

**Municipality of the District of St. Mary's**

**Municipal Climate Change Action Plan**



**Prepared by:**

St. Mary's Municipal Climate Change Action Committee  
Approved by Council December 2013

This document was adopted by Council for the Municipality of the District of St. Mary's on

December 16, 2013

Through the following resolution:

That the Council for the Municipality of St. Mary's endorses the recommendations described within the Municipal Climate Change Action Plan and amend the Integrated Community Sustainability Plan to include the Municipal Climate Change Action Plan.



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## 1. Overview of St. Mary's Municipality

The Municipality of the District of St. Mary's is located along the Eastern Shore, and is situated within the third largest county (Guysborough County) in Nova Scotia. It is bounded on the North by Antigonish and Pictou Counties, on the West by Halifax County, on the South by the Atlantic Ocean and on the East by the Municipality of Guysborough.

St. Mary's Municipality is divided into seven polling districts (see Appendix A) which combined make up a land mass of 1,909.59 km<sup>2</sup>. These districts are represented by seven councillors who are elected for a four year term. According to the figures from the most recent census in 2011, the municipality is home to 1,700 private dwellings with only 1,071 of these occupied by usual residents. The population sits at 2,354 residents, a decline of 233 from 2006. As with most municipalities across the province, St. Mary's is no different as its population is that of an aging one. Over 61% percent of the population is over the age of 45, of which 36% are over the age of 60.

The Municipality is comprised of a rural setting, approximately 65km from the nearest town/shopping centre. The main industries for the working community are agriculture/forestry/fishing and hunting, construction, and health care/social assistance. Occupations for the region contribute to sales/service, trades/transport/equipment operators, and natural resources/agriculture operators.

The St. Mary's River (from which the Municipality is aptly named) is situated in the heart of the Municipality, and at approximately 250 km in length it is one of the longest rivers in Nova Scotia. The river drains an area approximately of 1,350 km<sup>2</sup> and has four branches the West, East, North and Main.

St. Mary's is also home to the historic Sherbrooke Village Museum. Located on the main street of Sherbrooke, the museum depicts that of an actual working village in Sherbrooke from the late 1800's to the early 1900's. This museum houses 80 buildings (25 of which are open to the public), employs 16 full time & 70 seasonal staff, and this season past, drew upwards of 15,000 tourists to both the village and in turn surrounding businesses.

### Project Framework

As outlined in the Municipal Climate Change Action Plan Guidebook provided by SNSMR, the report was organized by the following steps:

1. Build a Municipal Climate Change Action Team
2. Identify the Impacts & Hazards
3. Identify the Affected Locations
4. Identify the Affected Facilities & Infrastructure
5. Review how these affect St. Mary's Municipality Socially, Economically, and Environmentally
6. Establish Priorities for Adaptive Actions



## **Municipal Climate Change Adaption Team**

As required by SNSMR, A Municipal Climate Change Action Team was created to direct the compilation of required information, and produce feedback to develop and complete project guidelines. These members include:

- Christa Webber, Community Development Officer
- Robert Jordan-Robichaud, EMO Co-ordinator
- Richard Kaiser, Superintendent of Public Works
- Paul Flynn, Department of Transportation, District Manager
- Brad Burns, RecPlex Facility Manager
- Debbie Torrey, Planning
- Jacqueline Dort, Councillor – District 6 & Vice Chair, Eastern Region Solid Waste Management Committee
- David Clark, Warden – District 3/5
- Michael Mosher, Deputy Warden – District 2
- Peggy Kaiser-Kirk, Councillor – District 8
- Debbie Findlay, Councillor – District 1
- Kevin Pye, Councillor – District 4
- Everett Baker, Councillor – District 7

## **Climate Change Hazards**

The Climate Change Action Team used a ratings system to determine which hazards were of most detriment to the Municipality of St. Mary's. This was established by ranking each possible hazard propelled by Climate Change in Atlantic Canada. Each hazard was rated by the team based on the following points:

- a. Severity of impact on the area in previous and possibly in future years
  - Severe
  - Moderate
  - Minor
- b. Frequency with which it occurs
  - Often
  - Sometimes
  - Rarely
- c. Size area it impacts
  - Large
  - Medium
  - Small

Those impacts that rated highly on these scales were then brought to the forefront, and reviewed in great length throughout the process.



## Affected Locations

Based on the Climate Change Hazards determined to have an impact on the St. Mary's Municipality, the action team collected, by district, a list of areas that are and possibly could be prone to risk today and in the future. These areas were then rated by the team as either **high, medium or low risk** depending on whether it affected the well-being of citizens, the frequency of which it could occur, and the damage it would project.

## Affected Facilities & Infrastructure

A list of all major and important infrastructures required for the livelihood and safety of St. Mary's residents was compiled. These were grouped by service and labeled by district. As St. Mary's covers a large land mass with a small population, it was imperative that each district was reviewed in detail. Although residents of St. Mary's share many municipal structures, most often times they rely on the facilities in their respective district (ie. Community halls, fire departments) in emergency situations. This is due to a great deal of time and space between districts. Facilities & Infrastructure were rated by the team with an overall **high, medium or low risk**. This encompassed the impact of the building to the municipality, its use in an emergency, the shape the building is in, and the level of hazard risk to the structure. Those that were rated high were explored in greater detail.

## Adaptive Actions

Data was reviewed by the team from each of the previous steps and the greatest at-risk hazards were prioritized. Each hazard was analyzed and adaptation measures established. Actions were arranged on a **short, medium, or long term basis**. This level of priority allows the municipality a time line in which to appropriately carry out each action based on available funds, staff, and Municipal guidelines.



Ecum Secum Community Hall/Fire Department on Wharf Loop



## 2. Impacts & Hazards

### What is Climate Change?

In today's society, there is a great deal of discussion surrounding our planet, and how our actions will affect its outcome, in either a positive or negative fashion. Many times we will hear the terms "global warming" and "climate change" interchangeably. Many believe that "climate change" is the new term that has replaced "global warming". This is not the case however, and it is necessary to know the difference between both terms in order to have a clearer understanding.

In short form, global warming is the "long term trend of a rising average global temperature" whereas climate change is "changes in the global climate which result from the increasing average global temperature". "Human greenhouse gas emissions are causing global warming, which in turn is causing climate change."

[www.skepticalscience.com/climate-change-global-warming.htm](http://www.skepticalscience.com/climate-change-global-warming.htm), Skeptical Science, (Global Warming vs Climate Change, Wayne, 08/01/2013)

"Climate change is already having a significant impact on ecosystems, economies and communities. Rising average temperatures do not simply mean balmy winters. Some regions will experience more extreme heat while others may cool slightly. Flooding, drought and intense summer heat could result. Violent storms and other extreme weather events could also result from the increased energy stored in our warming atmosphere."

<http://www.davidsuzuki.org/issues/climate-change/science/climate-change-basics/climate-change-101-1/>, David Suzuki Foundation, (What Is Climate Change?)

### Adaptation

While it is always the best solution to prevent situations before they occur, it is not always possible to do so. This may be for various reasons such as monetary restraints, resources, timelines, etc. For that reason, most often times we look to adapting to climate change.

"Adaptation is about making adjustments to the way we live, in order to better take advantage of new opportunities and challenges arising from inevitable changes in climate. Adaptation may require changes in how we construct our roads and buildings to ensure that our infrastructure is designed to withstand new climate conditions. It may also require changes in how we prepare for, and respond to, extreme events like storms, floods and droughts, since these impacts are expected to worsen in coming years."

In order to build our capacity to adapt to climate change, specific adaptation actions are available to lessen these risks. They are broken down as follows:

- **Anticipatory adaptation** - Taking proactive measures before climate impacts occur. Examples include developing emergency preparedness plans, or early heat alert warning systems.
- **Natural adaptation (Spontaneous/Autonomous)** - Adaptation that happens on its own. For example: Tourists come when the climate is right. As the sea level rises, new construction moves inland. Species move north with warmer weather.
- **Planned adaptation (Intervention)** - Adaptation that requires immediate action to address a current impact or vulnerability.



For example: Strengthening a building which has weathered an extreme event for instance, or the re-topping of a dyke to ensure it doesn't flood again.

[http://climatechange.gov.ns.ca/content/adaptation\\_basics](http://climatechange.gov.ns.ca/content/adaptation_basics), Climate Change NS (The Basics, NS Department of the Environment, 06/07/2011)

### Why is it Important?

With all of these climate changes taking place on our planet, it is imperative that we as a municipality are aware of the extremities that may transpire, in not just the days, but years, decades, and centuries to come. By using the tools available and assessing our municipality's current issues, we can determine which of these hazards will affect us in the future. Climate Change is already happening, and will continue to happen. Severe storm systems will continue to develop and eventually worsen. It is important to identify these risks and prioritize our actions of adaptation towards them so to ensure that we secure our future well-being as a community. A strategy for adaptation is both possible and necessary.

### Climate Change Hazards

Climate Change Hazard Matrix – Municipality of St. Mary's

Hazard	Severity			Frequency			Area			Total Risk
	Severe	Moderate	Minor	Often	Sometimes	Rarely	Large	Medium	Small	
Sea Level Rise		x			x			x		M
Erosion	x			x			x			H
Flooding	x			x	x			x		H
Landslides			x			NA			NA	L
Storm Surge		x			x			x		M
Hurricanes & Wind		x			x		x			M
Forest Fires			x			x	x			L
Drought			x			x			x	L

Climate Change Hazards are the weather related activities that have the greatest impact to an area. As shown in the chart above, there are various hazards that impact the Municipality of St. Mary's, with the most severe of those being Coastal Erosion and Flooding (Heavy Rainfall). These hazards then have a tendency to be fueled by a high-medium frequency of Heavy Winds. As the majority of the Municipality is a coastal community, built along one of the longest rivers in Nova Scotia, it stands to reason that as climate change continues to become a growing concern, these coastal hazards are likely to increase along with it.



- **Coastal Erosion:**

Coastal erosion is a natural process that consists of the breakdown (or “weathering”) of rock and sediments at the shoreline, both above and below the water surface. In Atlantic Canada, coastal erosion happens as a result of the action of waves, and to a lesser extent tidal action, wind, storm surge, ice, rain, and surface runoff.



Highway #7 Liscomb to Ecum Secum

Rates of erosion and deposition are different at different points on the coast. Factors such as exposure and tides can each influence the degree to which a shoreline may erode. Changes to climatic conditions and sea level will also influence the rates of erosion and deposition. Human activities can also affect rates of coastal change.

Climate change is expected to result in a rise in sea level and a reduction in sea ice, which will likely increase the rates of erosion in many locations along our coasts. Rising sea levels and more intense storm activity will cause beaches and barriers to migrate, or even disappear, as sediment is carried from one area to another. While it may be difficult to know the exact rates at which sea level will rise and shorelines will erode, both rates are nevertheless certain to increase.

<http://atlanticadaptation.ca/sites/discoveryspace.upei.ca/acasa/files/Coastal%20Erosion%20and%20Climate%20Change.pdf>, (Coastal Erosion & Climate Change, PEI Dept. of Environment, Labour & Justice, 2011)

- **Flooding (Heavy Rainfall):** A flood is an overflow of water that submerges land which is usually dry. Flooding can occur in many different ways and for various reasons. For the sake of this report, listed below are those that are feasible to cause flooding in St. Mary’s Municipality.

1. **Areal (rainfall related):** Floods can happen on flat or low-lying areas when the ground is saturated and water either cannot run off or cannot run off quickly enough to stop accumulating. This may be followed by a river flood as water moves away from the floodplain into local rivers and streams. Floods can also occur if water falls on an impermeable surface, such as concrete, paving or frozen ground, and cannot rapidly dissipate into the ground.

2. **Riverine:** River flows may rise to floods levels at different rates, from a few minutes to several weeks, depending on the type of river and the source of the increased flow. Slow rising floods most commonly occur in large rivers with large



Sonora Road Flood Area



catchment areas. The increase in flow may be the result of sustained rainfall, or rapid snow melt. Localized flooding may be caused or exacerbated by drainage obstructions such as landslides, ice, or debris.

3. **Estuarine and coastal:** Coastal areas may be flooded by storm events at sea, resulting in waves over-topping defences or in severe cases by tsunami or tropical cyclones. A storm surge, from either a tropical cyclone or an extra tropical cyclone, falls within this category.  
<http://en.wikipedia.org/wiki/Flood>, (Flood, 10/18/2013)

The primary cause of the flood types listed above are due to an over flow in water from an extreme rain fall as well the melting of heavy snow. As per the data tables below from the Climate Change Nova Scotia Website, the number of days with rain are expected to increase considerably over the next 67 years, with 5.9 additional rain days over this time span. Days of snow are expected to decrease, however the next 7 years are at a record high with the years to come still higher than snow days in the 1980’s. The intensity with which the rain is expected to fall will also increase at a rate of approximately 5% or more every 30 years. This combination of climate change spells certainty of increased flood patterns due to rainfall, as well as the intensity with which they occur.

#### Climate Change Data Scenario – Guysborough County

Parameter	1980’s	2020’s	SD	2050’s	SD	2080’s
Days With Rain	137.1	143.9	3.5	147.4	2.4	149.8
Days With Snow	24.5	42.6	8.4	34.2	5.8	28.4
Intensity Short Period Rainfall (%)	0	5	4	9	7	16

<http://climatechange.gov.ns.ca/adaptation/54#table>, Climate Change NS (The Basics, W. Richards Climate Consulting, August 2011)

In the last century, St. Mary’s has experienced four extreme flood events, with the culprit consisting of a heavy rainfall in conjunction with the jamming of ice cakes in the river. As the chart shows below, the freeze free season is set to increase substantially, which means less opportunity for ice to generate on the lakes and rivers. In another positive light, the rate at which the freeze-thaw cycles will occur is decreasing as well. The change in temperature pattern is causing these cycles to decline, suggesting less opportunity for ice cakes to take shape, resulting in decreased extreme flood events to occur from this origin.

#### Climate Change Data Scenario – Guysborough County

Parameter	1980’s	2020’s	SD	2050’s	SD	2080’s
Freeze Free Season	224.3	244.5	19.7	264.2	16	280.2
Freeze-Thaw Cycles-Annual	82.5	78.6	8.9	69.7	9.1	60.6
Winter	40.6	40.3	0.9	41.2	0.7	40.5
Spring	33.2	30.6	6.5	24.1	7.1	17.0
Summer	0.0	0.0	—	0.0	—	0.0
Autumn	8.7	7.8	3.3	4.5	1.4	3.1

<http://climatechange.gov.ns.ca/adaptation/54#table>, Climate Change NS (The Basics, W. Richards Climate Consulting, August 2011)

Coastal Erosion is also a large proponent to concerns for St. Mary’s. As a large portion of the municipality is situated on the Atlantic Ocean, the rise and fall of the sea level has a large impact on the expected damage. There is always the occurrence of erosion, as it happens naturally with the rise and flow of the tide. Over the next century, Guysborough County is set to see a total sea level rise of 110cm.



Over that time frame, many of the coastal communities situated on the Atlantic Ocean will be at a greater risk of damage due to erosion, whether it is damage to roads, residential homes or community structures (ie halls, wharves), loss of land acreage, or physical changes to beaches, eco systems, etc.

**Sea Level Rise Data Scenario – Guysborough County**

Return Period	Residual	Level 2000	Level 2025	Level 2055	Level 2085	Level 2100
<b>Total Sea Level Rise (m)</b>			0.16 ± 0.03	0.45 ± 0.15	0.86 ± 0.36	1.10 ± 0.48
<b>Extreme TSL-10 Yr Ret Period</b>	0.71 ± 0.20	2.56 ± 0.20	2.72 ± 0.23	3.01 ± 0.35	3.42 ± 0.56	3.66 ± 0.68
<b>Extreme TSL-25 Yr Ret Period</b>	0.81 ± 0.20	2.66 ± 0.20	2.82 ± 0.23	3.11 ± 0.35	3.52 ± 0.56	3.76 ± 0.68
<b>Extreme TSL-50 Yr Ret Period</b>	0.88 ± 0.20	2.73 ± 0.20	2.89 ± 0.23	3.18 ± 0.35	3.59 ± 0.56	3.83 ± 0.68
<b>Extreme TSL-100 Yr Ret Period</b>	0.95 ± 0.20	2.80 ± 0.20	2.96 ± 0.23	3.25 ± 0.35	3.66 ± 0.56	3.90 ± 0.68

<http://climatechange.gov.ns.ca/adaptation/54#table>, Climate Change NS (The Basics, W. Richards Climate Consulting, August 2011)

As evidence shows, climate change situations are expected to make an impact on the Municipality of St. Mary’s. These changes in events over the next hundred years, if not prepared for correctly, will most certainly take its toll. By prioritizing the areas that will be affected by the main hazards (flooding/coastal erosion) due to the environmental changes highlighted above, St. Mary’s will be equipped to protect at risk areas and limit the impact to the lively hood of its citizens.

Many of the areas of greatest impact in the Municipality currently have protection from the elements so to minimize the effects of damage. This may be from breakwaters, coastal cliff walls, and even forest walls. The Department of Transportation does its share of monitoring its infrastructure in the area and has its own priority levels to protect roads and bridges at risk. Protection is done through instances such as rocking up eroded walls, building newer/stronger bridges, digging larger culverts and the like.

While these current measures work at holding the elements at bay, it is imperative that Municipality explores the impact of climate change through this report, and play a part in adopting an added level of assurance to protect its citizens by all means available.



Lighthouse Road, Port Bickerton



### 3. Affected Locations

As discovered in the Climate Change Hazard Matrix in the previous section, the main cause for concern when speaking to climate change in the Municipality of St. Mary's is that of Coastal Erosion and Flooding (Heavy Rainfall).

The southern portion of St. Mary's is bounded by the Atlantic Ocean. The coastlines, having very little protection from the elements, often times leave themselves vulnerable. Coastal Erosion is always happening, and the rate and height at which the waves rise and fall are expected to increase over time due to changes in the climate. These changes in the sea levels, as well as aggravation from increased storm and heavy wind activity will speed up the erosion process. The Marine Drive, which travels the length of the Eastern Shore, incorporates multiple main "trunk highways" connecting coastal communities to one another as well as the Trans Canada. For the St. Mary's Area, "Trunk Highways" #7 and #211 are two key access points for the municipality, both of which run parallel with the Atlantic Ocean. A large number of communities have congregated along this coastal route, making members of the community and the highway vulnerable to Coastal Erosion.

The Municipality of St. Mary's and the famous St. Mary's River are synonymous with one another, with the river at the heart of the municipality and the shire town of Sherbrooke. The length of the river itself borders on a total of five counties: Guysborough, Antigonish, Pictou, Colchester, and Halifax. Running approximately 250km in length (102km of this is located in St. Mary's), St. Mary's River drains water from a large watershed of 1,350km<sup>2</sup>. It is comprised of two main branches in St. Mary's Municipality; East (56km long) and West (27km long) that meet 19km above the head of the tide. Flooding is a growing concern as the changes in climate continue to escalate. More consistent, heavy rainfall, snow storms and colder temperatures have the propensity to result in increased flooding activity in the municipality. Communities and main roadways that will be most affected are those in low-lying areas adjacent to the St. Mary's river.

As shown in the matrix below, there are multiple areas that have been identified by the team as hazard areas, namely affected by the act of Coastal Erosion or Flooding. The areas have been graded by their hazard level (**high, medium or low**) based on three factors; the frequency of which the hazard will occur, the severity of the outcome either in present day or the future, as well as the number of people it will affect. As the land area in St. Mary's is expansive, and the population quite small, in some cases these hazards will have a relatively limited impact on human activity. The level of impact a hazard area had on the livelihood of individuals meant the difference between a high and a medium or low hazard level. The hazard levels deemed high were explored in further detail, while those rating medium or low are reviewed as additional reference points when adopting an overall adaptation plan.



### St. Mary's Hazard Areas Matrix

DISTRICT	HAZARD AREA	HAZARD	HAZARD LEVEL
1 - Sherbrooke	Highway 7 Stillwater to Sherbrooke	Flooding	H
2 - Ecum Secum	Wharf Loop	Coastal Erosion	M
	Main Road - Marie Joseph to Ecum Secum	Coastal Erosion	H
3/5 - East & West River	Off Highway 348 Glenelg Church Road	Major Flooding	H
	Highway 7 Aspen	Flooding	L
	Off Highway 348 Westside Waternish	Major Flooding	H
4 - Sonora/Port Hilford	Sonora Road	Flooding	M
	Sonora South	Coastal Erosion	M
	Port Hilford Beach	Coastal Erosion	M
6 - Goshen	No Hazards	N/A	N/A
7 - Liscomb	McKinley Point Road	Coastal Erosion	L
	Little Liscomb Road	Coastal Erosion	L
	West Liscomb Road	Coastal Erosion	H
8 - Port Bickerton	Lighthouse Road	Washout	M

### High Areas of Concern:

#### Concern:

- **District:**  
2 – Ecum Secum  
7 – Liscomb

#### Area:

Areas of Highway #7 between Liscomb & Ecum Secum where the highway is in close proximity of the shoreline

#### Hazard:

Coastal Erosion due to high South Easterly winds increasing wave levels on the shoreline

#### Route:

Travelling either North or South along Highway #7 through the coastal communities of Liscomb, Marie Joseph, and Ecum Secum.

#### At Risk:

1. Coastal Erosion of the shoreline along Highway #7, leading to erosion and weathering of the roadway and bridges in areas in direct proximity of the shore.
2. Coastal Erosion of residential and community land resulting in loss of acreage and infrastructure.

#### Exits:

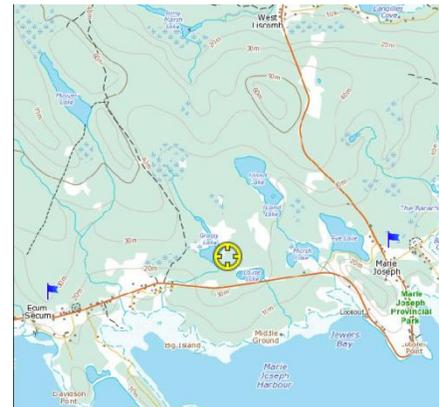
1. Highway #7 travelling South to Halifax Regional Municipality alternately to travel from
2. Highway #7 turn off near Ecum Secum to New Chester to either Sheet Harbour (Halifax)
3. Highway #7 turn off near Ecum Secum to New Chester to Glenelg (St. Mary's)
4. Highway #7 travelling North to Sherbrooke

#### Frequency:

1. Natural Erosion occurring constantly
2. Extreme Erosion occurring throughout the year during high South East Wind Storms

#### Preventative Measures:

Roadway is monitored. When required, shoreline is rocked up, back fill added, guard railed installed, and road fixed



Topographical View



**Concern:**

• **District:**

1 – Sherbrooke

**Area:**

Highway #7, Stillwater to Sherbrooke

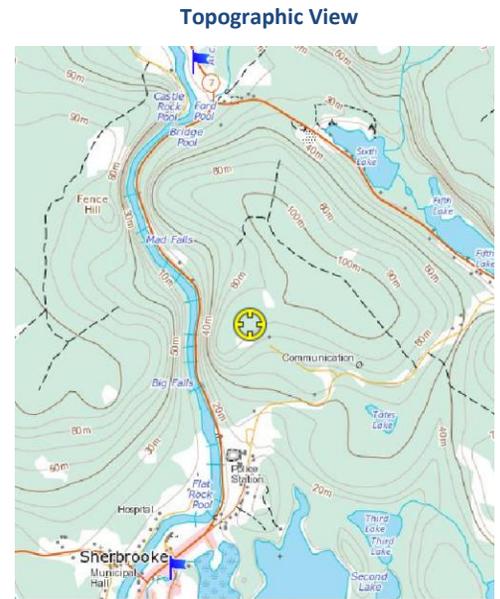
**Hazard:**

Flooding – winter/spring thaw

1. Combination of heavy rain fall & melting of heavy snow
2. Combination of heavy rain fall & ice jams in the river

**Route:**

1. Back end of Sherbrooke Village
2. South on Highway #7, starting at the intersection of Highway #7 & #211, taking a right angle turn at the entrance of Main Street of Sherbrooke, over the Sherbrooke Bridge, taking a right angle turn on the other side onto dead end Hospital Road. This route runs parallel with the St. Mary’s River on either side.



**At Risk:**

1. Back End of Sherbrooke Village as it is located by the river in a low lying area: Infrastructure at risk of flooding; Water Treatment Plant, Museum Barn & Museum Brigley House.
2. In an extreme flooding event the portion of Sherbrooke Village located along the river, Main Street, and along Hwy #7 to Hwy #211 intersection is at risk of flooding.
3. Hospital Road, Entrance is at risk of flooding as it is low lying with the river. It is a dead end road with no exit point and is home to a handful of residents & St. Mary’s Memorial Hospital. Those located on this road, including the hospital are at risk of being stranded.
4. Highway #7 low lying areas. Risk of road closure.

**Exits:**

1. Highway #7 travels North turning on Highway #211 to Port Bickerton
2. Highway #7 travels North turning on Highway #347 to New Glasgow
3. Highway #7 travels North turning on Highway #348 to New Glasgow
4. Highway #7 travels North continuing on to Antigonish
5. Highway #7 travels North turning off in Nine Mile Woods to Country Harbour.
6. Highway #7 travels South to Halifax Regional Municipality.

**Frequency:**

1. Minor Flooding in low lying areas 1-2 per year
2. Medium Flooding, one every few years
3. Extreme Flooding, four in the past century (1955, 1970, 1990, 2003)

**Preventative Measures:**

1. Water Treatment Plant – Built on an Elevated hill area
2. Brigley House – Basement Flooding – Furnace suspended off the floor
3. Sherbrooke Bridge – Built new in 1970, made sturdier and on raised incline
4. Road is closed until water subsides



**Concern:**

- **District:**

3/5 - East & West River

**Area:**

Intersection of Highway #348, Glenelg Church Road & West Side Waternish

**Hazard:**

Flooding – winter/spring thaw

1. Combination of heavy rain fall & melting of heavy snow
2. Combination of heavy rain fall & ice jams in the river

**Route:**

West onto Highway #348 off of Highway #7, over Silvers Pool Bridge to an intersection. Highway 348 continues straight through Caledonia towards New Glasgow.

Left at the intersection is West Waternish, and right is Glenelg Church Road.

**At Risk:**

The Highway #348/West Waternish/Glenelg Church Road intersection is in a low lying area with a fielded area on either side of the #348 leading to the intersection. This intersection is at risk of heavy flooding with a possible risk of road closure. Glenelg Church Road is situated next to a large lake (Glenelg Lake) and is the most at risk as the home owners on this road have the potential to be stranded.

**Exits:**

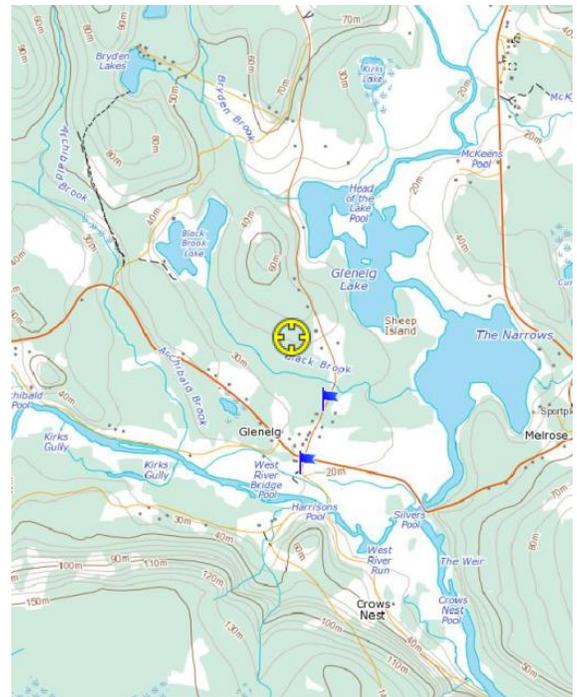
1. Highway #348 travels East to Highway #7
2. Highway #348 travels West to New Glasgow.
3. Church Road meets up with Highway #347 which continues to New Glasgow or can intersect with Highway #7
4. Waternish Road also loops back, connecting with Highway #7

**Frequency:**

1. Minor Flooding in low lying areas 1-2 per year
2. Extreme Flooding 1 in the past decade

**Preventative Measures:**

1. Road is closed until water subsides



Topographic View



**Medium/Low Areas of Concern:**

**Concern**

<b>Area:</b> Wharf Loop, Ecum Secum	<b>Hazard:</b> Coastal Erosion
<b>Issue</b>	Erosion of the Shoreline due to heavy winds/extreme storm system.
<b>Concern</b>	The Fire Department & Community Hall is located on the Wharf Loop Road in direct proximity to the shore line. As extreme climate change events occur in the future, the building will draw ever closer to the shore, until it is surrounded by water.
<b>Rating</b>	Medium - The breakwater provides a great deal of protection from heavy winds, lessening the effect of coastal Erosion. There are very few residents located on this road.

**Concern**

<b>Area:</b> Sonora South, Sonora/Port Hilford	<b>Hazard:</b> Coastal Erosion
<b>Issue</b>	Erosion of the Shoreline due to heavy winds/extreme storm system.
<b>Concern</b>	Damage and wearing of the road way, leading to possible road closure.
<b>Rating</b>	Medium – it is a main roadway mainly used for the communities of Sonora and Port Hilford, however it is not an intersecting main highway and there are alternate exits.

**Concern**

<b>Area:</b> Sonora Road, Sonora/Port Hilford	<b>Hazard:</b> Flooding
<b>Issue</b>	Flooding of the road way due to rain fall and ice jams
<b>Concern</b>	Road closure
<b>Rating</b>	Medium – it is a main roadway mainly used for the communities of Sonora and Port Hilford, however it is not an intersecting main highway, and there are alternate exits. There is one residential property in range of th

**Concern**

<b>Area:</b> Port Hilford Beach, Sonora/Port Hilford	<b>Hazard:</b> Coastal Erosion
<b>Issue</b>	Erosion of the Beach and the nearby bank of which the Sonora Road travels.
<b>Concern</b>	A brook runs through the beach flowing the ocean. Due to the course of the wind and wave pattern it can change its course of flow into the ocean. The shore is located below the elevated road way.
<b>Rating</b>	Medium – it is a main roadway mainly used for the communities of Sonora and Port Hilford, however it is not an intersecting main highway, and there are alternate exits. There is one residence in this flooding zone, and has caused erosion in proximity to the home. A rock wall has been ejected recently to reduce effects.

**Concern**

<b>Area:</b> Lighthouse Road, Port Bickerton	<b>Hazard:</b> Washout
<b>Issue</b>	Washout of private Lighthouse Road leading to the Port Bickerton Lighthouse Interpretive Centre due to heavy South East winds
<b>Concern</b>	Damage to the dirt road
<b>Rating</b>	Medium - Instances of washout situations occur outside of tourist season. This leaves time in the off season to make necessary repairs. Road was recently upgraded a couple years ago



### Concern

<b>Area:</b> MacKinlay Point Road, Liscomb	<b>Hazard:</b> Coastal Erosion
<b>Issue</b>	Erosion of the Shoreline due to heavy winds/extreme storm system.
<b>Concern</b>	Damage and wearing of the road way, leading to unsafe roads.
<b>Rating</b>	Low - there are no homeowners on this road. Improvements have been made recently (rocking, backfill, guardrail) to protect it.

### Concern

<b>Area:</b> Little Liscomb Road, Liscomb	<b>Hazard:</b> Coastal Erosion
<b>Issue</b>	Erosion of the Shoreline due to heavy winds/extreme storm system.
<b>Concern</b>	Damage and wearing of the road way, leading to unsafe roads.
<b>Rating</b>	Low - This is occurring at the dead end of the road with no homeowners directly affected.

### Concern

<b>Area:</b> Highway 7 Aspen, East & West River	<b>Hazard:</b> Flooding
<b>Issue</b>	Flooding of McKeen Court road way due to heavy rainfall collected due to beaver dam
<b>Concern</b>	Road closure
<b>Rating</b>	Low - Roadway affects only three residential homes. They are elevated from the flood zone and the pond area developed from the dam is used for personal use. Area is monitored by DOT and when water levels rise, dam can be lowered by 6 inches per day so as to eliminate the possibility of flooding onto Highway #7



## 4. Key Infrastructure

Listed below is a collection of infrastructure with key importance to the residents of St. Mary's. Each facility has been graded based on its propensity to be at **risk to climate change hazards**, as well as its **current condition** and its **impact on residents**. For structures with a medium or high rating, detail has been given to the reasoning behind its specified risk level. This will give council a deeper insight in the future on the risk areas for the highlighted structures, and how to prioritize involvement in these facilities going forward.

KEY INFRASTRUCTURE/SERVICES	District	Coastal/ Flood Zone	Municipal Impact	Facility Used For Emergency	Shape of Facilities	Facility Hazard	Risk
<b>Water Supply &amp; Treatment</b>							
Sherbrooke Water Treatment Plant	1	N	M	N/A	Sound	None	L
<b>Wastewater Collection &amp; Treatment</b>							
Sherbrooke Sewer Treatment Plant	1	Y	M	N/A	Sound	Flooding	M
<b>Municipal Buildings</b>							
St. Mary's RecPlex	1	N	H	Y	Minor Repairs Needed	None	M
St. Mary's Municipal Administration Building	1	N	H	Y	New	None	L
St. Mary's Transfer Station	7	N	H	N	Sound	None	L
Port Bickerton Lighthouse Interpretive Centre	8	Y	M	N	Minor Repairs Needed	Road Washout	M

**Sherbrooke Sewer Treatment Plant** (built in 1991) - Is situated in a low lying area near the St. Mary's River. Normal tide levels are 6ft, and the facility is built on an elevation of an additional 6ft for protection from flooding. The facility is a strictly sanitary waste facility and can withstand 80,000 gallons of fluid/day. When flooding levels occur, additional water is absorbed through the treatment process. This makes the system work harder and dispenses additional chemicals to treat the flood water in addition to the sanitary waste. In cases of high flood levels, more fluid may pump through the system than that which the 80,000 system can allow. Those gallons of water over the 80K mark will get treated by the chlorine, but due to the overflow ends up bypassing and does not get un-disinfected. As periods of heavy rainfall are expected to increase over time, this could amass to increased water flow bypassing the un-disinfection process, leading to elevated chlorine levels flowing into the river.

**St. Mary's RecPlex** (built in – 1998) – Structure is fairly new and has various energy efficient upgrades. It is a positive asset to the municipality for both recreation and emergency situations. In the past year the roof has suffered some leakage, and minor repairs were completed. These repairs will not withstand increasing climate change levels, especially which of heavy rain, and if left untreated would be detrimental to the shape of the facility.

**Port Bickerton Lighthouse Interpretive Centre** – This property includes the previous lighthouse and the light keepers' facility, and is used in the summer months as a tourist attraction. The property was acquired by the municipality in the past year through a divestiture from the province, upon which initial government funds were supplied to the municipality for upkeep. As both the facility and the private road leading up to it are situated on the coastline, they are both susceptible to heavy winds, and therefore road washout. As sea levels are expected to rise in the coming years, the roadway will be prone to increased washouts.



KEY INFRASTRUCTURE/SERVICES	District	Coastal/ Flood Zone	Municipal Impact	Facility Used For Emergency	Shape of Facilities	Facility Hazard	Risk
<b>Bridges, &amp; Wharves</b>							
Sherbrooke Bridge	1	Y	H	N/A	Sound	Flooding	L
Ecum Secum Bridge	2	Y	M	N/A	Major Repairs Needed	Coastal Erosion	M
Silvers Bridge	3&5	Y	M	N/A	Sound	Flooding	M
West River Bridge	3&5	Y	M	N/A	New	Flooding	L
Waternish Bridge	3&5	Y	M	N/A	Sound	Flooding	L
Lower Caledonia Bridge	3&5	Y	L	N/A	Sound	Flooding	L
Liscomb River Bridge	7	Y	M	N/A	Major Repairs Needed	Coastal Erosion	M
Indian River Bridge	8	Y	M	N/A	Sound	Coastal Erosion	L
Marie Joseph Government Wharf	2	Y	M	N/A	Upgraded	Coastal Erosion	L
Port Bickerton Wharf	8	Y	M	N/A	Sound	Coastal Erosion	L
Port Bickerton Lighthouse - Helicopter pad	8	Y	L	Y	Sound	Road Washout	L
Marie Joseph Helicopter pad	2	N	L	Y	Sound	None	L
Hewitt's Bridge	4	Y	M	N/A	Sound	Flooding	M
Sonora Wharf & Sonora Breakwater Wharf	4	Y	M	N/A	New	Coastal Erosion	L
<b>Power Utilities/Supplies</b>							
Municipal Generators	1	N/A	H	Y	Sound	N/A	N/A
Nova Scotia Power Depot (Supplies)	6	N	M	N	Sound	None	L

**Local Bridges & Wharves** - The Department of Transportation has an office situated in the community of Sherbrooke. They are required to monitor the condition of the roads, bridges and culverts throughout the municipality and the impact that climate change has on them. The Liscomb River Bridge has been impacted by coastal erosion, and is in need of major repairs. It is planned for repair in summer 2014 which will include concrete work and steel streamer to reduce the risk of erosion in future years. The Ecum Secum bridge in need of major repair as well. It is a main access point on Highway #7 between Ecum Secum and the Halifax Regional Municipality (HRM) county line. It is an important structure as it is located on a main highway route; however it is actually located in the HRM, giving them the responsibility to repair. As coastal erosion is always happening and extreme weather events such as rain and wind are expected to increase, the Ecum Secum Bridge is a growing concern. Loss of the bridge will force travellers to detour off of the main highway through an alternate route in New Chester.

KEY INFRASTRUCTURE/SERVICES	District	Coastal/ Flood Zone	Municipal Impact	Facility Used For Emergency	Shape of Facilities	Facility Hazard	Risk
<b>Police &amp; Fire</b>							
RCMP Station	1	N	H	Y	Sound	None	L
Sherbrooke & Area Vol Fire Dept	1	Y	H	N	Major Repairs Needed	Flooding	M
Ecum Secum Vol Fire Dept/Community Hall	2	Y	H	Y	Sound	Coastal Erosion	H
East River St. Mary's Vol Fire Dept/Community Centre	3&5	N	H	Y	Upgraded	None	L
Glenelg - St. Mary's & District Vol Fire Dept/Community Centre	3&5	Y	H	N	Deteriorating	Flooding	M
Caledonia - St. Mary's & District Vol Fire Dept Bay	3&5	N	H	N	Sound	None	L
Aspen - St. Mary's & District Vol Fire Dept Bay	3&5	N	H	N	Sound	None	L
Goshen - District #6 of the Mun. of St. Mary's Vol. Fire Dept.	6	N	H	Y	Sound	None	L
Liscomb Vol Fire Dept	7	N	H	N	Sound	None	L
Port Bickerton Community Centre/Seashore Vol Fire Dept	8	N	H	Y	New	None	L
<b>Hospitals &amp; Nursing Homes</b>							
St. Mary's Memorial Hospital (access to Helicopter pad)	1	Y	H	Y	Sound	Flooding	H
Maple Manor	1	Y	M	Y	Sound	Flooding	M
Highcrest Nursing Home	1	Y	M	Y	Sound	Flooding	M
EHS Base	1	N	H	N	Sound	None	L



**Ecum Secum Vol. Fire Dept./Community Hall** – This facility is used by the residents of the communities in district 2 (Ecum Secum). The building is a combination of fire department and community space, both utilized in the event of an emergency. The facility is built on Wharf Loop, which is located in close proximity to the coast line. Coastal Erosion is at risk to wear the shoreline and over time, up to the base of the facility. This puts the structure at risk of loss to the community and must be a high level of concern for those in charge of the facility, including the Municipal EMO Team.

**St. Mary’s Memorial Hospital-** Hospital Road runs parallel with the St. Mary’s River and the road entrance, as it is in a low lying area, is prone to flooding. In an extreme flood event, the road is at risk of being impassable, leaving people stranded as there is not alternate escape route. In the event of an emergency to bring in or evacuate residents, a chopper life line is required. Flooding does not raise high enough to affect the hospital facility; however the possibility of no escape road is a risk to those in need of hospital care.

**Sherbrooke & Area Vol. Fire Dept.** – This is an ageing facility, built on an extremely small lot on top of a brook leading to the St. Mary’s River. The current facility is in need of repair and is at risk of flooding and erosion due to its proximity to the river. A much larger facility, built on high ground nearby the local school has been purchased. The Department has plans to upgrade this building to supply adequate surroundings for their needs, and reduces the risk of climate change affects to their current facility.

**St. Mary’s & District Vol. Fire Dept./Community Centre (Glenelg)** – This fire department has three different facilities, a fire dept./community centre in Glenelg, and fire truck bays in Caledonia and Aspen. Both bays are in sound condition and not located near coastal or flooding zones. The Community Centre/Fire Dept. in Glenelg however is deteriorating and is located in a flood zone. As a sound structure is required in Glenelg, the department is looking to remove the building on the property in Glenelg and relocate the building in Aspen (which is on a concrete slab) in its place. With the removal of the deteriorating building, neighbouring East River has a large community hall that Glenelg residents can utilize and a fire department for Aspen residents.

**Maple Manor/Highcrest Nursing Home** – Both facilities are located in low lying areas and their basements are prone to flooding. There are 21 residents in Maple Manor and 39 in the nursing home. These residents are high risk during a natural disaster because of age and vulnerability. Nursing Home facility has a backup generator source during power outages and plan is in place to move residents to hospital if necessary. The Maple Manor has a propane generator that provides a heat source during emergencies. Recently both facilities have had upgrades including roof, windows, furnace, etc.



KEY INFRASTRUCTURE/SERVICES	District	Coastal/ Flood Zone	Municipal Impact	Facility Used For Emergency	Shape of Facilities	Facility Hazard	Risk
<b>Schools</b>							
St. Mary's Academy	1	N	H	Y	Upgraded/New	None	L
<b>Community Buildings</b>							
St. Mary's Lions Hall	1	N	M	Y	Sound	None	L
Greenfield Oldsters (includes EHS Base with 6 nurses)	3&5	N	M	Y	New	None	L
IHL/Jordanville Community Centre	4	N	M	Y	Sound	None	L
Sonora Community Centre	4	N	L	N	Minor Repairs Needed	None	L
Goshen Community Centre	6	N	M	Y	Sound	None	L
Liscomb Legion	7	N	M	Y	Sound	None	L
<b>Other</b>							
DOT Infrastructure Renewal Office	1	N	H	N	Sound	None	L
DNR Office	1	Y	M	N	Sound	Flooding	L
DFO Office	1	N	M	N	New	None	L
Country Harbour Ferry	8	Y	M-H	Y	Sound	High Winds/Sea Level	M
Canadian Coast Guard Vessel	8	Y	H	Y	Sound	High Winds/Sea Level	M
Sherbrooke Village	1	Y	H	Y	Sound	Flooding	H
Liscombe Lodge	7	Y	H	Y	Sound	None	L
St. Mary's Smokehouse	1	N	H	N	Sound	None	L
Scotia Pallets Ltd.	6	N	H	N	Sound	None	L

**Sherbrooke Village** – This historical living museum is owned by the province. The back portion of the village is prone to flooding as it is situated in a low lying area. The barn area and Brigley house (hands on history program) are more frequently at a risk of flooding after a very heavy rain fall. In the event of an extreme flood event, the village road situated in close proximity to the river could be at risk to similar flood issues. This would encompass a number of working buildings that are used as part of the village tour such as the tailor, pottery shop, post office, etc. As the village employs approximately 86 staff members and brings approximately 15,000 visitors to the municipality annually, the issue of a possible flood hazard is a growing concern.



## 5. Considerations

- **Social Considerations**

In regards to the services provided by the Municipality, the most important of all is to protect the well-being of its citizens. The best way to ensure all residents are cared for is through an Emergency Measures Plan. In case of the threat of a natural disaster, it is imperative that the Municipality have in place policies and procedures for every type of emergency. Not only must this be made aware to municipal staff, but to residents as well. By being proactive to changes in the climate, the municipality can better anticipate potential events and the risks associated with them.

**Concern:** Seniors

**Impact:** The municipality has a population of an ever ageing one. Many seniors may live alone, have mobility issues, and/or no access to a vehicle. In the event of an evacuation due to an extreme event (ie. flood, road closure, fire) they may not be able vacate the premises without assistance.

**Adaptation Measures:** Update the Emergency Measures Plan to incorporate all at risk seniors in each district and relatable concerns towards them in the event of an emergency.

**Concern:** Individuals with special health conditions

**Impact:** Individuals with special health conditions (i.e. require oxygen) may require assistance in the event of a power outage such as the use of a generator

**Adaptation Measures:** Update the Emergency Measures Plan to include a list of all citizens in St. Mary's Municipality who have special health conditions, as well as the accompanying procedures to be carried out to ensure their safety.

**Concern:** Residents living in flood zones

**Impact:** Residents living in flood zones may become stranded in their homes for a period of time. They may require supplies, prescriptions, or medical attention during this time

**Adaptation Measures:** Update the Emergency Measures Plan to include a list of all citizens in St. Mary's Municipality who are at risk of being stranded due to flooding. Include community members who have the ability to assist, ie. access to boat, special radio unit, generator, etc .

**Concern:** Residents living on coastlines

**Impact:** Residents living on coastlines are at risk of the effects of coastal erosion on their homes or property. If they are in close proximity to the shore, their main roadways and home may be at risk to damage.

**Adaptation Measures:** Work with Department of Transportation to ensure affected roadways are monitored to standard safety level. Educate residents on effects of coastal erosion, related bylaws, and Emergency Measures Plans.



**Concern:** Volunteer & Emergency services

**Impact:** Volunteer & Emergency services are extremely important in cases of disaster events. It is imperative that they have Emergency Measures Plans in place and that infrastructure and equipment is in working order in the event of a disaster. In some instances residents may be required to evacuate their homes and take shelter in community facilities. It is important that the necessary services are available.

**Adaptation Measures:** Work with department heads from essential community halls and fire departments to ensure all is in working order. Work with EMO coordinator to ensure an EMO plan is in place for each district and distributed.

- **Economic Considerations**

The effect of climate change events on the local economy is an important aspect to consider, as it is what drives the day to day operations of the municipality. It is important to understand how extreme weather events can impact the livelihood of residents throughout the municipality so as to ensure the proper procedures are in place to control the outcomes where possible.

**Concern:** Fishery

**Impact:** Increased sea level rise, storm events and flooding can potentially damage fishery facilities such as boats, wharves, storage buildings, and equipment. Severe weather systems can also decrease the number of days that are available for fishing.

**Adaptation Measures:** Encourage fishermen to consider climate change hazards and adaptation strategies. Monitor for any ongoing concerns.

**Concern:** Forestry

**Impact:** Increased amounts of rain fall and flooding can affect the root system of trees, thereby threatening resources

**Adaptation Measures:** Confer with the local Department of Natural Resources for at extreme risk areas and encourage developing adaptation strategies through restoration projects.

**Concern:** Tourism

**Impact:** Increased rainfall decreases the number of days available for tourists to travel. Flooding and road washouts at tourist attractions such as Sherbrooke Village or Port Bickerton Lighthouse may either close facilities for repair, or deter travellers from visiting.

**Adaptation Measures:** Encourage Department of Transportation to build larger culverts as well as monitor storm sewer systems, reducing flooding on the road ways. Monitor roadway to Port Bickerton Lighthouse and build up the rock wall where necessary. Encourage the provincially owned Sherbrooke Village to adapt a flood protection plan.



**Concern:** Local Business

**Impact:** Flooding resulting in road closure can affect goods from entering and exiting the area. This can also result in limited customer flow. Power outage from high winds for an extended period of time can spoil supplies resulting in loss of funds.

**Adaptation Measures:** Encourage business owners to consider climate change hazards and adaptation strategies (such as purchasing generators or water pumps). Work with Nova Scotia Power to prioritize repair to any troublesome power lines.

**Concern:** Municipal Services

**Impact:** In the case of the Water Treatment Plant, heavy rainfall causes turbidity (discolouration) in the water supply from the lake system. Greater resources are required to reverse the process to be used for consumption.

Climate change events cause wear and tear on municipal structures, causing more frequent repairs. Funds used to make repairs may result in the loss of an alternate service. Heavy wind may result in the loss of power at municipal structures, resulting in the closure of services or the inability to have the service in an emergency situation.

**Adaptation Measures:** Monitor the frequency of instances of turbidity at the water treatment plant and its cost to reduce. Explore less cost invasive options. Monitor municipal facilities, and regularly prioritize their levels of necessary repair to ensure repairs are made before facility weakens.

- **Environmental Considerations**

In a rural municipality such as St. Mary's, the environment and the nature that surrounds it is a large proponent to why residents choose to live here. The impact of severe climate change can be seen all around the municipality. Events such as coastal erosion and high winds can wear the coastline, damage recreational trail systems, and alter varieties of local wildlife.

**Concern:** Contamination

**Impact:** Circumstances of extreme flooding exceeding the waste water capacity at the Sewer Treatment Plant could result in high levels of non, un-disinfected water returning into the river system causing possible contamination.

**Adaptation Measures:** Monitor water levels flowing through the Sewer Treatment Plant. If the levels exceed capacity levels on a consistent basis, causing extreme contamination levels, alternate solutions such as reviewing building a larger water system could be explored.

**Concern:** Wildlife

**Impact:** Warmer average temperatures (ie mild winters) are causing an increase in the natural habitat in the St. Mary's area. Canada Geese are seldom flying south as mild winter temperatures are not requiring them to do so. A higher number of Black Bears are surviving the winter as in previous years as there are far less extremely cold days and very few are lost to natural causes from freezing temperatures. Canada Geese are affecting local farms' corn crops, and Black Bears are seen more frequently around residential areas looking for food.

**Adaptation Measures:** Encourage Department of Natural Resources to monitor the wildlife population and control as required if considered a detriment to the public's safety.



**Concern:** Parks & Protected Areas

**Impact:** Increased climate change events causing extreme effects from flooding, high winds, and Coastal Erosion creates damage to local provincial parks and trails. Trails experience washout, dead trees fall blocking passage way, and banks and shoreline are weathered away causing the area to be unsafe.

**Adaptation Measures:** Promote and encourage the preservation of these parks and trails to local residents. Utilize various grants that may be available from all levels of government for financial aid, or involve the recreation department in taking part in not-for-profit groups aimed at park preservation such as “Friends of Stonewall Park”.

**Concern:** Deforestation

**Impact:** The deforestation process has the potential, in situations of heavy rain fall, to cause erosion of soil due to water runoff, siltation of water courses in the river affecting fish spawning grounds.

**Adaptation Measures:** Discourage deforestation in areas involving greatest impact to river water courses and habitat.



Example of Deforestation in St. Mary's

## 6. Priorities for Municipal Action

### Priority #1

<b>Priority:</b>	#1 - Revise in great depth the Municipal Emergency Measures Plan
<b>Goal:</b>	Medium Term
<b>Hazard:</b>	Flooding
<b>Details:</b>	<p>Create a Municipal EMO team with the EMO Co-ordinator as the lead</p> <ul style="list-style-type: none"> <li>-Include dept heads from other services (ie hospital, nursing home, school, etc.)</li> </ul> <p>Develop a detailed Municipal EMO plan to encompass:</p> <ul style="list-style-type: none"> <li>-All hazards to the municipality &amp; follow through scenarios</li> <li>-An updated list of contacts and their information</li> <li>-A list of all at risk citizens &amp; their needs</li> <li>-Create a disaster clean up EMO plan for the transfer station</li> <li>-Create an EMO plan for each district by working with fire depts &amp; local citizens</li> </ul> <p>Educate all residents of the Municipality on the newly constructed EMO plan</p>

### Priority #2

<b>Priority:</b>	#2 - Awareness of local Fire Departments
<b>Goal:</b>	Short Term
<b>Hazard:</b>	Infrastructure
<b>Details:</b>	<p>Prepare for an annual meeting to involve:</p> <ul style="list-style-type: none"> <li>-Councillors</li> <li>-Representative from each local Fire Department</li> <li>-EMO Co-ordinator</li> </ul> <p>Discuss conditions of facilities &amp; EMO procedures</p>

### Priority #3

<b>Priority:</b>	#3 - Replace the RecPlex Roof
<b>Goal:</b>	Short Term
<b>Hazard:</b>	Infrastructure
<b>Details:</b>	Adapt as a priority in the Municipal budget

### Priority #4

<b>Priority:</b>	#4 - Review Municipal Land Use Bylaws
<b>Goal:</b>	Medium Term
<b>Hazard:</b>	Coastal Erosion
<b>Details:</b>	<p>Review Municipal Land Use Bylaws in regards to:</p> <ul style="list-style-type: none"> <li>-Flood Plain Development</li> <li>-Coastal Erosion Set Back</li> </ul> <p>Set up meeting with Council and the Planning Dept to discuss further measures</p> <p>Amend Land Use Bylaw where possible to incorporate Coastal Erosion issues</p> <p>Amend other areas of the Land Use Bylaw where applicable</p> <p>Educate the residents of St. Mary's on the newly amended Land Use Bylaw</p>

### Priority #5

<b>Priority:</b>	#5 - Review Constructing Emergency Access Road from Hospital Road
<b>Goal:</b>	Long Term
<b>Hazard:</b>	Flooding
<b>Details:</b>	<p>Council to revisit the option of clearing an Emergency Access Road from Hospital Road</p> <p>Speak with affected residents to adopt this Emergency Access Road</p> <p>Consider alternate routes/options to aforementioned road</p>



## Mitigation

### Energy Changes Made by St. Mary's Municipality

#### 1. Green Globes 4 Certified Administration Building

##### Architectural Features:

- Building is well insulated: walls R30, roof R60, under floors and foundation walls insulated to R10.
- Energy efficient windows: triple glazed, argon gas filled, low-E.
- Low VOC in materials and finishes.
- All occupied spaces have operable windows to allow for natural ventilation.
- Siding is fiber cement which contains recycled content and is manufactured with a process which conserves energy and water. The product has superior durability and the finish has an extended service life.
- The insulated concrete floor acts as a thermal mass for the in-floor radiant heating system.

##### Mechanical Features

- In-floor radiant heating and cooling
- Low flow toilets
- Heat recovery ventilation system
- Demand water heater for low usage sink in Community Room which is remote from hot water heater.
- Heating zoned to correspond with various usage patterns of building.

##### Electrical Features

- Daylight and occupancy sensors control lighting.
- Use of natural light where possible.
- Light fixtures energy efficient LED.
- Energy Star appliances used in building

#### 2. St. Mary's Sherbrooke Utility Enhancement Project

Energy Audit was completed of all buildings owned and operated by the Municipality with several opportunities identified with great potential to reduce GHG emissions and increase efficiencies. Upgrades to the water and sewer plants were deemed to be of the most beneficial and was completed by February 2011. Upgrades included:

- Replaced roto phase converter to variable speed at the sewer treatment plant giving operators ability to determine when and at what rate to run the pumps rather than pumps running at constant speed at all times.
- Added differential pressure switches for inlet air filters on blower to indicate filter changes and reduce blower power consumption at sewer plant
- Add doorway and louver for generator and electrical room to reduce heat loss in water treatment plant

#### 3. Education of Efficiency NS to community

- Promotion of Efficiency NS programs to all local business and not for profit groups
  1. Clean NS Program
    - a) Established free efficiency upgrades for 49 local businesses/facilities
  2. Business Energy Rebates Program
    - a) Established free efficiency audits for seven local businesses/facilities



#### **4. Recplex Facility Upgrades**

Energy Audit was completed in 2009 and upgrades included:

- Added extra insulation to ceiling creating increased efficiency for the refrigeration plant
- Replaced all lighting with LED

#### **5. Introductions of Programs to the St. Mary's Waste & Recycle Program**

- Mandatory Clear Bag Program was introduced by Council in November, 2005
- Blue bag recycling program is in place
- Universal Pick Up was introduced by Council in July, 2011. The previous system was a pay as you go. This reduced roadside waste and illegal dump sites considerably.
- Derelict vehicle program is in place
- Curbside Heavy haul program is operated once or twice annually as determined by Council. This also has reduced roadside waste and illegal dump sites.

### **Future Plans to Reduce Energy by St. Mary's Municipality**

#### **1. Transit Feasibility Study**

- The consultant firm of MMM Group was hired to conduct a Transit Feasibility Study for the Municipality of St. Mary's, funded by the Province through the NS-TRIP program. Although dependant on the outcome of the study, it is hoped that it will be feasible to operate a public transit system of an appropriate format for the Municipality of St. Mary's.

#### **2. Council to adopt BOMA BESt ( Building Environmental Standards) for an efficient manner of operating the Municipal Administration Building.**

- BOMA BESt is the only assessment and certification program of its kind for commercial buildings in Canada. The Program provides a consistent framework for owners and managers to critically assess six key areas of environmental performance and management:
  - a. Energy
  - b. Water
  - c. Waste Reduction and Site
  - d. Emissions and Effluents
  - e. Indoor Environment
  - f. Environmental Management System

#### **3. Active Transportation**

- St. Mary's Recreation Department is planning to develop an Active Transportation Plan that will incorporate current activities and equipment (bikes, snowshoes, etc) and build on it. For an example, this would promote a share the road program and introduce bike lanes.

#### **4. LED Street Light**

- The Provincial Government has mandated each municipal unit to change all street lights to LED within the next seven years.



**Appendix A**  
**Boundary Map – Municipality of St. Mary's:**

