

Water Quality Remediation and Public Outreach

Final Report



By:

The Shediac Bay Watershed Association Inc.
Johanne Paquette

March 1, 2013

ACKNOWLEDGEMENTS

The Shediac Bay Watershed Association Board of Directors sends thanks to the numerous groups and individuals that contributed to making our programs a success again this year. In particular, the SBWA extends its appreciation to following individuals and organizations for their interest and involvement with the Shediac Bay Watershed Association during the 2012-2013 fiscal year.

- New Brunswick Environmental Trust Fund
- Fisheries and Oceans Canada
- Environment Canada
- Shell Environmental Fund
- New Brunswick Department of the Environment and Local Government
- New Brunswick Department of Agriculture, Fisheries and Aquaculture
- Shediac Market in the Park
- Groupe de développement durable du pays de Cocagne
- South-eastern Anglers Association
- Centre culturel et sportif de Cormier-Village (Ecoparc Cormier-Village)
- Vision H2O
- NBEN
- Town of Shediac
- Shediac Bay Marina
- Dupuis Printing
- Branch Design
- Encorp Atlantic
- Coop Atlantic, Shediac
- Ecole Mgr-Francois Bourgeois
- Shediac Cape School
- *Homarus*, Maritime Fishermen's Union
- University of Moncton
- Moniteur Acadien
- Etoile Shediac
- Acadie-Nouvelle
- CBC News
- Rogers TV
- Atlantic CTV News
- Times & Transcript
- Great Canadian Shoreline Cleanup
- Bassin versant de la baie de Caraquet
- R. J. Daigle Enviro
- Club les ami(e)s de la nature du Sud-est

TABLE OF CONTENTS

1	INTRODUCTION	4
1.1	Description of the Shediac Bay Watershed Association	4
1.2	Overview of the Shediac Bay Watershed’s Region.....	4
1.3	Water Quality Remediation and Public Outreach program	7
2	SHEDIAC AND SCODOUC RIVERS WATER QUALITY MONITORING	9
2.1	Introduction.....	9
2.2	Material and Methods	10
2.2.1	Water Quality.....	10
2.2.1.1	Macro-Invertebrate Survey	10
2.3	Results.....	Error! Bookmark not defined.
2.3.1	Shediac and Scoudouc Rrivers Physico-chemical Characteristics	10
2.3.1.1	Water Temperature	10
2.3.1.2	Dissolved Oxygen	10
2.3.1.3	Potential Hydrogen	Error! Bookmark not defined.
2.3.1.4	Conductivity.....	11
2.3.1.5	Nitrate-Nitrogen.....	11
2.3.1.6	Total Phosphorus	11
2.3.1.8	Escherichia coli	Error! Bookmark not defined.
2.3.1.9	Macro-Invertebrate Survey	Error! Bookmark not defined.
2.3.2	Shediac and Scoudouc Rrivers General Characteristics	12
2.3.2.1	Rivers General Morphology	Error! Bookmark not defined.
2.3.2.2	Riparian Zones	12
2.3.2.3	Substrate.....	13
2.4	Discussion.....	13
3	PARTNERSHIP WITH STAKEHOLDERS	14
3.1	Stakeholders and Partnerships	14
4	HABITAT AND WATER QUALITY ENHANCEMENT.....	16
4.1	Community Aquatic Community Program.....	18
5	PUBLIC OUTREACH AND EDUCATION	21
5.1	Meetings and Information Sessions / Workshops	Error! Bookmark not defined.
5.2	Beach Sweep.....	21
5.3	Education and Awareness.....	Error! Bookmark not defined.
5.4	Social medias	Error! Bookmark not defined.
6	CLOSING COMMENTS	2
7	Annexes.....	17

INTRODUCTION

1.1 Description of the Shediac Bay Watershed Association

The Shediac Bay Watershed Association (SBWA) was founded in 1999 as a result of growing concerns from local community residents over the ecological health of Shediac Bay. In order to establish a long-term water quality-monitoring program, a community-based association was formed.

The Shediac Bay Watershed Association vision and mission statements are as follows:

Our Vision – Communities working together to foster a healthy ecosystem that will sustain the quality of water for future generations.

Our Mission – The SBWA will accomplish its vision through education and community stewardship.

The Board of Directors includes the following members:

Mr. David Dunn, President	Mr. Bob Ford
Mr. Armand Robichaud, Vice-President	Ms. Connie Doyle
Mr. Victorin Mallet, Past President	Ms. Frances Kelly, Secretary
Mr. Bill Murray, Past President	Ms. Helen Hall, Treasurer
Ms. Dominique Audet	Mr. Erick Bataller
Mr. Pierre Landry	Mr. Léo-Paul Bourgeois

The Shediac Bay Watershed Association gratefully receives guidance, donations and in-kind support from various organizations and interest groups. SBWA has a database of over 325 stakeholders consisting of business-owners, industry, foresters, farmers, local residents, cottage owners, recreation boaters and swimmers, conservation groups and community organizations within the Shediac Bay Watershed.

1.2 Overview of the Shediac Bay Watershed

The Shediac Bay Watershed covers 400 km² of land area and stretches along 36 km of coastline, from Cap Bimet to Cap de Cocagne (Fig. 1). The Shediac Bay Watershed is composed of two major river systems emptying into Shediac Bay: the Shediac River and the Scoudouc River. The Shediac and the Scoudouc rivers are characterized by dendritic patterns of small tributaries covering a watershed of 201.8 and 143.3 km², respectively. The Shediac River is composed of two major water arms. The northern water arm is created by the convergence of the McQuade Brook, the Weisner and the Calhoun Brook. The southern large water arm of the Shediac River is the continuation of the Batemans Brook. Water velocity in both rivers is generally weak due to the gentle regional elevation. The watershed boundaries stretch into both Kent and Westmorland County and cross into both the Shediac and Moncton Parish. During summer, the Watershed region consists of a population of approximately 15,000 people.

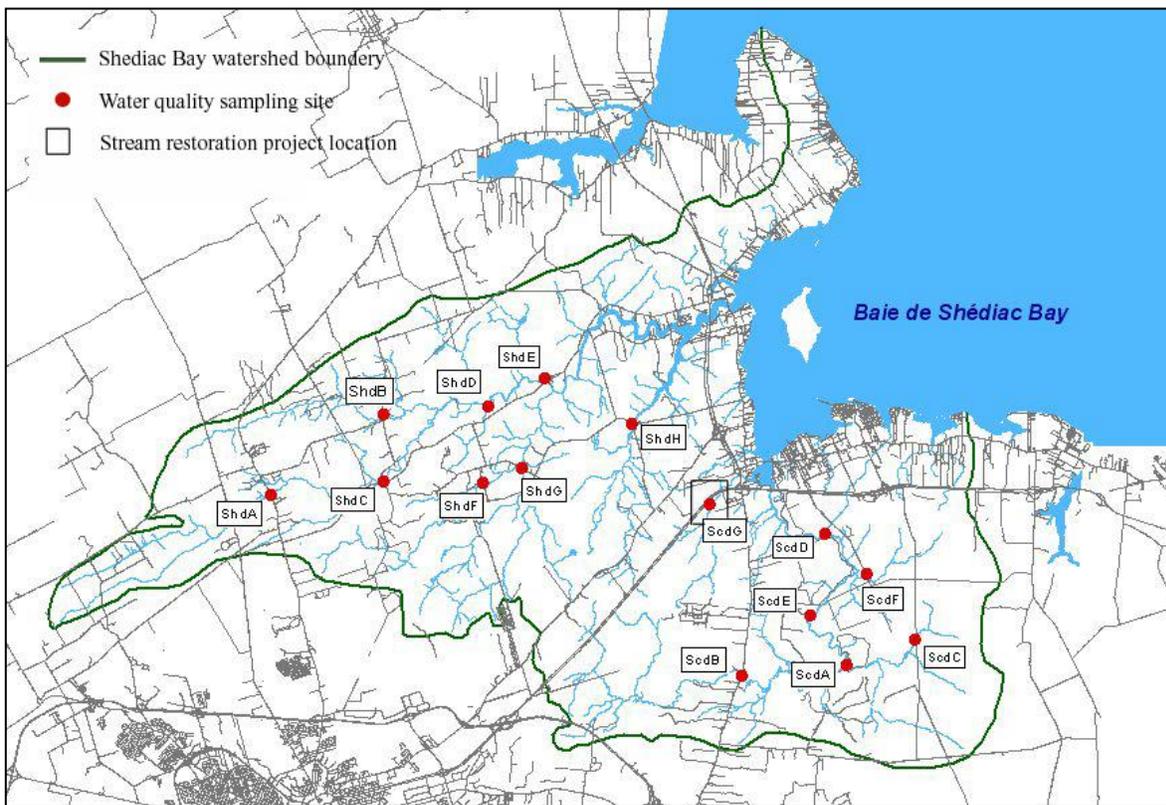


Figure 1 : Map of Shédiac Bay watershed including water quality sampling site and stream restoration locations



Figure 2: Shediac Bay Flood in January 21, 2000.

Crédit: R. J. Daigle Enviro

By the 2050s, flood levels are expected to be 40 cm higher, and by 2100, one metre higher than what we expect today.

Climate Change links:

NB Climate Futurs Maps: <http://www.acasamaps.com/index.html>

Climate Change in Atlantic Canada: <http://www.climatechangeatlantic.com/>

1.3 Water Quality Remediation and Public Outreach program

Table I: Summary

Project	Facts
1) Develop comprehensive remediation plans by working with stakeholders	-Meeting with industries throughout the watershed
2) Public education	<p>-Conduct 12 educational environmental presentations classrooms in local schools</p> <p>-1 tree planting event for the National Tree Day with MFB school, parents and volunteers</p> <p>-1 event with local boaters and marina users</p> <p>-50 awareness survey for 50 businesses in the watershed</p> <p>-One bilingual newsletter to the public throughout the watershed relaying information on current watershed issues and current SBWA projects and events.</p> <p>-8 Environmental Education Sessions at the Shediac Farmers Market. The SBWA Information Booth was displayed at Shediac’s Market In The Park every second week in 2012. App. 5000 visitors during summer.</p> <p>-App. 350 documents, brochures, books, DFO posters distributed to the public. The topics are Climate Change, Energy Efficiency, Energy Conservation, Water Conservation, Green Boating, Aquatic Invasive Species, Riparian Health and Management, Beach Sweeps, Keep Water Clean, Organic Gardening, Eat Local, Environmental Stewardship and more)</p> <p>-Our aquarium has attracted the attention of many visitors this summer. The aquarium is used to better understand the habits of green crabs. It’s a reproduction of a salty water</p>

	<p>habitat and a teaching tool.</p> <p>-Environmental Education on social medias and public awareness.</p>
3) Partnerships	<p>-At least 25 new strong partnerships will be created with stakeholders, government and other ENGOS.</p> <p>-One conference meeting with DFO in Moncton and 2 conferences in Fredericton (Climate Change and Biodiversity).</p> <p>-Meet regularly with other ENGOS and Associations (ex. Vision H2O) to identify how we can efficiently work together and share expertise.</p> <p>-6 interviews with the medias</p> <p>-1 important Oyster Restoration Project in collaboration with <i>Homarus</i> (MFU). As a keystone species, oysters are filter feeders and provide habitat for many marine species.</p>
4) Monitor Water Quality	<p>-Water quality testing and monitoring was conducted between June and October 2012. Sampling sessions were conducted on a monthly basis at 14 sampling sites (former Water Classification sites). We are working on the analysis of all the water data collected by SBWA for the annual general report.</p> <p>-Community Aquatic Monitoring Program (CAMP) with DFO during summer.</p>
5) Beach Survey and Beach Sweeps	<p>-2 events aimed to combat marine litter and contribute to the protection and conservation of our marine environment at Shediac Bay Marina. The first beach sweep was held on June to celebrate World Oceans Day and the second event in September with 65 participants. Students from MFB school in Shediac, teachers, community workers and volunteers all pitched in to collect more that 200 kg of litter.</p>

The *Water Quality Remediation and Public Outreach Program* focuses on continuing remediation efforts within the Shediac Bay Watershed. The program also focuses on forming partnerships, environmental education and water quality monitoring. The following objectives are set within this program

1) Conduct water quality monitoring

- Water quality physico-chemical parameters monitoring
- Bio-indicators monitoring (macro-invertebrates, fish abundance and diversity)
- Creation and promotion of the status of the watershed , webpage and social medias.

2) Continue environmental education and public awareness projects (Market in the Park, Community events, environmental education on social media, beech sweeps, tree planting, environmental education in schools, Community garden)

3) Continue forming partnership with other groups and organizations

2 SHEDIAC AND SCOUDOUK RIVERS WATER QUALITY MONITORING

2.1 Introduction

A detailed analysis of the water quality was initiated in 2007. Additional parameters were measured (nitrate-nitrogen, total phosphorus and *E. coli* counts) on a monthly basis at each sampling sites. This monitoring program allows the monitoring of remediation efforts and to establish the actual status of our rivers. The water quality monitoring is used to support the need for specific remediation actions and measure the effectiveness of the work. It is also used to complete detailed sanitary surveys and be used in emergency cases.

Such monitoring helps determine if changes to the water quality occurred and if sections of the stream or river remain are suitable for aquatic life. It is of utmost importance to have accurate and continuous data of water parameters for the watershed. This allows for effective management strategies and the creation of remediation plans.

2.2 Material and Methods

2.2.1 Water Quality

Water quality testing was conducted between June and October 2012. Sampling sessions were conducted on a monthly basis at 14 sampling sites (former Water Classification sites) (Fig. 1). The big beaver dam wetland at site ScdC was surveyed this year.

Water quality sampling was performed using the protocol developed by the New Brunswick Department of Environment.

Basic water quality parameters (DO, temperature, pH, conductivity and salinity) were measured using a water-condition instrument YSI QS600. Total coliforms, *E.coli*, Nitrate concentrations and Phosphorus were measured in the lab.

The equipment needed to perform the stream habitat assessment included clipboard and pencils, waders, GPS unit, digital camera, water-condition instrument (YSI), reference documents (identification key), meter stick and measuring tape as well as waterproof board and field sheets.

2.3 Shediac and Scoudouc Rivers Physico-chemical Characteristics

2.3.1.1 Water Temperature

Water temperature can fluctuate depending on the period of the day and during season changes. Values are influenced by numerous factors such as shade covering the stream, water velocity and water depth. It is considered that water above 25 or 29 degrees Celsius (°C) tends to be of poor quality because less oxygen can be dissolved. Therefore, water temperature directly influences the dissolved oxygen levels.

2.3.1.2 Dissolved Oxygen

Dissolved oxygen (DO) represents the concentration of oxygen in gaseous form in the water column. Most of the oxygen in the water comes from the surface atmosphere and is mixed in the water by turbulence and current. The measurement of the concentration of dissolved oxygen in surface waters is essential for measuring changes in water condition and rating water quality. It has a direct effect on aquatic life and can be influenced by stream habitat alteration. DO is essential for fish and many other forms of aquatic life. DO vary with temperature, tending to be higher when the water temperature is low. According to the Canadian Council of Ministers of the Environment's (CCME) Canadian water quality guidelines, the minimal amount of DO required for cold water aquatic life is 9.5 mg/l (early life stages) and 6.5 mg/l (other life stages).

2.3.1.3 pH

The potential hydrogen (pH) level indicates the acidity level of a stream. It affects how much other substances (such as metals) dissolve in the water. Many organisms that live in water are sensitive to changes in pH and may be adversely affected by pH that is either too high or low. The pH varies naturally depending on bedrock, climate and vegetation cover, but may also be affected by industrial or other effluents, the exposure of some kinds of rock (for example during road construction) or drainage from some mining operations. According to the CCME's Canadian water quality guidelines, pH should be between 6.5 and 9. Levels under or above these may cause some problems for aquatic life in the streams.

2.3.1.4 Conductivity

Conductivity is the measurement of the ability of water to pass an electrical current. It is affected by the amount of inorganic dissolved solids (nitrate, chloride, sulfate, sodium, etc.) found in the water. The conductivity level may be influenced by rainwater, agricultural or urban runoff and the geology of the area. There are no set criteria for conductivity levels for water quality, but the US Environmental Protection Agency states that streams conductivity levels ranging between 0.15 and 0.5 mS/cm usually seem to support a good mixed fisheries. Consequently, a higher conductivity level may indicate a higher amount of dissolved material in the water and the presence of contaminants.

2.3.1.5 Nitrate-Nitrogen

Nitrogen is essential for plant growth, but the presence of excessive amounts in water presents a major pollution problem. Nitrogen compounds may enter water as nitrates or be converted to nitrates from agricultural fertilizers, sewage, industrial and packing house wastes, drainage from livestock feeding areas, farm manures and legumes. The acceptable amount of Nitrate-nitrogen in water is set at 2.9 mg/l or 13 mg/l (NO₃).

2.3.1.6 Total Phosphorus

Phosphorus is an important nutrient for aquatic plants, but can be a potential pollutant as well. Large amount of phosphorus coming from cleaning products (detergents), agricultural and residential fertilizer components can cause eutrophication. CCME's guidelines suggest that total phosphorus levels should be under 0.035 mg/l to maintain a meso-eutrophic state or better.

E. coli most closely fits the requirements of an ideal indicator of faecal contamination for fresh waters. *E. coli* are always present in faecal contamination from human and animal sources. Detection suggests faecal contamination of water and thus the possible presence of faecal pathogenic bacteria, viruses and protozoa.

2.3.1.7 E.coli

Escherichia coli (*E. coli*) is one of many species of bacteria living in the lower intestines of mammals. The presence of *E. coli* in water is a good indicator of fecal contamination.

Table 2: Guidelines for Canadian Recreational Water Quality - Summary Table (Health Canada, 2010)

Parameter	Considerations	Guideline Value
Indicators of Fecal Contamination: Escherichia coli (Primary-Contact Recreation)	Geometric mean concentration (minimum 5 samples)	≤ 200 <i>E. coli</i> /100 mL
	Single sample maximum concentration	≤ 400 <i>E. coli</i> /100 mL
Indicators of Fecal Contamination: Escherichia coli (Secondary-Contact Recreation)	Geometric mean concentration not to exceed a value of 5 times the existing guideline value for primary-contact recreation	≤ 1000 <i>E. coli</i> /100 mL

Primary contact: Recreational activity in which the whole body or the face and trunk are frequently immersed or the face is frequently wetted by spray, and where it is likely that some water will be swallowed. Inadvertent immersion, through being swept into the water by a wave or slipping, would also result in whole body contact. Examples include swimming, wading, waterskiing, rafting/kayaking or subsurface diving (Health Canada, 2010).

These primary contact activities are not frequent in Shediac and Scoudouc Rivers but happen typically during the canoe run in spring.

Secondary contact: Recreational activity in which only the limbs are regularly wetted and in which greater contact (including swallowing water) is unusual. Examples include sailing, canoeing or fishing (Health Canada, 2010).

These activities are frequent and regular in Shediac and Scoudouc Rivers.

2.3.2 Shediac and Scoudouc Rivers General Characteristics

2.3.2.1 Riparian Zones

Overall, the banks were mostly composed of mixed forest. In addition, many wetlands are part of the Scoudouc River system. For example, the Big Meadow area has a surface of 2.14 km².

2.3.2.2 Substrate

In general, the Shediac River is mostly represented by coarser substrate (rubble, gravel, rock and bedrock). Bedrock is only found in Shediac River mainly (75%) at site ShdC. Scoudouc River is mostly characterized by rubble and gravel and finer sediment (fine and sand).

2.4 Discussion

We would like to continue water quality monitoring for Scoudouc and Shediac rivers this year. Water quality parameters such as dissolved oxygen, temperature, pH, conductivity and salinity are measured on a monthly basis (June to October). Nutrient levels such as nitrate, phosphorus and *E. coli* were measured.

Warmer temperatures were recorded this summer. All temperatures recorded until October are less than 20°C, which is acceptable for the survival of salmonids. Very dry summer causing low water levels in the rivers of the watershed and there is a possibility of record lows. This year, the results indicate that the average temperature of the water in our rivers was warmer in comparison with July last year for the majority of sites in exception at Scd B.

Some dissolved oxygen levels measured are critical for the protection of freshwater aquatic life. In August, several concentrations below the CCME guideline for the protection of aquatic life (6.5 mg / L for other life stages) were observed for the period of record. Dissolved oxygen was low in August at Scoudouc B, C, D, E, F and for Shediac B and H. In September, water temperatures recorded are cooler than August and dissolved oxygen records are still low at Scoudouc D and Shediac B and H. Dissolved oxygen is low when temperatures are higher, which has the effect of increasing the oxygen demand of the fish. Also, aquatic plants affect the concentration of oxygen dissolved in water by their cycles of photosynthesis and respiration.

All pH are acceptable. CCME guidelines are 6.5 and 9.0 for the protection of aquatic life. The pH is slightly lower for Scoudouc C in August and September. There is a huge beaver dam in this acidic wetland.

Elevated concentrations of nitrate can be harmful to aquatic life, and may contribute to excessive growth of algae or aquatic plants (eutrophication). Major sources of excess nitrate include fertilizer runoff from farm fields or domestic landscaping, runoff from manure and septic systems. Nitrate levels as recommended by the CCME (2012) for water quality and protection of freshwater aquatic life are 13 mg / l for long-term exposure and 550 mg / l for short-term exposure. The results show that nutrient inputs are tolerable for the aquatic life.

Recommendations in NB for water quality for freshwater for phosphorus are 0.03 mg / l. After this limit, the ecosystem is considered eutrophic. The results for Shediac F show very high concentrations of phosphorus in July and August. There is no buffer zone on the lawn of the property and fertilizing flower beds are probably in large quantities in the river. Algae grow in

large quantities due to high nutrients input. Phosphorus also exceeded standards in August in Shediac A, C, D and G as well as Scoudouc A, B and F. Rates are high in Shd D and Shd G in september.

E. coli is the best indicator of fecal contamination in fresh waters by fecal matter by human or animal origin. Typical sources in the watershed include wildlife, farm animals and malfunctioning sewage systems. The presence of *E.coli* usually has little effect on the health of aquatic life, but may affect the suitability of the water for recreational use. This is why the results are compared to recreational use guidelines. Most *E.coli* is not itself hazardous to humans (with the exception of some less common strains) but the presence of *E.coli* indicates an increased risk that other more harmful pathogens may also be present.

E. coli concentrations are elevated where cattle appears to have access to the stream, in cottage areas or where erosion issues were noted. The highest concentrations for 2012 are in Scoudouc G in July (980.4 MPN/100 ml) and Shediac A in August (866.4 MPN/100 ml). The farming activities influence the *E.coli* concentration at Scoudouc G and Shediac A. The lagoon runoffs could contribute to increasing *E. coli* counts in the Scoudouc River.

Continuing to perform water quality monitoring is of the utmost importance in making sure our watershed is properly managed. Such activities complement remediation work by determining not only where work is needed most, but also if such work is accomplishing its purpose.

3 PARTNERSHIP WITH STAKEHOLDERS

3.1 Stakeholders and Partnerships

Continued industries and stakeholders partnerships are essential to continue long term remediation efforts. Future remediation steps include the reduction of siltation in many small tributaries of the Scoudouc Rivers, where human activities such as ATV crossings are affecting the habitat integrity. SBWA is in contact with the ATV Country Wheeler Club. We also developed a partnership with the Scoudouc Canoe Club, and introduced an annual observation program for the Scoudouc River.



Figure 3: Scoudouc River Canoe Club (2012). Photo: Scoudouc River Canoe Club



Figure 4: There are many ATV trails along the rivers in the watershed. Some trails are crossing the river. Photo: Scoudouc River Canoe Club (2012).

4 HABITAT AND WATER QUALITY ENHANCEMENT



Figure 5: Water sampling in Shediac River at site C by Johanne Paquette, Biologist (2012).



Figure 6: Water sampling by Jim Weldon in Scoudouc River site C (2012).



Figure 7: Water sampling by Jim Weldon at Scoudouc River site D (2012).



Figure 8: Water quality monitoring in Scoudouc River site A (2012).

4.1 Community Aquatic Community Program

Again this year, we were able to monitor the water quality within the Shediac Bay Watershed by partnering with the Department of Fisheries and Oceans on the Community Aquatic Monitoring Program (CAMP) from June to September of 2012. This is a long-term monitoring program aiming to study ecosystem evolution and changes over time. Data collection is expected to continue in the 2013 field season.



Figure 9: Community Aquatic Monitoring Program (CAMP) (2012).



Figure 10: During CAMP last summer, SBWA captured more than 550 green crabs, up from only seven the summer before.



Figure 11: Public concern more of effluents from fish processing and their effect on coastal environments.

Oyster restoration in Shediac Bay

Oysters are an important natural filter feeder that can help to maintain the quality of our water. In recent decades, the natural beds in Shediac Bay disappeared.

For several years now, the SBWA has been reintroducing oysters. This summer, we collaborated with *Homarus* (Maritime Fishermen's Union) to place over **2.5 million oyster spat on our restoration site**. These oysters are considered contaminated and should not be consumed.

A mature oyster can filter **36.4 litres** of water in one hour. This helps to reduce the overload of nutrients and turbidity in the water. As a keystone species, oysters are filter feeders and provide habitat for many marine species.



Figure 12: Oysters restoration project (2012).

5 PUBLIC OUTREACH AND EDUCATION

5.1 Meeting and Information Sessions

In order to accomplish the various objectives, regular meetings between various members and partners were required. The board of directors of the SBWA met to discuss and implement the various activities of the Association as per the following dates:

October 15 2012 : Participate in Waste Reduction Week in Canada.

October 24 2012 : Aperçu des activités de suivi et de recherche menées dans le détroit de Northumberland par le MPO, Moncton NB.

November 1st 2012 : Biodiversity Resiliency in the Face of Change: Science & Stewardship, Fredericton N.-B.

November 14 2012 : Meeting with Vision H₂O, Cap-Pele NB

November 15 2012 : Preparing for Climate 2100 - Tools and strategies for NB communities, Fredericton NB.

November 26 2012: SBWA Board Meeting, Shediac NB.

December 3rd 2012 : FCSA/CRI Webinair #3 Habitat Restoration – Terry Melanson, MPO

January 19 2013 : SBWA Special Board Meeting, Shediac NB.

February 13 2013 : FCSA/CRI Webinair #6: Habitat assessment, David LeBlanc – RRWMC

February 20 2013 : Webinair FCSA/CRI #7: Fish passage barriers and access, Fred Parsons, Environment Resources Management Association & Todd Dupuis, Atlantic Salmon Federation

March 13 2013: Workshop for ENGOs in SE New Brunswick, Ecoparc Cormier-Village NB.

March 14 2013: Promotion for Earth Hour in local Medias.

5.2 Beach Sweep

Each year the SBWA organizes community beach sweeps to fight against shoreline litter that can detract from enjoyment of coastal environment. This year, the SBWA sponsored two events aimed to combat marine litter and contribute to the protection and conservation of our marine environment. The first beach sweep was held on June to celebrate World Oceans Day, sponsored in part by the Shediac Co-op.

The weather was more favorable for our second event in September. Students from MFB school in Shediac, teachers, community workers, and volunteers all pitched in to collect more that 200 kg of litter. Some was then collected by Terracycle, a company specializing in traditionally non-recyclable waste. There was even a BBQ, courtesy of Sobeys Shediac.



Figure 13: Tree planting to celebrate the National Tree Day 2012.



Figure 14 : Beach Sweep at Shediac Marina (2012).

5.3 Education and Awareness

Shediac Market In The Park

The SBWA Information Booth was displayed at Shediac's Market In The Park every second week this past summer. Public response was very supportive. Topics of particular interest were energy efficiency and conservation, water conservation, local food and controlling invasive species. Our booth also allowed promoted the SBWA and attracted several new members.



Figure 15: Awareness session at the Shediac Market In the Park (2012).

Documentary

Rogers TV will produce in 2013 a documentary about our projects for this year for the TV show "Par chez-nous".

School Presentations

In 2012-2013, the SBWA developed and presented interactive Powerpoint presentations on climate change, energy efficiency, energy and water conservation to two local schools. We presented a list of informations containing different lessons plan on climate change and energy efficiency.



Figure 16: Ms. Manon Boucher students (grade 2) at MFB school in Shediac (2013).



Figure 17: Ms. Sylvie Duguay and Ms. Lyne Leblanc students (grade 4) at MFB school in Shediac on January 21, 2013.



Figure 18: Grade 2 students at MFB school (2013).



Figure 19 : Ms. Janice Maillet-Arsenault class (grade 2) at MFB school (2013).

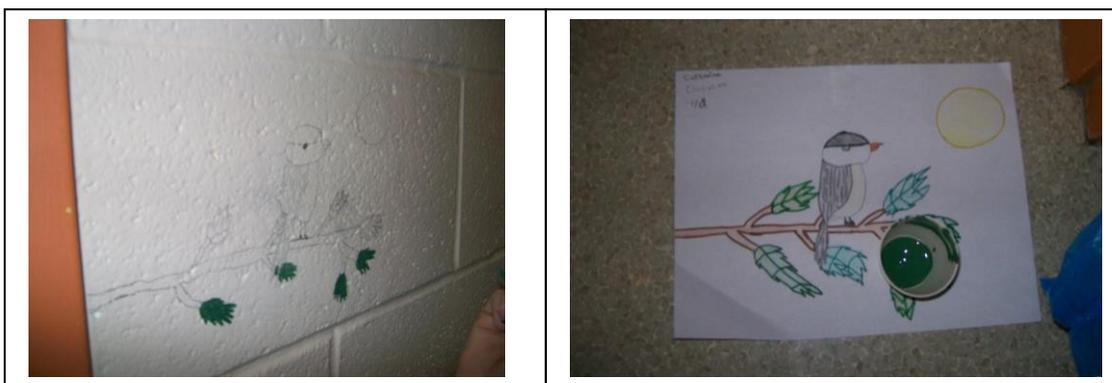


Figure 20: Painting a New Brunswick emblem on the wall at MFB School in Shediac by Catherine Chiasson, 4th grade.

Community Health Fair

SBWA was invited to share their educational materials at an information booth at the Shediac Health Fair on October 21, 2012. Low consumption CFL light bulbs and numerous documents were distributed to the public to promote energy conservation and energy efficiency. We also promoted the importance of eating local in the community. This community event did help us recruit new members for the association. The public has been very interested in the information available for the green crab invasive issue.



Figure 21: Shediac Community Health Fair (2012).

5.4 Socials Medias



<http://www.facebook.com/#!/shediacbawatershedassociation>



@SBWA12

Aquarium

Our aquarium has attracted the attention of many visitors this summer. Several species like mummichog, stickleback, 3 and 4 spines, sand shrimp, grass shrimp, silverside, red and smooth flounder, green crab, mud crab, American eel and bivalves such as mussels and oysters lives in. Green crabs limits the number of species found in the aquarium. Furniture supporting the aquarium was built with reused wood. The aquarium is used to better understand the habits of green crabs. It's a reproduction of a salty water habitat and a teaching tool.



Figure 22 : Jim Weldon, Director and Johanne Paquette, Biologist.



Figure 23: We help the public to identify aquatic species like Golden star tunicate (*Botryllus schlosseri*) and green crabs (*Carcinus maenus*) at Shediac Bay Marina.

6 CLOSING COMMENTS

The Shediac and Scoudouc Rivers as being the largest sources of bacteria input in Shediac Bay. Also, Parlee Beach Provincial Park is an important tourist attraction during summer. It is important to monitor water quality in the watershed and make necessary actions for the health of our rivers and the bay. Our important project is the oyster restoration project.

The work performed during the development of the project included different activities related to water quality remediation planning and public outreach. The water quality monitoring program is crucial for the management of the watershed. The water quality monitoring program allowed us to identify problematic areas and water quality trends.

Continuing to perform water quality monitoring and adopt new methods of doing so is very important to ensure that our watershed is properly managed. Such activities complement remediation work by determining not only where this work is needed most, but also if such work is properly accomplished. All these efforts should be distributed on a long period of time in order to produce accurate indicators of water quality and habitat integrity.

Public outreach within our watershed took many different forms throughout the year. The *Status of Shediac Bay and its Watershed – An Introduction* has gained momentum throughout the year and is well recognized by residents. We are working to develop a Strategic Plan for 2013-2017.

The media also plays a huge role in enhancing the association's profile. Various articles were in newspapers, radio stations, television to announce our projects and events. The SBWA has built reliability among the community. When a project is taking place, we take the opportunity to make interviews with different media. This way, the public can refer to us as a complete group performing many projects to aiming to maintain the water quality. The SBWA also installed their booth at various community events during the year. Hosting events such as the beach sweeps also served to raise awareness and the association's visibility while helping members of the community realize that their participation can have an enormous positive impact on our watershed.

Furthermore, developing and implementing an annual environmental education program with local schools has proven especially useful in sensitizing our youth, teachers and parents on watershed issues and the importance of protecting our waterways. Children responded very well to our presentations and the schools greatly appreciate our work.

Directly working with various governmental agencies has helped in reaching many stakeholders. The Department of Fisheries and Oceans, for example has assisted the SBWA in different projects such as Invasive aquatic species identification with the public. Increasing our visibility is crucial for the long-term development of a watershed group. We believe that we can greatly contribute at multiple levels for the management of bays and watersheds. Multiple complaints were received during the 2012-2013 fiscal year regarding water sedimentation issues, possible water contamination and coastal developments. The SBWA is engaged to respond to such complaints by contacting appropriate governmental agencies to verify permit compliances. In some cases formal complaints are directed to the concerned governmental bodies. The Department of Fisheries and Oceans and Environment Canada were contacted when sedimentation issues or fish habitat deterioration are observed.

The SBWA also enjoyed the support of multiple volunteers and members during the year. Their support always ensures the stability of the group and allows us to continue to develop great educational activities.

Finally, the *Water Quality Remediation and Public Outreach Program* was very successful and we accomplished many activities and events over the past year. Many endeavours remain to be completed due to the magnitude and scope of the remediation work left to be tackled.

The SBWA is definitively making a big difference in the community. Monitoring results show modifications in stream water quality. Our work needs to be performed on a long-term basis in order to obtain positive results. However, we are confident that our group can enhance and maintain the water quality and a healthy community for future years since action taken at a community scale has proven to be successful.

Grand nettoyage des rivages canadiens

SHÉDIAC - Chaque année, en septembre, des groupes s'unissent pour lutter contre les déchets riverains qui menacent gravement nos eaux et prennent part au Grand nettoyage des rivages canadiens.

Il représente le plus important programme de conserva-

tion par l'action directe au Canada. L'association du bassin versant de la baie de Shédiac a prêté main-forte à la lutte contre les déchets riverains en organisant un nettoyage des rivages près de la marina de Shédiac.

Le 28 septembre dernier, les trois classes de 2e année de l'école Mgr. Marcel-François-Bourgeois de Shédiac ainsi que les enseignantes, l'agent de développement communautaire et quelques parents ont aidé au grand nettoyage en ramassant près de 200kg de déchets! Certains déchets comme les filtres de cigarettes ont été

envoyés à Terracycle, une compagnie qui transycle et recycle des déchets traditionnellement non recyclables. Les élèves ont aussi pu manipuler et identifier les espèces aquatiques de notre région ainsi qu'une espèce

aquatique envahissante: le crabe vert. Une grillade a été offerte gracieusement du Sobeys de Shédiac. L'activité s'est terminée avec la plantation de trois arbres à la marina afin de souligner la journée nationale de l'arbre.



Photo : Contribution

Johanne Paquette, de l'Association du bassin versant de la baie de Shédiac, donne les directives aux élèves.



Des élèves de Shediac ramassent plus de 200 kg de déchets

SHEDIAC - Trois classes de 2e année de l'école Mgr-François-Bourgeois ont ramassé plus de 200 kg de déchets près de la Marina de Shediac, le 28 septembre. L'activité a eu lieu dans le cadre du 19e Grand nettoyage des rivages canadiens. Certains déchets traditionnellement non recyclables, comme les filtres de cigarettes, ont été envoyés à TerraCycle. Cette entreprise se spécialise dans le recyclage de tels objets. Les élèves ont également eu l'occasion de manipuler et d'identifier des espèces aquatiques propres à la région. Plusieurs ont eu leur première rencontre avec l'espèce aquatique envahissante, le crabe vert. Les élèves ont terminé leur aventure en plantant trois arbres à la Marina de Shediac. Le geste avait pour but de souligner la Journée nationale de l'arbre (le 26 septembre). - JMD

Arndie Nouvelle



Des élèves de l'école Mgr-François-Bourgeois de Shediac ont ramassé plus de 200 kg de déchets à la Marina de Shediac. - Gracieuseté

Actualités régionales

Des élèves de Shediac ramassent plus de 200 kg de déchets

Version imprimable 

Jean-Marc Doiron

jean-marc.doiron@acadienouvelle.com

le vendredi 5 octobre, 2012

SHEDIAC - Trois classes de 2e année de l'école Mgr-François-Bourgeois ont ramassé plus de 200 kg de déchets près de la Marina de Shediac, le 28 septembre. L'activité a eu lieu dans le cadre du 19e Grand nettoyage des rivages canadiens. De telles initiatives ont lieu à travers le pays chaque année en septembre.

Certains déchets traditionnellement non recyclables, comme les filtres de cigarettes, ont été envoyés à Terracycle. Cette entreprise se spécialise dans le recyclage de tels objets.

Les élèves ont également eu l'occasion de manipuler et d'identifier des espèces aquatiques propres à la région. Plusieurs ont eu leur première rencontre avec l'espèce aquatique envahissante, le crabe vert.

Les élèves ont terminé leur aventure en plantant trois arbres à la Marina de Shediac. Le geste avait pour but de souligner la Journée nationale de l'arbre (le 26 septembre).

Quantité de crabes verts plus importante cette année dans la région

Éric Le Shediac



L'Association du bassin versant de la baie de Shediac a remarqué une augmentation importante de la quantité de crabes verts dans les eaux de la région. L'an dernier, l'échantillonnage effectué à la plage au moyen d'un filet a permis de découvrir sept crabes verts. Cette année, après avoir effectué seulement la moitié de l'échantillonnage, plus de 440 crabes verts ont été détectés. Le crabe vert est facile à reconnaître. Il est plus petit que le crabe nordique indigène. Il peut atteindre la taille de 10 cm (4 pouces) et il est surtout de couleur verte, jaune ou rouge. Même s'il est relativement inoffensif pour les humains, le crabe vert peut être nuisible pour l'aquaculture des crustacés. Le crabe est un prédateur qui peut s'attaquer aux autres espèces de crustacés. Il consomme majoritairement des palourdes, des moules, des huîtres, des pétoncles et même les petits homards. Originnaire de l'Europe et de l'Afrique du Nord, cette espèce a d'abord été découverte dans les eaux américaines au cours des années 1800. Au Canada, un premier spécimen a été identifié dans la baie de Fundy dans les années 1950. Le contrôle et la capture constituent la seule manière connue de contrôler la population de crabes verts après son apparition dans une région. Selon l'Association du bassin versant de la baie de Shediac, il est déconseillé de collectionner et de transférer le crabe vert dans d'autres régions. Toute personne qui capture un crabe vert doit le congeler ou le détruire. L'Association du bassin versant de la baie de Shediac est un organisme sans but lucratif qui se consacre à la protection de l'environnement de la région de Shediac. Fondée en 1999, elle surveille la qualité de l'eau, assure des services de restauration de l'habitat et offre des programmes de sensibilisation du public. Photo contribution

K945 - News - Invasive Green Crab Population Reaches Alarming Numbers on N.B. Coast Page 1 of 1

Invasive Green Crab Population Reaches Alarming Numbers on N.B. Coast

By The Newsroom. Last updated: 2012-08-16 05:38:55

The New Brunswick coastline has seen a significant rise in the invasive green crab population and they're continuing to make their way up to Shediac Bay.

The green crabs eat oysters, mussels and clams and they also eat a notable amount of the shellfish seeds used in the aquaculture industry.

The Shediac Bay Watershed Association found hundreds of the invasive crabs in their count yesterday.

Jim Weldon surveys for green crabs and he told the CBC the numbers are very concerning.

He says that some form of funding is necessary to plan ahead and keep the green crab population lower than what they are at now.



TIMES & TRANSCRIPT

The green crab species has invaded inland fishing waters and is quickly becoming a major nuisance for eel and shellfish harvesters in the province.

Green crabs found

► Continued From A1

done so far.

By the time the third count is done in August, the Watershed Association's Jim Weldon estimates the number of specimens will be more than 600.

That's bad news.

The green crab (*Carcinus maenas*) is an invasive species and in local waters an aggressive predator that can destroy shellfish and eel grass beds, and poses a threat to shellfish aquaculture. They've caused significant declines in clam and mussel resources wherever populations have been able to take hold.

"It was only three years ago we found a couple in Cape Tormentine," Weldon said yesterday, adding that the species is well on its way to clawing out territory up the length of the Northumberland coast.

Now the range seems to stretch as far as Bouctouche, though they haven't yet been found in significant numbers that far north.

Although relatively harmless to humans, green crabs can be a nuisance for people wading on local beaches.

"They don't back off like other crabs," he said.

Besides being the one more likely to pinch your toes, a green crab is easily recognizable. It is smaller than the native rock crab. It can grow to 10 cm (4 inches) and is mostly green, yellow, or red in colour.

Native to Europe and North Africa, the species was first discovered in US waters in the 1800s. It probably migrated in the ballast of ships.

The first sighting in Canada was in the Bay of Fundy in the 1950s. Since then, the green crab has slowly expanded its range around Nova Scotia, and is now in Prince Edward Island and New Brunswick.

They stay in shallower water and are able to leave the water for much longer periods than their native North American cousins. They are also fast swimmers, much more so than most native species.

The only known way to control the green crab once it enters an area is through extensive monitoring and trapping. The public is cautioned not to collect and release green crabs into other areas. Anyone catching green crabs should either freeze or destroy them.

"We want to make people aware they're here," he said, adding he also wanted to make sure no one was unwittingly aiding in their proliferation.

Weldon says he hopes the association, a non-profit organization dedicated to sustaining the environment in the Shediac area, can do more extensive monitoring to get a better understanding of its spread and its impact.

One worrisome fact is the number of other aquatic species found in the seine samplings done this year were significantly down, but Weldon cautioned there are far too many other variables at play to conclude predation by green crabs is solely to blame.

Green crabs invading bay

JULY 24-12

■ Invasive, aggressive species threatens shellfish industries

BY BRENT MAZEROLLE
TIMES & TRANSCRIPT STAFF

Last year, researchers for the Shediac Bay Watershed Association found seven green crabs in three samplings they took from Shediac Bay.

This year they have found 442, and that's just in the two beach seine sampling surveys they have

► See GREEN, A12

TIMES & TRANSCRIPT

The small green crab is feared by shellfish harvesters because of the species' aggressive and persistent attacks on mussels, oysters and clams.

HUNDREDS OF INVASIVE CRABS FOUND IN SHEDIAC BAY

[CBC News](#)

Posted: Aug 15, 2012 7:48 PM AT

Last Updated: Aug 15, 2012 8:35 PM AT

Related Stories

[Green crabs invade Shediac Bay](#)



The invasive green crab's population is exploding in Shediac Bay. (CBC)

The invasive green crab is moving up the coastline of New Brunswick to Shediac Bay.

The Shediac Bay Watershed Association found a handful last year. When they did their last count of the year Wednesday they found hundreds of the invasive crabs.

Jim Weldon surveys for green crabs in the waters from Cap Bimet to Cocagne three times a summer.

His team has found a more than 550 green crabs this year, a jump from the seven found last year.

In fact, they found [more than 100 since their check](#) last month.

Weldon says the numbers are alarming.

“I would just make a guess that the numbers are going to be really large next year. So we need a plan now, we need some sort of funding now that would help us plan ahead of time so we can keep the numbers at a level that would not degrade the environment totally.”

Thomas Landry, a biologist with the Department of Fisheries and Oceans, says attempts to eradicate the invasive species with traps have been a challenge.

“We don't have a successful story of being able to get rid of the green crab once it's been entered into a bay,” Landry said.

"If we could find a way to develop a fishery or reduce the numbers of these green crab through a fishery, then definitely that is an option we would like to consider. But at this point, right now we're aming at monitoring and making sure there is no human introduction."

In Kouchibouguac, the DFO is now studying the impacts the crabs have on other species.

Green crabs eat oysters, mussels and clams. They are also known to eat large quantities of the shellfish seeds used in the aquaculture industry.

Officials at DFO hope that information will help them figure out how to manage the green crab invasion

GREEN CRABS INVADE SHEDIAC BAY

Researchers see explosive growth of one of world's worst invasive species since last year

[CBC News](#)

Posted: Jul 24, 2012 1:25 PM AT

Last Updated: Jul 24, 2012 2:19 PM AT



The invasive green crab's population is exploding in Shediac Bay. (CBC)

The population of the invasive green crab has exploded in Shediac Bay.

"We had seven last year in three samplings for the three months. This year we have over 400 in two samplings; [we're] expecting about 600 in three samplings so it's a significant increase," said Jim Weldon, manager of the Shediac Bay Watershed Association.

More precisely, researchers have found 442 green crabs in their traps. Weldon said that the rapid expansion was a surprise, and that he'll spend the next three days in the field monitoring the Shediac Bay watershed.

The green crab is a 10-centimetre long invasive species from Europe. It was first spotted in New Brunswick in the Bay of Fundy in the 1950s.

The species was first introduced on the northeastern seaboard in the early 19th century and migrated north from there. It has since worked its way around Nova Scotia towards the Northumberland Strait.

The green crab eats oysters, mussels and clams. They are also known to eat large quantities of the shellfish seeds used in the aquaculture industry.

Weldon said he expects that the crabs will continue their spread northward until they reach water that is too cold for them.

"They have a tendency to just travel along the shore; they've been doing it ever since they were introduced in New England and then into the Bay of Fundy and around Nova Scotia," he said.

"Now they've started up the Northumberland Strait and they'll continue; we expect the pattern will be to continue until the temperature becomes too restrictive farther north."

Weldon said that the green crab can be used as a resource, but that it's not an easily marketable species.

"There are processing plants that produce fertilizer and fish food," he said. "If we could figure out a way to trap thousands and ship them to one of these processing plants."

According to the federal Department of Fisheries and Oceans, the green crab is ranked [among the 100 worst alien invasive species worldwide](#), and one of the most successful ones, being an aggressive competitor and a prodigious reproducer that is tolerant of a wide variety of marine environments, with the ability to alter entire ecosystems at great economic cost.

A [2006 Harvard University study](#) indicated that the crab's [northern](#) success could be thanks to new lineages, added to northern populations in Nova Scotia, that may have adaptations that allow the species to persist in a wider range of environmental conditions.

Scientists say that once green crabs arrive, [very little can be done to eradicate them](#). The green crab has already altered coastal environments around Atlantic Canada, British Columbia and the east coast of the United States.

INVASIVE GREEN CRABS MOVE INTO THE MARITIMES



Green crabs are an aggressive species that arrived from Europe 200 years ago

Published Friday, Aug. 17, 2012 1:45PM ADT

Green crabs are moving north into Maritime waters, gobbling up prey directly in their path. While the invasive species is here to stay, scientists say the big problem is figuring out how to control their numbers.

“Our concern here is that they’re moving in here and we’d like to do some sort of remediation to reduce their numbers so we slow down the northerly migration,” says Jim Weldon, manager of the Shediac Bay Watershed Association in New Brunswick.

The aggressive species arrived from Europe 200 years ago and has been making its way up the Eastern Seaboard. Weldon says now that the green crab has arrived in the Maritime region, it’s here for good, and it will be a challenge to control its numbers.

“We need some sort of funding set up where a fisher, whether it be a licensed fishery or a nuisance fishery, would have the ability to go out and catch as many as he can,” says Weldon.

Once caught, there are many potential uses for a green crab, such as fish food, bait, or even as an additive to things like pet food.

Weldon says the crabs’ numbers are manageable for now, but the species could devastate the fishery if their numbers get out of hand.

Biologists with the Department of Fisheries and Oceans have been concerned about the crabs’ northerly migration for years, and the affect on its meal of choice, the softshell clam.

“The green crab is known to have a major impact on softshell clam population,” says research biologist Thomas Landry. “Up to 80 per cent of the clams can be destroyed.”

A female green crab can lay 185,000 eggs in a year, and without a major predator in the area, it is free to roam where it wants.

“It’s a species that is quite capable of hiding and establishing,” explains Landry.

Researchers at the Department of Fisheries and Oceans are currently conducting a study to understand the effects of the green crab on all species.

With files from CTV Atlantic's Jonathan MacInnis