geology

Cumberland County Nova Scotia Forest Inventory

Cumberland County Nova Scotia Soil Characterization

Cumberland County Nova Scotia Wet Areas Mapping

Inundation for 1 in 10, 25, and 100 year flooding events: Oxford, Nova Scotia

Joggins Poster Plan

Pugwash Poster Plan

Pugwash Poster Plan Tabloid

Municipality of Cumberland County Municipal Planning Strategy

Municipality of Cumberland County Land Use Bylaws

Secondary Plans (Joggins, Pugwash and Central Planning Area)

Supporting bylaws (Joggins, Pugwash and Central Planning Area)

Municipality of Cumberland County Integrated Community Sustainability Plan

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REPORT**

**APPENDIX C**

**Stakeholder Interviews**

A list of key stakeholders is identified below along with in interview outline.

- Municipality of Cumberland County Councilors
- Service Nova Scotia Municipal Relations
- Nova Scotia Transportation and Infrastructure Renewal
- Tourism, Culture and Heritage
- Director/Development Officer of Town of Amherst
- Town Planner for the Town of Parrsboro
- Development Officer of Town of Oxford
- Clerk Treasurer of the Village of Pugwash
- Director of Building and Property Services of Town of Springhill
- Tantramar Planning Commission
- Cumberland County director of planning and development
- Cumberland County development officer
- Cumberland County director of policy and research
- Cumberland County emergency management coordinator
- Cumberland County director of public works
- Department of Environment
- CAO Cumberland County



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REPORT**

**APPENDIX D**

**Issues Summary Table**

## Issues Identified Through Key Stakeholder Interviews and Research

Issue Category	Issues Identified During Interviews	MPS Policy	Provincial Statements of Interest	Gaps/Further Questions
Water/Wellfields Well Fields	Lack of Potable Water (Maccan/Hastings Area)	None	Statement of Provincial Interest on Drinking Water Supply	What is causing water quality concerns in this area?
	Poor Water Quality (Maccan/Hastings Area)			
	Poor water quality – buying drinking water (Northumberland/Pugwash Area)	Drinking water services identified among “Other Projects” (PSPS, p. 57)	Statement of Provincial Interest on Drinking Water Supply	Should development of a village water supply be a higher priority for Pugwash? Infrastructure was identified as the leading priority in the Pugwash Community Master Plan.
	Drinking water issues - salt contamination (Pugwash)			
	Water quality issues may inhibit some economic development in Pugwash			
	Water and sewer is an issue in the development of Pugwash		Statement of Provincial Interest on Infrastructure	
	Issues with manganese and arsenic in water but is not aware of testing results indication unacceptable levels of either.	None	Statement of Provincial Interest on Drinking Water Supply	What areas are affected by these problems?
	Parrsboro has limited excess capacity – could supply water but there is “bad blood” over the gas station issues	Policies 3.2.3.1, 3.2.3.2, and 3.2.3.5 commit to protect MacAloney Lake water supply (CMPS, p. 11)	Statement of Provincial Interest on Drinking Water Supply	Should Cumberland County leverage access to water networks in acknowledgement of its protection of water supplies?
	Oxford’s water supply was specifically engineered to frustrate access by county residents	Policies 3.2.3.1, 3.2.3.2, and 3.2.3.4 commit to protect McElmon Brook water supply (CMPS, p. 11)	Statement of Provincial Interest on Drinking Water Supply	
	Amherst is trying to return Dickey Brook to be a natural watercourse – it has been more or less a drainage ditch	AMPS Policy E-3 establishes Amherst’s intention to reinstate Dickey Brook. Policies E-1 and E-2 commit to protect the Brook and control flooding (AMPS, p. 36)	Statement of Provincial Interest on Flood Risk Areas (not directly pertinent to Dickey Brook)	Upstream portions of Dickey Brook are located in Cumberland County.
	Blair Lake in Amherst is eutrophic as a consequence of urban development and agricultural activity in the area	AMPS Policy E-5 seeks to minimize sources of pollution within that portion of the Blair Lake Watershed, which lies within the Town boundary, through appropriate development and infrastructure requirements (AMPS, p. 36)		Watercourse setbacks and agricultural controls are in place. Can anything else be done?
	Dam at Nappan River (old water supply) is not a safe structure – lake behind dam – if breaks lots of damage to nearby houses	None	None (Canadian Dam Association Guidelines are used for licensing in NS)	Need policy to repair the dam. Should review CDA Guidelines
Issue over the revival of the gas station located in the Parrsboro wellfield	Policies 3.2.3.1, 3.2.3.2, and 3.2.3.5 commit to protect MacAloney Lake water supply (CMPS, p. 11)	Statement of Provincial Interest on Drinking Water Supply	County lost NSUARB Appeal. Should anything be done to avoid repetition?	
Parrsboro’s water supply area is 90 per cent in Cumberland County				

Issue Category	Issues Identified During Interviews	MPS Policy	Provincial Statements of Interest	Gaps/Further Questions
	High degree of development in the Parrsboro watershed including a portion of a commercial area			
	Amherst has concerns with its wellfield and the restoration of Dickey Brook – which is the only watercourse of note in the town	Policies 3.2.3.1, 3.2.3.2, and 3.2.3.3 commit to protect North Tyndal water supply (CMPS, p. 11). Amherst Policies MS-7 and MS-8 commit to protect North Tyndal wellfield and work with the County (AMPS, p. 28)		Should the County adopt complementary policy to protect/
	Springhill has concerns with subsidence and stormwater infiltration	No reference to subsidence in CMPS or SMPS		Should we obtain subsidence mapping from NSDNR and incorporate in the CMPS with related policy?
	Some livestock in the Parrsboro watershed	None		
	There are farms in the vicinity of the Oxford water supply – closer than desirable	Policies 3.2.3.1, 3.2.3.2, and 3.2.3.4 commit to protect McElmon Brook water supply (CMPS, p. 11)	Statement of Provincial Interest on Drinking Water Supply	Are agricultural controls adequate?
Wastewater	Trying to get improved sewer system – top infrastructure priority	?	Statement of Provincial Interest on Infrastructure	To what area does this refer?
	Too big of an expense for a sewer plant (very rural area)	?	Statement of Provincial Interest on Infrastructure	To what area does this refer?
	Maccan sewage lagoon – feeds into the Maccan River then ultimately into the ocean	None	Statement of Provincial Interest on Infrastructure	Is this a problem? The lagoon has to discharge to some watercourse?
	Concerns with septic fields in the Northumberland cottage area	Objective 3.1.1 d) ensures that unserviced development has the potential to provide safe drinking water and the ability to accommodate an on-site septic disposal system. (CMPS, p. 8)	Statement of Provincial Interests on Drinking Water Supply and Infrastructure	Is tighter control required?
	Intense cottage development on the Northumberland Shore: older, inadequate sewage disposal on under-sized lots			
	Sewer system serving the village core needs to be extended to the balance of the village and adjacent coastal areas.	Sewer extension for East, West, and South Pugwash among “Other Projects” (PSPS, p. 57)	Statement of Provincial Interest on Infrastructure	Should extension of village sewer network be a higher priority for Pugwash? Infrastructure was identified as the leading priority in the Pugwash Community Master Plan.
	Sewer treatment plant in Pugwash has considerable excess capacity			
	Amherst has extended water to areas of the county but never sewer	Policy MS-1 commits Amherst to “incremental extension” of services	Statement of Provincial Interest on Infrastructure	
	Access to water and sewer services impacts potential for business and residential development			
	Water and sewer is an issue in the development of Pugwash	See Water above	Statement of Provincial Interest on Infrastructure	

Issue Category	Issues Identified During Interviews	MPS Policy	Provincial Statements of Interest	Gaps/Further Questions
	Dam associated with the pumping station is not in immediate need of repair but it represents obvious risks			
	Tanks leaking is a concern of the County			
	1993-1994 preliminary design for sewage treatment collection – have add cottages for a long time – many cottage residents unwilling to put in proper systems.			
	Seasonal residents probably have ancient onsite sewage disposal systems - as there is more erosion there are more issues we are going to have - a lot of unapproved sewage disposal types. - only takes one well contamination			
Flooding	Concern with climate change and impacts in marshlands and flooding	Climate change is referenced in Section 2.3 (CMPS, p. 5)		Is there a need for more explicit policy to address climate change?
	Flooding is a big concern for the Springhill to Parrsboro Area	Policy 3.5.1.1 a) requires 100-foot buffer for flood-prone area (wetlands and watercourses) (CMPS, p. 14)		
	Effects of flooding has increased in recent years (Maccan Marsh)			
	Flooding in the area causes damage to roads/highways (Maccan)			
	Flooding is a chronic concern in the Tantramar area			Would cooperation with Tantramar PDC assist in addressing this issue?
	Oxford is an accident waiting to happen – severe potential flooding issues	Floodplain planning and protection throughout OMPS		
	Oxford has severe flooding concerns exacerbated by clear cutting in the watershed			
	Clear cutting and the relationship to flooding	None		
	There was a breach in the Advocate Seawall in 2008 – there is a threat of very serious flooding in Advocate if storm occurs with high tide	None		
	Clear cutting may have impacted Advocate	None		
	Clear cutting is an issue – hurting waterways			
	Storm surge issue in Parrsboro			
Coastline setbacks should be situational	Policies 3.5.1 and 3.5.1.1 c) (CMPS, p. 14) allows easing of shoreline buffer requirements. Policy 3.2.1 provides specific setbacks at Joggins Cliffs (MPSJ)			
There isn't a well-developed rationale for buffer distances in any case				

Issue Category	Issues Identified During Interviews	MPS Policy	Provincial Statements of Interest	Gaps/Further Questions
Erosion	Coastline erosion is a big concern for the area (Northumberland/Pugwash Area)	Policy 3.5.1.1 a) requires 100-foot shoreline buffer (CMPS, p. 14)	Statement of Provincial Interest being developed to deal with coastal zone management	
	Coastline development uses mitigation measures to prevent erosion – causing more problems elsewhere (Northumberland/Pugwash Area)			
	Coastline erosion in the Wallace/Malagash Area – clay/sandy shoreline			Although at least one contact identifies armour stone as the solution it only serves to move the problem.
	Coastline erosion is an important issue in the Wallace/Malagash Area – people want to develop along the coastline			
	Erosion not as severe in Pugwash, however, where there is erosion armour stone is usually the solution			
	The Peace Park has been subject to erosion			
	Eaton Lodge at the mouth of the Pugwash River has been inundated in storms			
	Intense cottage development on Northumberland similar to Cumberland – some cottages have been moved as a result of recent substantial storm events			
	Clay/sandy material in the area – not going to be able to do anything about the erosion – mitigation only makes it worse elsewhere			
	High risk for climate change as anywhere else. The Bay Fundy is one of the highest risk areas.			
Told that the amount of coastline that is now seasonal residents is placing rock on the shoreline - unless the entire shoreline is protected by rock you can increase rate of erosion				
Agriculture	Water pipes have been extended from the Town of Amherst to Nappan through good quality farmland – encouraging urban development and potentially limiting agriculture activity	S. 2.6.3 commits to avoid land use conflicts between agricultural and non-agricultural land (CMPS, p. 7). Objective 1.4.1 addresses protection of agricultural land in the area (MPSCPA, p. 26)	Statements of Provincial Interest on Infrastructure (sprawl) and Agriculture (protection)	Are stronger restrictions required on the development of agricultural land (e.g., restriction on development on Class 4 or better)
	A lot of overgrown farm land – could be used if the right economic conditions existed			
	Losing agricultural land to development			
	Need to maintain dykes to maintain agricultural lands			
	Concerns with blueberry spray chemicals in Parrsboro	None	Statement of Provincial Interest on Drinking Water Supply	Is there a need for pesticide or hazardous materials policy?
Lots of blueberries in the area as well as sod – these practices use lots of chemicals				

Issue Category	Issues Identified During Interviews	MPS Policy	Provincial Statements of Interest	Gaps/Further Questions
County Planning	Need a comprehensive plan	Planning study required to change any General designation (CMPS, p. 3)	MGA, Part 8	Should the CMPS be expanded to address land use? How much revision should be considered to ensure proper connection between MPS policy and LUB provisions? To enhance structure and comprehensibility (e.g., in some sections objectives and policies are explicitly distinguished in others they are not – suggesting there are no objectives)
	Lack of land use planning in the County effects future coordinated development			
	Needs to control sprawl in the county – extending water and sewer lines contrary to the Provincial Statement of Interest.	Intention to develop on existing water services and in areas with the potential to receive municipal water and/or sewer (CMPS, p. 6)	Statement of Provincial Interest on Infrastructure	To what degree is the County willing to control development? Does the County need to adopt a nodal/hamlet approach to satisfy the Statement of Provincial Interest.
	Push back from local residence on watercourse buffers 100-foot watercourse buffer – bit above average There isn't a well-developed rationale for buffer distances in any case	Policy 3.5.1.1 a) (CMPS, p. 14)	Statement of Provincial Interest on Flood Risk Areas (does not bear specifically on any area in Cumberland)?	This is a key issue, especially for Oxford and Parrsboro, and, perhaps Advocate. Should more be done (e.g., flood plain mapping)?
Multi-jurisdictional Collaboration	Issues concerning cooperation between the County and the towns	Object 3.2.2 commits to “to cooperate with other municipalities in the protection of their municipal drinking water supplies;” (CMPS, p. 10)	Statements of Provincial Interest on Drinking Water Supply and Infrastructure	Need for reciprocal cooperation on provision of sewage collection and treatment.
	Issues between the County and the Town of Amherst			
	Number of conflicts over water and sewer issues between the towns and the County			
	Variety of conflicts between the County and the Town of Amherst over the extension of sewer services into areas of the County on the edge of Amherst			
There is good collaboration among the County, Parrsboro and Springhill – Oxford seems to sit to the side – while Amherst appears to compete with the County in most respects	The Oxford plan (OMPS) has extensive commitments to collaborate on provision of municipal services, flood mapping, and environmental protection. Others address water only. Springhill makes no reference whatsoever.			
Even though Chignecto is shared between Cumberland and Tantramar, the two jurisdictions have not traditionally or recently collaborated	None	None	No strong evidence of problems arising from lack of collaboration with Tantramar other than potential flooding issues in marshlands	

Issue Category	Issues Identified During Interviews	MPS Policy	Provincial Statements of Interest	Gaps/Further Questions
Other	New provincial approaches to watercourse protection in NB are intended to be more flexible but fears they will be more complicated	None	Statement of Provincial Interest on Flood Risk Areas	New Brunswick guidelines are only relevant as a potential model. No significant watercourses or water bodies cross the provincial boundaries.
	Concern with wildlife on the isthmus	None		
	Forestry roads have negative impact when water crossings have been installed incorrectly – blocks fish passage (inner bay of fundy salmon SARA COSWIC listed species in the area)	None		
	Opposition to wind farm proposal on Gulf Shore Road near Pugwash	Policy 3.3 addresses wind turbines (CMPS, pp. 12-13)		