

Shediac Bay Watershed Association
Association du bassin versant de la baie de Shediac



Annual Report 2015-2016

Rapport annuel 2015-2016



Ce projet a été réalisé avec l'appui financier de :
This project was undertaken with the financial support of:



Environnement et
Changement climatique Canada

Environment and
Climate Change Canada

Canada



**TD Friends of the
Environment
Foundation**

ACKNOWLEDGEMENTS

The following organisations have funded our projects in 2015-16 allowing us to do all the work that is outlined in this report.

Government programs

New Brunswick Environmental Trust Fund
New Brunswick Wildlife Trust Fund
Environment and Climate Change Canada - EcoAction Program
Environment and Climate Change Canada - Habitat Stewardship Program
Environment and Climate Change Canada – Environmental Damages Fund
Fisheries and Oceans – Recreation Fisheries Conservation Partnership Program

Foundations

Atlantic Salmon Conservation foundation
TD Friends of the Environment

Municipal

Town of Shediac
Communauté Rural Beaubassin -Est

Work Placement

Environment and Climate Change Canada - Science Horizons
New Brunswick Post-Secondary Education Training and Labor – SEED program
Human Resources and Development Canada- Canada Summer jobs

Other donations/ grants

COOP - IGA Shediac
Miramichi River Environmental Assessment Committee
Homarus Eco Center
G3E
Scoudouc River Canoe Club

Many other groups and individuals contributed to making our programs a success again this year and the SBWA wishes to extend their sincere gratitude.

TABLE OF CONTENTS

1	INTRODUCTION	1
1.1	Description of the Shediac Bay Watershed Association	1
1.2	Overview of the Shediac Bay Watershed	1
2	WATER QUALITY AND HABITAT MONITORING	2
2.1	Introduction.....	2
2.2	Results for 2015.....	3
2.2.1	Water Temperature	3
2.2.2	Dissolved Oxygen.....	4
2.2.3	Potential Hydrogen (pH).....	4
2.2.4	Conductivity	5
2.2.5	Nitrate-Nitrogen.....	6
2.2.6	Phosphates	7
2.2.7	Total Coliform	8
2.2.8	Escherichia Coli.....	8
2.3	Historical Data of the Shediac and Scoudouc Rivers Physico-chemical Characteristics.....	9
2.4	Water Quality Monitoring in the Shediac Bay	9
2.5	Macro-Invertebrate Survey (CABIN).....	11
2.6	Electrofishing.....	12
2.7	Community Aquatic Monitoring Program.....	13
2.8	Green Crab Monitoring.....	13
3	HABITAT ENHANCEMENT AND RESTORATION.....	14
3.1	Fish Habitat Restoration	14
3.1.1	Bank Stabilization near the Dionne Brook, Scoudouc River	14
3.1.2	Beaver Dam Removal Shediac River	15
3.2	Fish Ladder	16
3.3	Tern Platform.....	17
4	BIODIVERSITY AND SPECIES AT RISK.....	18
4.1	Biodiversity Project with the Town of Shediac	18
4.2	Brook Floater Habitat Assessment	24
5	PUBLIC OUTREACH AND EDUCATION	26
5.1	Beach Sweep.....	26
5.2	Public Tree Planting Events.....	26
5.2.1	MFB School Educational Garden: “ <i>Jardin Pédagomax</i> ”	27
5.2.2	TD Tree Day	27
5.2.3	Tree Planting near Ohio Rd.	28
5.3	Bird Houses	29
5.4	Interpretation Panels	29
5.5	School Program	30
5.5.1	Fish Friends	30
5.5.2	Classroom Presentations Summary	31

5.6	Shediac Farmer’s Market in the Park	31
5.7	Public Outreach Summary	32
5.8	Kiosk at the Lobster festival	33
5.9	Booth at the Bouctouche Eco-Festival	33
5.10	News Coverage	33
5.11	Social Media & Website	34
6	PARTNERSHIP WITH STAKEHOLDERS	34
6.1	Meeting with Environmental Groups of Southeastern NB	35
6.2	Climate Change Adaptations	35
7	CLOSING COMMENTS	36

1 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 2015 includes the following members:

Mr. Armand Robichaud, President	Mr. Gerry Dionne
Mr. Denis Haché, Vice-President	Ms. Brenda Ryan
Mr. David Dunn, Past President	Mr. Léo-Paul Bourgeois
Ms. Connie Doyle, Treasurer	Mr. Victorin Mallet,t
Ms. Frances Kelly, Secretary	Mr. Joe Caissie
Mr. Pierre Landry	Mr. Marc Fougère
Mr. Claude Léger	Mr Art Melanson

The Shediac Bay Watershed Association gratefully receives guidance, donations and in-kind support from various organizations and interest groups. SBWA has a database of 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 420 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: 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.



MAP OF SHEDIAC BAY WATERSHED INCLUDING WATER QUALITY SAMPLING SITES

2 WATER QUALITY AND HABITAT MONITORING

2.1 Introduction

Water quality monitoring began in the Shediac Bay Watershed during the water classification program in 2000-01. Basic physical measurements were then taken at the same sites from 2002 to 2006. In 2007, additional parameters were measured (nitrate-nitrogen, total phosphorus and *E. coli* counts) on a monthly basis at each sampling sites. 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 establish the status of our rivers.

Such monitoring helps determine if changes to the water quality occurred and if sections of the stream or river remain 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.

The addition of biomonitoring through the use of macroinvertebrate sampling (CABIN) will add valuable data to our water quality monitoring. By creating a baseline data of macroinvertebrate ecosystems at various sites, we will be able to observe changes in the ecosystem if there are changes in water quality. The use of biomonitoring will help use determine the environmental impacts of activities such as urban development, road works, one-time pollution events or long-term pollution impacts, and even climate change.

Freshwater quality monitoring was conducted once a month from May to October 2015, at 10 sampling sites.

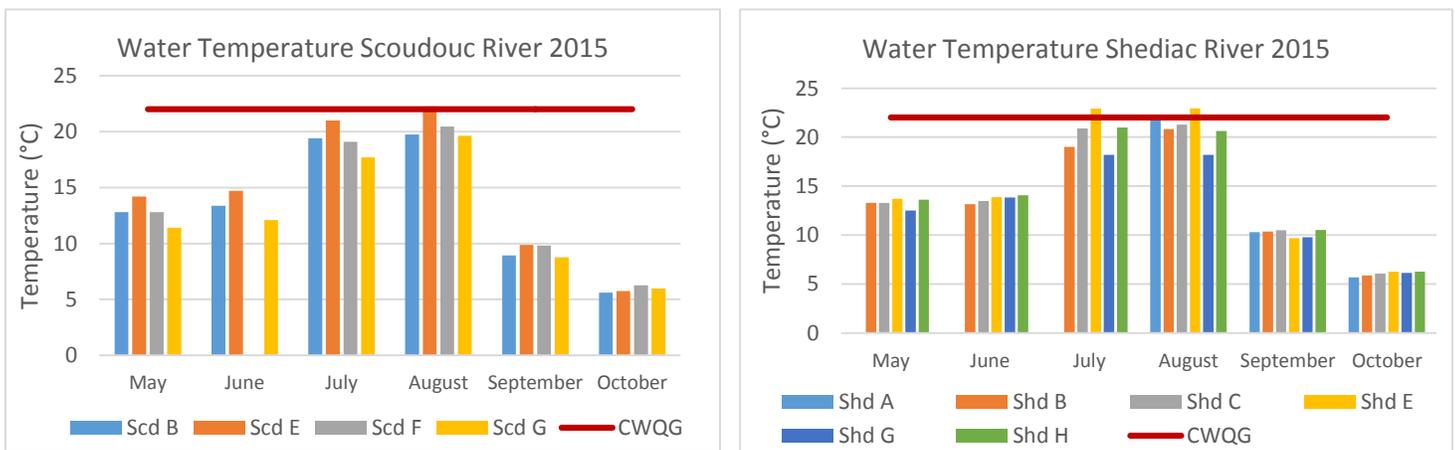
A database was created to regroup the historical monitoring data from the SBWA between 2000 and 2015. This dataset can show trends in water quality for sites monitored by the SBWA.

2.2 Results for 2015

2.2.1 Water Temperature

Water temperature can fluctuate depending on the period of the day and during seasonal changes. Values are influenced by numerous factors such as the tree canopy providing shade, water velocity and depths, presence of cold springs, etc. 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. Water temperatures above 22 °C is said to cause thermal stress to salmonid populations, causing them to stop feeding and search for thermal refugia.

The overall mean water temperature for both rivers was 14.61 °C, which is an acceptable value. The highest temperature recorded was 22.93 °C, at site ShdE (covered bridge).in August

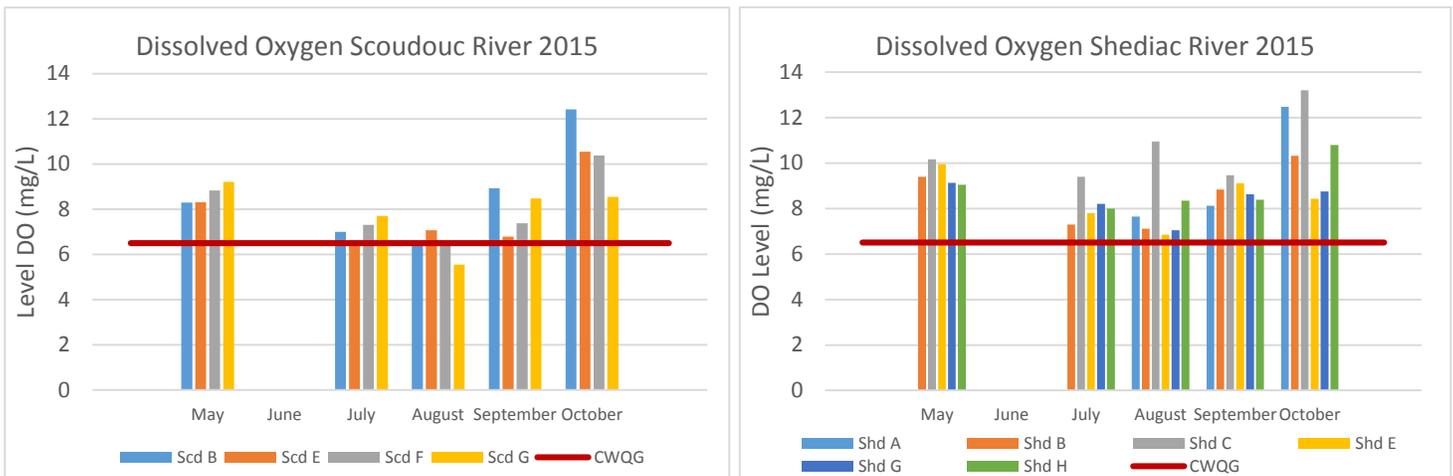


Water Temperatures for Scoudouc and Shediac Rivers, 2015

2.2.2 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 for cold water aquatic life is 9.5 mg/l (early life stages) and 6.5 mg/l (other life stages).

In 2015, the overall DO mean for all the sites was 8.57 mg/l. The lowest level of 5.55 mg/L is the only instance where dissolved oxygen was below the recommendation for aquatic life (CWQG). There is no data for June, as we were unable to acquire proper equipment to measure dissolved oxygen for that sampling day.

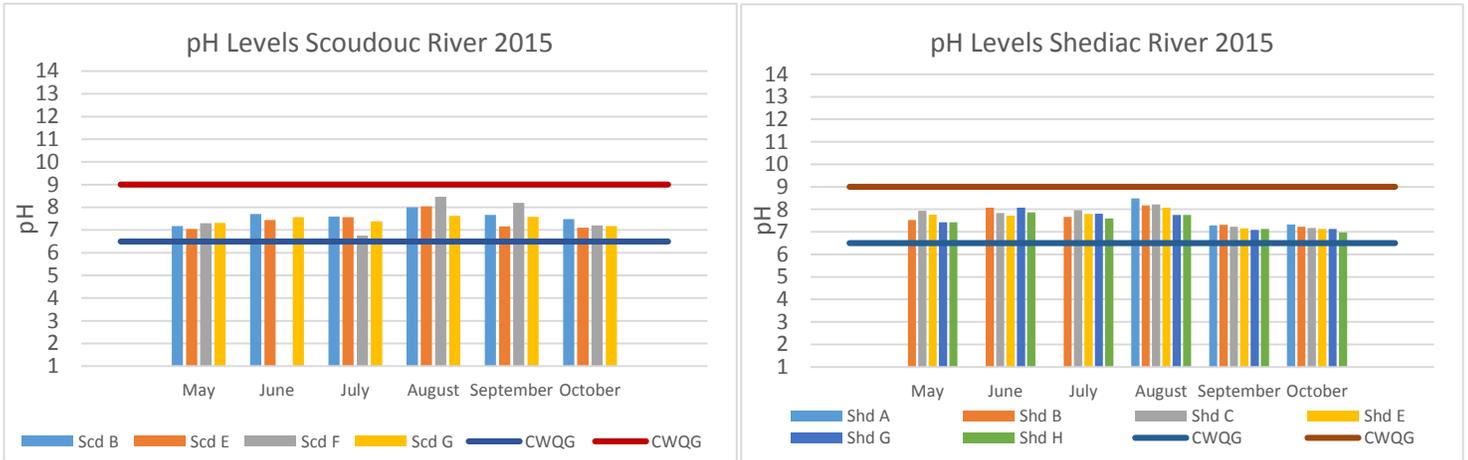


DO levels for the Scoudouc and Shediac River, 2015

2.2.3 Potential Hydrogen (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 the 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.

The overall pH mean for all the sites was 7.55. The highest pH recorded for the Scoudouc River was 8.46 at ScdF in the month of August, and the lowest was at the same site in July, at a pH of 6.75. The highest pH for the Shediac River was 8.48 at ShdA in August, and the lowest pH was 6.98 at ShdH in October.



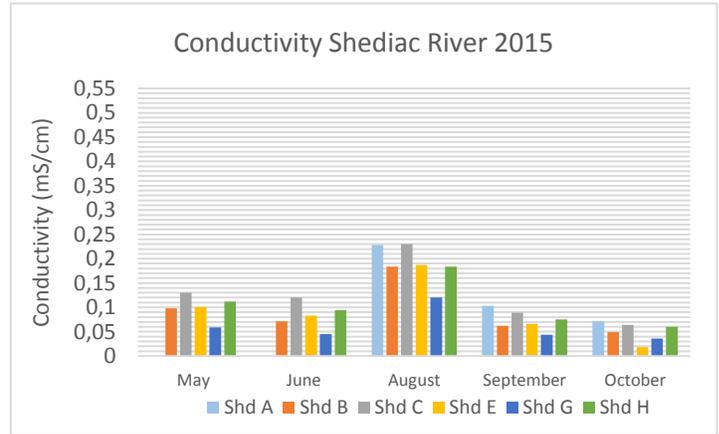
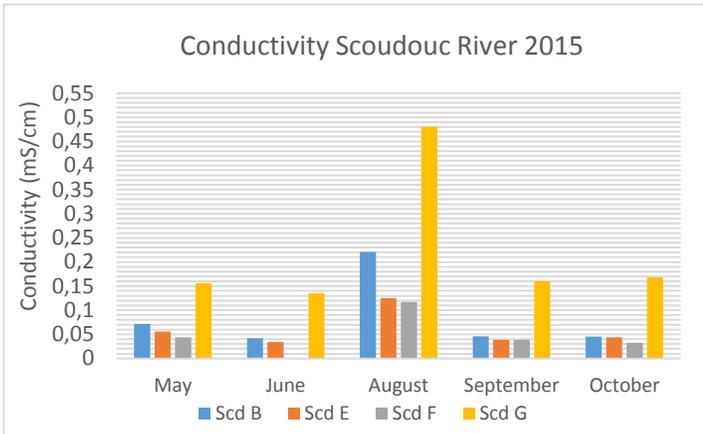
pH levels for the Scoudouc and Shediac River, 2015

2.2.4 Conductivity

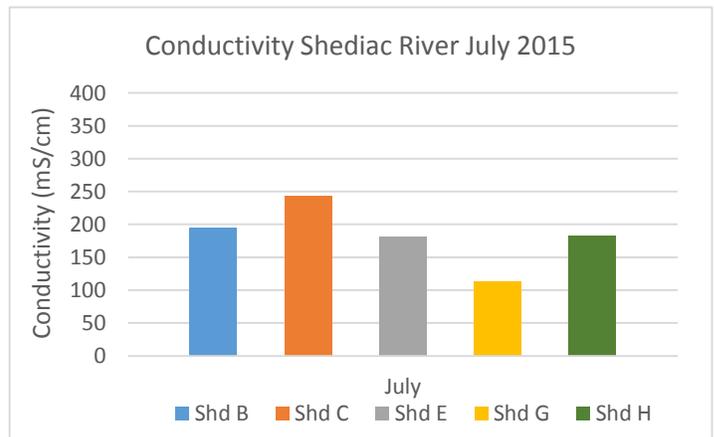
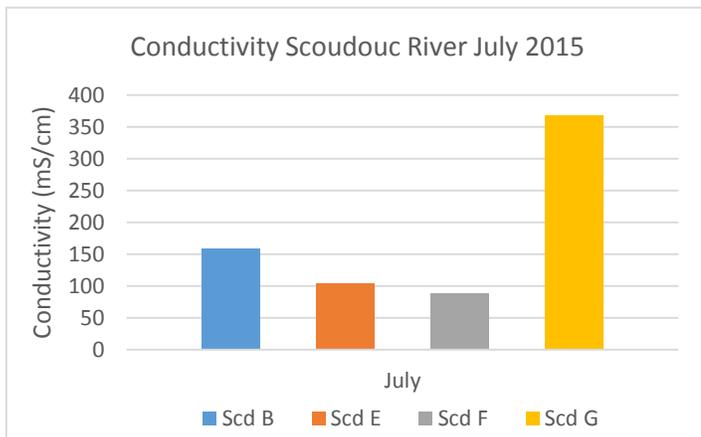
Conductivity is the measurement of the ability of water to pass an electrical current. It is affected by the amount of inorganic dissolved solids (nitrate, chloride, sulfate, sodium, etc.) found in the water. The conductivity level may be influenced by rainwater, agricultural or urban runoff and the geology of the area. There are no set criteria for conductivity levels for water quality, but the US Environmental Protection Agency states that stream 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.

The following interpretation for conductivity of 2015 excludes the month of July. The overall conductivity mean for the Scoudouc River (Fig.8) and for the Shediac River (Fig.9) was 0.108 mS/cm and 0.099 mS/cm, respectively. The highest conductivity level recorded was 0.480 mS/cm at site ScdG in the month of October, and is consistently higher than any other site every month. The lowest level recorded was 0.018 mS/cm at site ShdE in the month of October, consistent with the data from 2014 (0.015mS/cm for October).

The month of July was very different from the usual conductivity readings (Fig.10) (Fig.11). The levels measured were between 89.3 and 367.8 mS/cm, with an average of 163.6mS/cm. The same thing happened in July of 2014, with an average 155.5 mS/cm, leading us to conclude that there was no instrument malfunction, but an occurrence of higher dissolved minerals in the last two months of July. We will be keeping watch on this parameter in 2016, as well as attempt to determine the cause of these high conductivity readings. Heavy precipitation events are suspected.



Conductivity levels for Scoudouc and Shediac River 2015

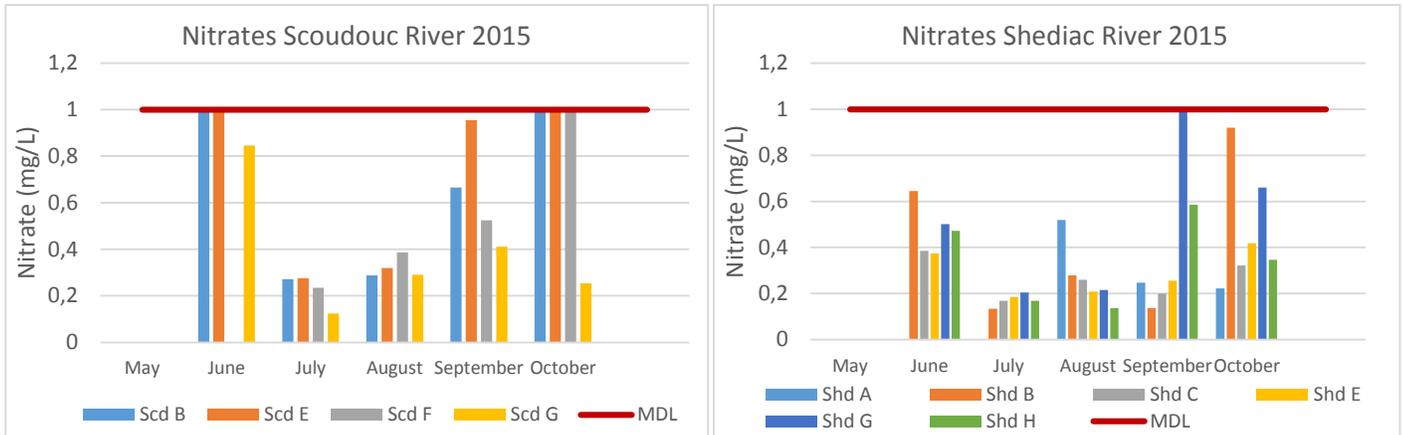


Conductivity levels for Scoudouc River and Shediac River for July 2015

2.2.5 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 for the protection of aquatic life in freshwater is set at 13 mg/l (NO₃).

The overall mean for all sites was 0.47 mg/L. The overall mean for the Scoudouc River (Fig.12) and the Shediac River (Fig.13) were 0.57 mg/L and 0.36 mg/L, respectively. The highest levels recorded were at the maximum detectable limits of 1 mg/L, on five occasions in the Scoudouc River; ScdB in June and October, ScdE also in June and October, and ScdF in October.

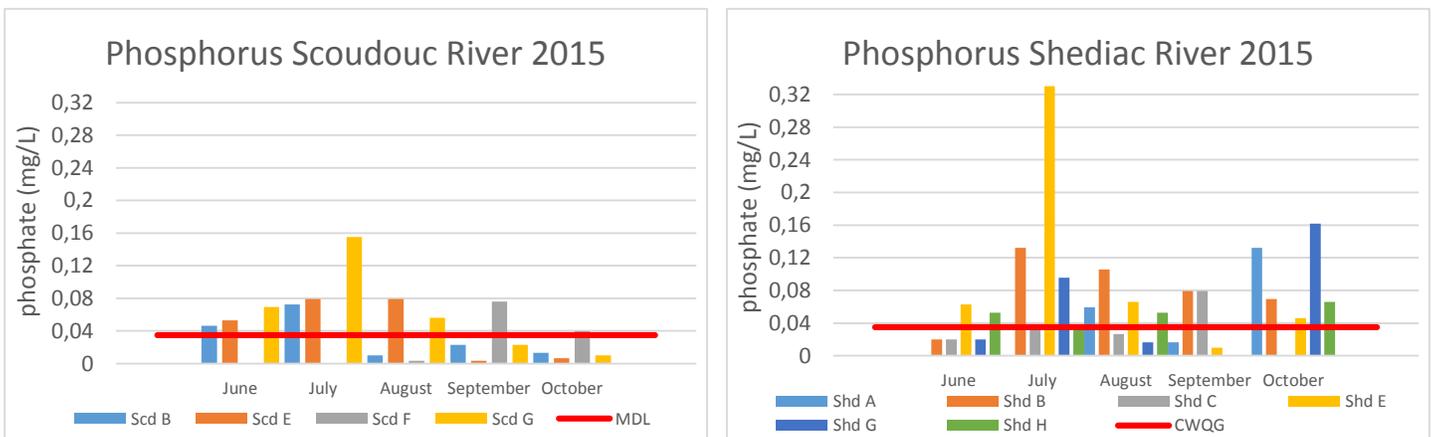


Nitrate levels for the Scoudouc and Shediac River, 2015

2.2.6 Phosphates

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.

The overall mean for the Scoudouc River (Fig.14) and the Shediac River (Fig.15) were 0.04 mg/L and 0.06 mg/L, respectively. The highest level recorded for the Scoudouc River was 0.15 mg/L at ScdE in August, and the lowest level was below the detection limit of 0.01 mg/L. The highest level recorded for the Shediac River was at the maximum detection limit of 0.33 mg/L at site ShdE in the month of July, and the lowest level recorded was below 0.01 mg/L at multiple sites; ShdG and ShdH in September, and ShdC in October.

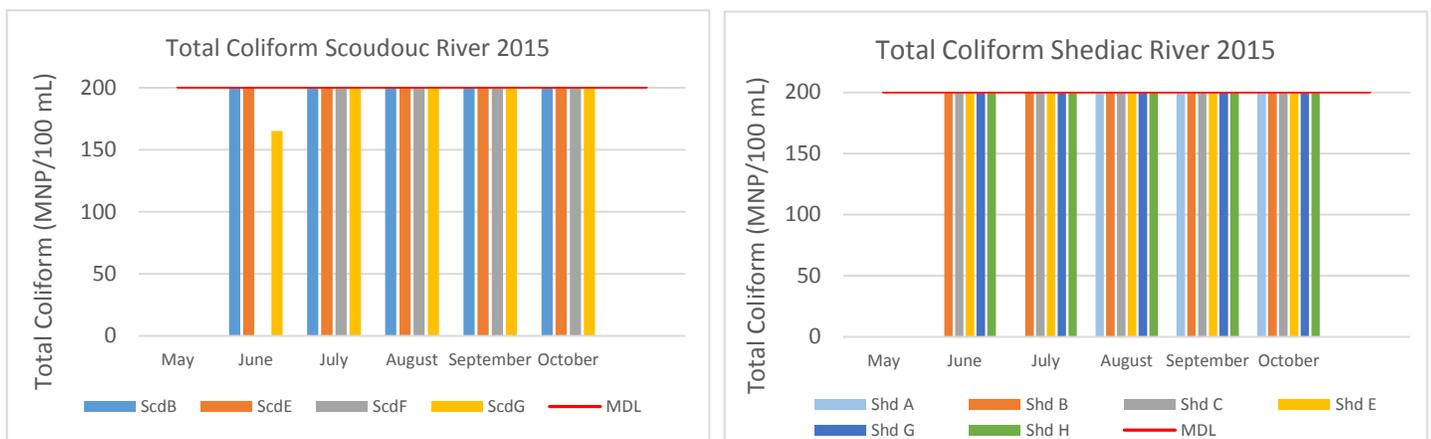


Phosphates levels for Scoudouc and Shediac River, 2015

2.2.7 Total Coliform

Coliforms are the commonly used bacterial indicator of sanitary quality for food and water. Coliforms are abundant in warm-blooded animals, but can also be found in aquatic environments, in soil and on vegetation. The acceptable count of coliforms in water for recreation is set at 400 MPN/100 ml. The method used to analyze bacterial concentration by the laboratory in 2015 has maximum detection limits (MDL) of >200.5 MPN/100 mL (Most Probable Number).

The overall mean for all sites was at the maximum detection limit of >200.5 MPN/100 ml (Most Probable Number), and it was the level measured at 99% of all sampled site during the 2015 sampling season (Fig.16) (Fig.17).

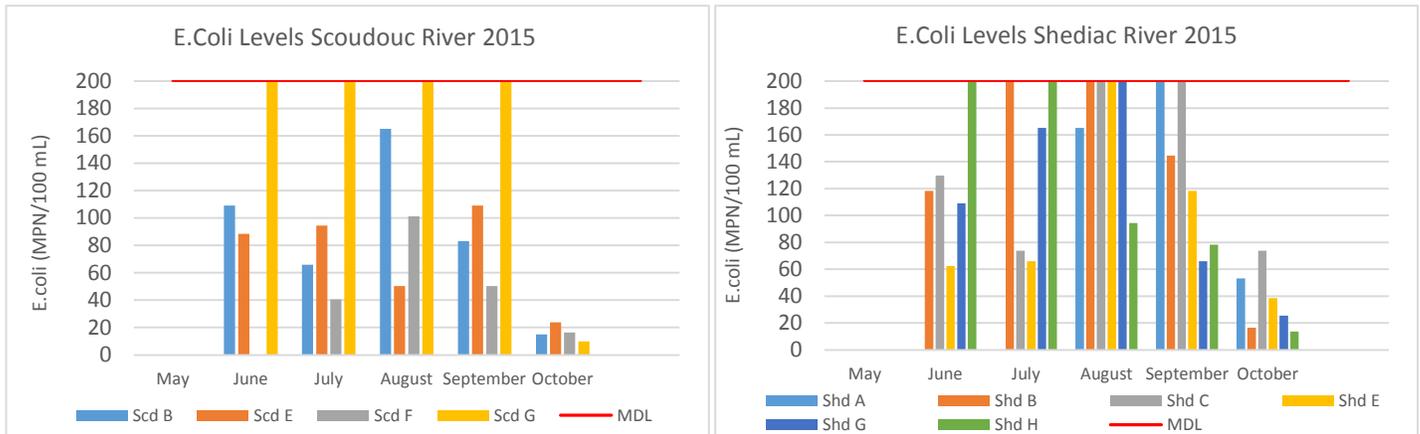


Total coliform count for Scoudouc and Shediac River, 2015

2.2.8 Escherichia 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 common indicator of fecal contamination. The acceptable count of E.coli in water is set at 400 MPN/100 ml.

The overall mean for the Scoudouc River (Fig. 18) and the Shediac River (Fig. 19) were 117.82 MPN/100 mL and 122.02 MPN/100 mL, respectively. The highest recorded level of E.coli in the Scoudouc River was >200.5 MPN/100 mL at ScdG every sampling month except October, when this site had the lowest recorded level for the Scoudouc River. This site (ScdG) is located in an agricultural field. The highest levels in the Shediac River were >200.5 MPN/100 mL, and it was recorded at 32% of the sites sampled during the season, especially in the month of August, where 4 out of 6 sites were above detection limits.



E.Coli levels for Scoudouc and Shediac River 2015

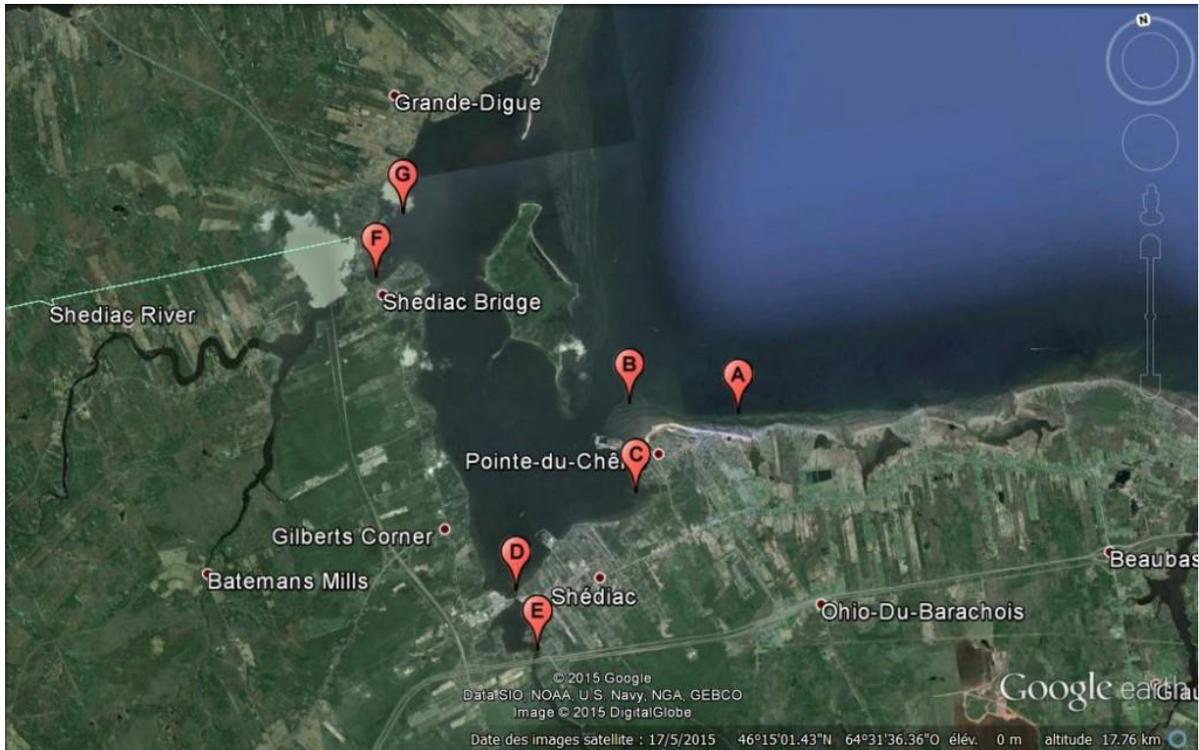
2.3 Historical Data of the Shediac and Scoudouc Rivers Physico-chemical Characteristics

This fall, all the water quality data since the beginning of the Association in 1999 has been compiled and organized into a usable format, thus creating an updated database for further studies by the Association itself and interested organizations. The water quality database allows us to create graphs that will tell the story of our rivers. There are so many possibilities for the use of this data, for example; showing the evolution of each site over the years, showing the averages of any parameters in our Rivers on a long-term or short-term basis, etc. These graphs displaying historical water quality data will eventually be available on an interactive map on the Association’s website.

2.4 Water Quality Monitoring in the Shediac Bay

The SBWA has been monitoring freshwater quality in the rivers for many years. In 2015, we expanded our sampling to the salt-water areas in and around Shediac Bay. Our monitoring program helps us to better respond to environmental threats to the health and safety of aquatic life, and to those people that depend on the bay for recreation, commercial fisheries, and aquaculture.

Water samples are collected by boat at approximate 3 week intervals at the locations shown on the map. More exact location detail and lat-long values can be found in our protocol document on our web page.



Water quality monitoring sites 2015

Station	Fecal Coliform (MPN* per 100ml)			
	<u>19-07-2015</u>	<u>11-08-2015</u>	<u>25-08-2015</u>	<u>14-09-2015</u>
A	2	7	2	79
B	11	8	350	33
C	11	130	17	8
D	4	2	4	5
E	49	33	49	23
F	2	7	280	110
G	240	23	5	13
H			5	2

***MPN:** The most probable number (MPN) of coliform or fecal coliform bacteria per unit volume of a sample. It is expressed as the number of organisms which are most likely to have produced the laboratory results noted in a particular test.

2.5 Macro-Invertebrate Survey (CABIN)

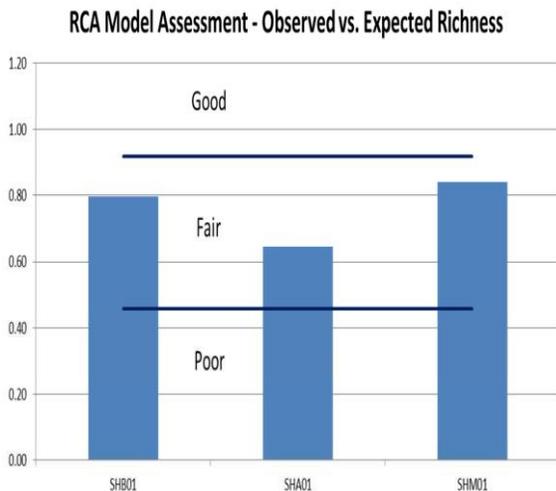
The SBWA field team has been certified to conduct the CABIN (Community Aquatic Biomonitoring Network) sampling of macroinvertebrates. This sampling program compliments the water quality monitoring program, as the composition of the macroinvertebrate community is an excellent indicator of water quality. The sampling was done in partnership with a study from the Miramichi River Environmental Assessment Committee (MREAC), looking to increase CABIN data in Atlantic Canada. The data from field sheets, laboratory analysis, and site photos have been entered in the CABIN Data Management website and can be shared with other groups.



SBWA team doing CABIN surveys 2015

The following Reference Condition Approach (RCA) assessment results illustrate the findings for Observed vs. Expected Richness, and also show other RCA outputs for Shediac Bay Watershed Association.

Various indexes used to evaluate water quality and habitat integrity using macro-invertebrates community as bio-indicators for the Scoudouc and Shediac rivers in 2015



Site_Ids	O/E Richness	O/E Berger_Parker	O/E Simpson	O/E Pielou	O/E Shannon
SHB01	0.80	1.52	1.26	1.31	1.30
SHA01	0.65	1.36	1.16	1.13	1.10
SHM01	0.84	1.33	1.17	1.11	1.13

RCA Model Assessment for Shediac River CABIN Sites 2015

2.6 Electrofishing

As part of our restoration efforts, electrofishing surveys were done at our restoration sites to establish baseline data on existing populations in the degraded habitats. These surveys will act like a before snapshot, to be compared with future surveys to allow us to measure the benefit of our restoration work.

The team was very excited to find Atlantic salmon parr at 2 out of 3 sites surveyed; in the McQuade brook (Shediac River), and in the Scoudouc River, near the convergence of the Dionne Brook.



Electrofishing surveys in the Shediac (top left) and Scoudouc Rivers (middle left), salmon parr (bottom left), from top to bottom on right: brook trout, brook trout, salmon parr, tail comparison of brook trout and Atlantic salmon 2015

2.7 Community Aquatic Monitoring Program

The SBWA has completed its 10th year in a partnership with Fisheries and Oceans Canada to monitor fish population health in the Bay. Our staff and volunteers sample the same 12 locations around the mouth of the estuaries of the Scoudouc and Shediac rivers, to measure any significant changes in aquatic life. Using the contents from a 30-meter fishnet as a barometer for identifying changes in our local ecology, we are able to identify and investigate ecological changes as they occur.



Field Team doing C.A.M.P. sampling in the summer 2015

2.8 Green Crab Monitoring

Monitoring the invasive and devastating green crab population in Shediac Bay has been a part of the SBWA program since 2013 by the SBWA to monitor green crab populations. In-kind support from DFO allowed SBWA to carry out this study within an acceptable budget for the first two years.

The sampling allowed us to determine the changes in the population structure over the 3-year study. Overall, there seemed to be an increase in population density in 2014 compared to 2013. In 2015 however, we had unexpected results. The population numbers dropped dramatically, led us to believe that the previous harsh winter may have had an impact on the green crab population.

The invasive green crabs are a threat to the quahog and eel fishery in the bay, and to very important eel grass habitats.



3 HABITAT ENHANCEMENT AND RESTORATION

3.1 Fish Habitat Restoration

Fish Habitat restoration is a major initiative of the SBWA. Areas where bank erosion occurs causes an excess of sediment in the watercourse, which can cause various issues for aquatic ecosystems; it can suffocate fish and fish eggs, bury aquatic insects, can carry harmful pollutants such as phosphorus and heavy metals that can further worsen conditions of the ecosystem, etc.

3.1.1 Bank Stabilization near the Dionne Brook, Scoudouc River

The SBWA identified a severe erosion problem in the Scoudouc River, near the convergence of the Dionne Brook. This erosion was creating heavy loads of sediment that covered the substrate on a 500 m stretch downstream of this site.

An 18 ft. (5.5m) retaining wall was built into the eroding bank in the meander. Once the retaining walls were installed, trees were planted and straw was used to cover and retain the soil. In total, there were approximately 45 trees planted on a 50 metre segment of the site. On both sides of the wall, deflector trees (*Balsam fir*), were installed along the bank to protect it against erosion and even help rebuild the bank.



Construction of the Scoudouc River retaining wall, 2015

3.1.2 Beaver Dam Removal Shediac River

This site is located in the McQuade Brook, a tributary to the Shediac River. This site had significant fish movement impediments caused by the presence of abandoned beaver dams. Four beaver dams covered a 225 meter stretch of this stream. These were old abandoned beaver dams with large amounts of sediments trapped within them. The dams were removed manually, with the help of shovels and rakes, and were done in accordance with the guidelines provided in the watercourse alteration permit.

Once the flooded areas were drained and dried, approximately 95 native trees were planted to eventually provide shade and help with stabilization of the banks. The team then spread clover seeds throughout the entire area where there was exposed soil, covering a surface of approximately 5,200 m² or 0.5 hectares.



Beaver dam removal site in Shediac River tributary 2015

3.2 Fish Ladder

The SBWA installed a 10-foot aluminum fish ladder on an older elevated culvert in the McQuade brook, a major tributary to the Shediac River. The culvert was identified as being an impediment to fish migration upstream of the bridge towards suitable spawning areas. In 2014, the group did significant restoration work upstream of this culvert. This included beaver dam and debris removal, and tree planting on the riverbanks.

There are numerous fish ladders in New Brunswick, mostly wood and cement structures. This novel structure is the only one in the southeast region made of this heavy-duty aluminum design. Atlantic salmon and brook trout has traditionally used this stream during spring and fall migrations but the numbers of fish have certainly dropped in the last 40-50 years. Restoring healthy habitats for fish is one of the mandates of this watershed group.



Fish ladder installation in the McQuade Brook, 2015

3.3 Tern Platform

A number of years ago, during construction of the Shediac Bay, a barge was filled to create a breakwater for the Shediac Bay Marina. This barge proved to be an ideal habitat for the common tern and a colony was subsequently established. However, the barge had to be replaced and last year the tern colony lost its home.

Knowing that there was little if any alternative habitat in our area for the tern colony, the SBWA established an experimental tern platform that successfully demonstrated it could provide a nesting area. Based on this success, this year the platform has been expanded, with more than 100 birds now having adopted it as nesting area. Our counts indicate that there are over 100 eggs among 41 nesting pairs.

The platform is located in the southeast corner of Shediac Bay, and can be easily viewed from the Pointe-du-Chêne walking trail bridge.

This project is supported with funding from the Environmental Damages Fund and the Wildlife Trust Fund. A special thanks goes out to the Shediac Bay Yacht Club for donating docks that were used to build the new platform. Thanks also go to the Canadian Wildlife Service – Environment Canada for their support.



Artificial habitat for the Common Tern occupied by colony and Tern nest

4 BIODIVERSITY AND SPECIES AT RISK

4.1 Biodiversity Project with the Town of Shediac

The Shediac bay watershed partnered with the town of Shediac to increase biodiversity in green spaces around the municipality. We accomplished this by planting native trees and shrubs as well as installing nest boxes.

We planted a total of 641 native trees and shrubs and 86 nest boxes were installed in the different parks and community spaces around the Shediac Bay.

The following figure shows the different areas that received native trees and shrubs. The following table list areas, tree species and year of planting for this two year project.



List of Trees Planted in 2014 and 2015 (from report in French)

<u>Lieux</u>	<u>Espèces</u>	<u>Quantité</u>	<u>Année</u>
Parc Centenaire de Shédiac	Sureau / Elderberry	8	2014
	Viorne trilobée / Highbush Cranberry	15	2014
	Cornouiller stolonifère / Red Osier Dogwood	5	2014
	Frêne Blanc / White Ash	17	2014
	Total Parc Centenaire : 45 Arbres et Arbustes		
Piste du Millénaire	Pruche d'Amérique / Hemlock	30	2014
École MFB	Chêne Rouge / Red Oak	2	2014
Total pour 2014 : 77 Arbres et Arbustes			
Webster Park	Chêne Rouge / Red Oak	3	2015
	Sorbier d'Amérique / Mountain Ash	5	2015
	Amélanchier / Serviceberry	2	2015
	Noyer Cendré / Butternut	4	2015
	Érable Rouge / Red Maple	2	2015
Total Webster Park: 16 Arbres			
École Mgr-François-Bourgeois	Érable à Sucre / Sugar Maple	7	2015
	Cèdre Blanc / White Cedar	3	2015
	Peuplier Baumier / Balsam Poplar	2	2015
	Frêne Blanc / White Ash	1	2015
	Frêne de Pennsylvanie / Green Ash	4	2015
	Cornouiller stolonifère / Red Osier Dogwood	10	2015

	Viorne trilobée / Highbush Cranberry	21	2015
	Sureau / Elderberry	10	2015
Total École MFB: 58 Arbres et Arbustes			
Centre communautaire de Pointe-du-Chêne	Chêne Rouge / Red Oaks	3	2015
Total Pointe-du-Chêne : 3 Arbres			
Ruisseau Ohio	Chêne Rouge / Red Oak	45	2015
	Érable Rouge / Red Maple	20	2015
	Bouleau Jaune / Yellow Birch	51	2015
	Érable à Sucre / Sugar Maple	2	2015
	Épinette Blanc / White Spruce	20	2015
	Cèdre Blanc / White Cedars	55	2015
	Cornouiller à feuilles alternes / Alternate leaved Dogwood	1	2015
	Viorne trilobée / Highbush Cranberry	5	2015
	Viorne Cassinoïde / Wild Raisin	1	2015
	Noyer Cendré / Butternut	1	2015
	Chêne à gros fruits / Bur Oak	1	2015
Total Ruisseau Ohio : 202 Arbres			
Champs de Baseball Shédiac	Érable Rouge / Red Maple	4	2015
	Chêne Rouge / Red Oaks	4	2015
Événement "TD Tree Day"			
Champs de Baseball Shédiac	Chêne à gros fruits / Bur Oak	12	2015

Chêne Rouge / Red Oak	10	2015
Noyer Cendré / Butternut	18	2015
Frêne Blanc / White Ash	11	2015
Sorbier d'Amérique / Mountain Ash	4	2015
Érable à Sucre / Sugar Maple	21	2015
Érable Rouge / Red Maple	4	2015
Bouleau à Papier / Paper Birch	13	2015
Bouleau Jaune / Yellow Birch	3	2015
Viorne Cassinoïde / Wild Raisin	8	
Pin Blanc / White Pine	35	2015
Pin Rouge / Red Pine	11	2015
Pruche d'Amérique / Hemlock	10	2015
Épinette Blanc / White Spruce	30	2015
Mélèze / Tamarack	1	2015
Cèdre Blanc / White Cedar	47	2015
Viorne trilobée / Highbush Cranberry	29	2015
Cornouiller à feuilles alternes / Alternate leaved Dogwood	10	2015
Événement "TD Tree Day" total: 277 Arbres et Arbustes		
Total Champs de Baseball Shédiac : 285 Arbres et Arbustes		
TOTAL	641 Arbres et Arbustes	

We also installed 86 nest boxes for 4 different bird species. The following figures show the area where the nest boxes were installed in the town of Shediac and in the village of Grande-Digue

The table gives details of location, number and type of nest boxes installed.



Location of nest boxes in the Town of Shediac, 2015



Location of nest boxes in Grande-Digue, 2015

Location, numbers and type of nest boxes

Emplacements des Nichoirs d'oiseaux				
	Mésange à tête noire	Hirondelle bicolore	Merle d'Amérique	Canard branchu
Espace vert Rue Dock		8		
Parc John-Lyons		5		
Parc Centenaire			6	
Parc Ourson			14	
Parc Rotary		7		
Parc Webster	10			
Parc Pascal-Poirier	7			
Rue Ohio				3
Notre Centre Grande-Digue		16		
École de Grande-Digue		1		
École MFB		9		
Total	17	46	20	3

4.2 Brook Floater Habitat Assessment

The Brook Floater (*Alasmidonta varicosa*), is a medium-sized freshwater mussel that was found in scattered regions of New Brunswick, Nova Scotia and certain regions of the East Coast of the USA. The population was never abundant, representing only 1-5% of total freshwater mussel populations in the areas where it was found. In 2009, it was given the status of special concern by COSEWIC when the species disappeared from 2 historical sites and approximately half of its known locations in the USA, leaving the Canadian populations to represent the majority of the remaining global populations of the Brook Floater. In 2013, it was added to the *Species at Risk Act*, Schedule 1 (SARA).

In 2005, the SBWA conducted a study on freshwater mussels within the boundaries of its watershed. The main objective was to establish the biodiversity and population status of freshwater mussels in the Shediac Bay watershed.

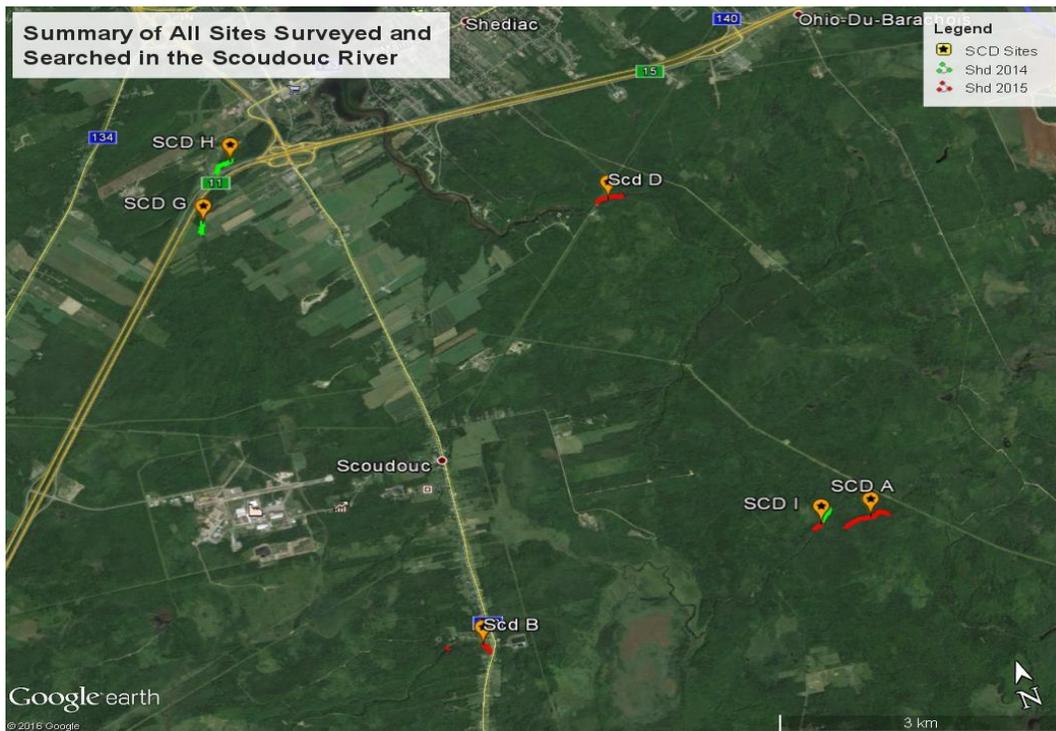
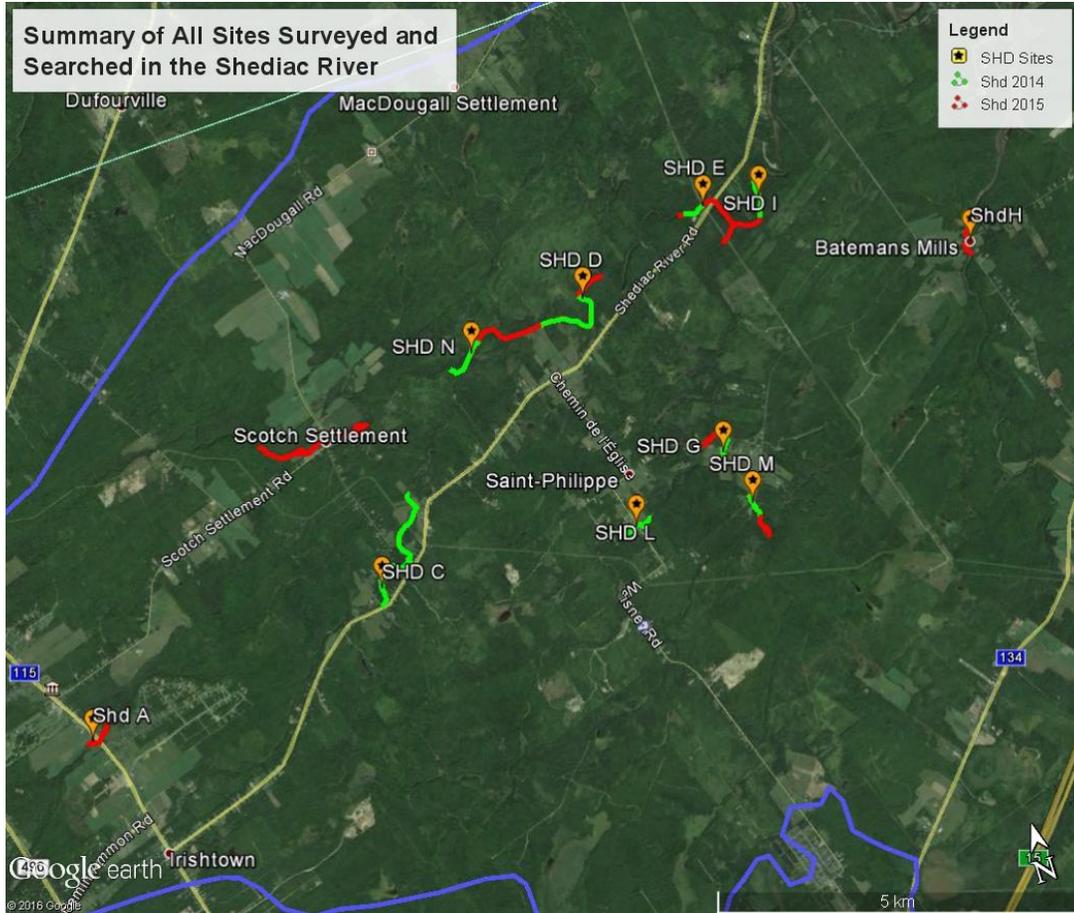
During the surveys in 2005, a total of 122 Brook Floaters were recorded to have been found throughout the Shediac River, Scoudouc River and their tributaries. In 2014-16, the Shediac Bay Watershed Association embarked on a new 2-year project containing the following objectives: reconfirm the presence of the Brook Floater in the watershed; assess the health of the surrounding habitat; work with landowners to create a plan of protection for its habitat.



The field team searched many sections of river but no brook floater mussel was found during the surveys.

The following section will summarize total areas searched for the brook floater mussel and its habitat over the 2014 and 2015 field sessions. The following figures illustrate mapping of all those areas; all paths drawn in green represent 2014 season, and those in red represent the 2015 field season.

Information was collected on other mussel species found and sent to the Atlantic Canada Data Conservation Center and the NB museum. A report on possible threats to Brook Floater habitat in the Shediac and Scoudouc rivers has also been written and is available on our website.



5 PUBLIC OUTREACH AND EDUCATION

Thanks to the support of the Environmental Trust Fund and other funding partners the Shediac Bay Watershed Association has expanded its education program in 2015-16. Regular annual activities such as the beach sweep was continued and new events such as tree planting days were added. The Association also had a greater presence in local schools for presentations and to help the students make concrete actions to help the environment. The SBWA was also available for special events and presentations when invited.

5.1 Beach Sweep

In celebration of World's Oceans Day, a public beach sweep event is organized every year by the SBWA, in partnership with the Town of Shediac. The event began at the Homarus Eco-Center, at the Pointe-du-Chêne wharf on Saturday, June 6th 2015.

Although that morning was pouring rain, a group of approximately 25 volunteers showed up with their raincoats and boots, ready to pick up garbage along the coastline. SBWA staff provided them with gloves, garbage bags and small handout gifts to thank them for their work. There were designated drop-off points for the garbage bags, which was then picked up by the Town of Shediac.

Our volunteers were invited to a lunch of hot dogs on the BBQ, provided by the Shediac Co-Op. Thankfully the rain had ceased and everyone had a good time conversing with one another and also enjoyed the season opening of the Homarus Eco-center.



Figure 1: Annual Beach Sweep June 6th 2015

5.2 Public Tree Planting Events

A two-year biodiversity enhancement project had a goal of planting 550 native trees and shrubs in the town of Shediac, and to build 60 bird houses for four species of birds. Having attained those goals in 2015, additional funding was received to plant an additional 75 trees and build 25 extra bird houses.

5.2.1 MFB School Educational Garden: “*Jardin Pédagomax*”

The SBWA became a partner in a project to create an educational garden and green space named “*Jardin Pédagomax*”, at the Monseigneur-François-Bourgeois elementary School in Shediac. The SBWA provided approximately 60 native trees and shrubs to plant around the school, as part of our biodiversity enhancement project

5.2.2 TD Tree Day

The biggest tree planting event realized, a TD Tree Day, was organized on September 26th 2015, in partnership with TD Friends of the Environment Foundation. Over 30 wonderful volunteers of all ages showed up motivated to plant 277 trees and shrubs throughout the Shediac Baseball Field, located behind the MFB elementary School. An “Acadian Forest Corner” was created with a mix of various species of deciduous and coniferous trees found in the forests of New Brunswick. This area will be a perfect educational tool for the kids to learn about their forest in the comfort of their own backyard. An interpretation panel on the Acadian Forest has been installed at the park to inform visitors about the importance of the Acadian Forest and the planting activities accomplished.



Figure 2: TD Tree Day at the Shediac Baseball Field, September 26th.

5.2.3 Tree Planting near Ohio Rd.

The SBWA organized two separate public tree planting events for the site surrounding a small brook next to Ohio Road. The riparian zone around this brook was severely damaged by flooding caused by the presence of a beaver dam a few years ago. It was therefore targeted as our tree planting site to begin the restoration process of the riparian zone.

The first event organized was held June 20th 2015, and a total of 112 small trees (30 cm) were planted. The native species planted are tolerant to the damp soil conditions of this site and consisted of red oaks, red maples and yellow birch. The second event was organized October 24th 2015, and a total of 84 native trees were planted. Here we had some larger trees: white spruce, large white cedars and some smaller white cedars.



Figure 3: Public tree planting near Ohio Rd; volunteers planting and trees (top photos June 20th, middle photos October 24th)

5.3 Bird Houses

The SBWA reached its goal on the construction and installation of 60 bird houses in the Town of Shediac. The bird houses were built by the 4th grade students at the MFB School in March of 2015, for the following species: black-capped chickadees, tree swallows, American robins and wood ducks. All nesting boxes were installed in the spring, throughout the town’s public parks and green spaces. There was a great success in attracting nesting Tree Swallows.

Having met our objective, additional funding was received from EcoAction to build 26 more bird houses, this time for only one species, the tree swallows. We organized another workshop in November 2015, working with the same 4th grade teachers at MFB School. Approximately half of those nesting boxes were placed in Grande-Digue, behind the Notre Centre community Center, and the other half has been placed behind MFB School and on the adjoining baseball field.



5.4 Interpretation Panels

As part of the Biodiversity enhancement project, three different interpretation panels have been professionally designed and have been placed at 3 locations: the Rotary Park (Big Lobster), Shediac Baseball Field behind MFB School, and at Webster Park. The panels have text and photos educating on the Acadian Forest, Biodiversity and Tree Swallows.



5.5 School Program

The SBWA has been creating new partnerships with local schools and strengthening old ones. We have raised brook trout in classrooms, did presentations and organized bird house building workshops.

5.5.1 Fish Friends

In March of 2015, the fish friends program began with the 3rd grade students at MFB School, with an aquarium containing approximately 200 brook trout eggs. During the course of the program, from March to June, both classes were combined for various presentations on salmonids, their life cycle, habitat requirements, etc. The brook trout began hatching on April 15th, which excited the kids as much as the teachers.

A field trip was organized on June 12th to release 148 juvenile brook trout in the Dionne Brook, a small tributary to the Scoudouc River. Each child was given a mason jar with 2-3 young trout to release, and the teachers also did the honours of releasing the remaining trout. Once the fish were released, SBWA staff showed the kids' freshwater mussels (*Margaritifera margaritifera*), as well as macro invertebrates that were collected with a kick net.



Fish Friends field trip June 12th 2015

5.5.2 Classroom Presentations Summary

It has been a great year for classroom presentations for the SBWA. A stronger relationship with the Shediac Cape School was established in 2015. Three new teachers have taken advantage of our science presentations to complement their curriculum, and engage their students with additional subjects on the environment and on local environmental concerns. Students have become accustomed to the SBWA biologist, and are always excited to receive new presentations. The teachers and school principals are all very appreciative of our work. In total, 24 presentations were given using 10 different presentation topics.



SBWA biologist speaking on biodiversity to 4th graders at Shediac Cape School

5.6 Shediac Farmer's Market in the Park

An education Kiosk was displayed on Sundays for 10 weeks in the summer, at the Shediac Farmer's market. In the summer of 2015, staff spoke to over 350 visitors of all aged about the watershed group, local environmental issues and projects realized to mitigate these issues. People were especially interested in hearing about the invasive green crab, salmon populations and habitat restoration, our tern platform and water quality monitoring.



SHEDIAC FARMER'S MARKET IN THE PARK 2015

5.7 Public Outreach Summary

The following table tallies approximate number of people that have attended events and viewed information organized by the Shediac Bay Watershed Association. We estimate to have reached over 10 000 people in the community through the various presentations, displays, news stories and partnerships.

Project	Deliverables	# People Reached
1) Public outreach activities	-1 Beach Sweep event aimed to combat marine litter	25
	-4 tree planting events: MFB school tree planting day, TD Tree Day, 2 open to the public	80
	-2 bird house-building workshops with students	106
2) Public Presentations	-Shediac Community Garden Committee on stormwater runoff	10
	-Scoudouc River Canoe Club	35
	-“ Institut féminin francophone du Nouveau-Brunswick”	85
	- Amis de la Nature du sud-est du NB	25
	- SBWA Annual General Meeting	20
3) School Programs	- Fish Friends Program in 1 local elementary	42
	-School Presentations Series: 10 presentation subjects, 24 presentation	300+
4) Educational Kiosks	-Information Kiosk Market In The Park every Sunday for 10 weeks in 2015.	350+
	-Kiosk at the Shediac Lobster Festival for 3 days	Unknown
	-Kiosk at the Bouctouche EcoFestival for 1 day	20
5) Homarus Eco-centre	-Student worked part-time at the Eco-Center	5,200 +
6) Communications and Outreach	-Two bilingual newsletter to the public	800+
	-3 televised news reports with CBC News	Unknown

	-2 Articles in the Times & Transcript	Unknown
	-1 video interview by Shediac Market in the Park published on Social media	740+ views
	-Photo albums with SBWA project description shared on social media	2880+ views

5.8 Kiosk at the Lobster festival

In partnership with the Homarus Eco-centre, a kiosk was set up for three days at the Shediac Lobster festival from July 8th-10th 2015. Our summer student spoke of our projects in the same fashion as the Shediac Farmer's market in the Park.

5.9 Booth at the Bouctouche Eco-Festival

Our education kiosk was present at the Bouctouche Eco-Festival on September 19th. Visitors received information on our watershed group, and free trees were given to interested families.

5.10 News Coverage

The SBWA has received some media coverage for this project. We post links to articles on our Facebook page and website for consultation.

The Shediac Farmer's market

The Shediac Market Park created a 6 min video on the Shediac Bay Watershed Association's educational kiosk, where our manager spoke of our various projects. The video was shared on social media and has over 700 views.

<https://www.facebook.com/shediacparkmarket/videos/959801644080213/>

Fish Ladder

CBC news New Brunswick covered our fish ladder project, on an evening news broadcast on September 9th, the following link at 19 min. The online written article can be found in

<http://www.cbc.ca/player/play/2675166165>

An article was also written in the Times and Transcript on our fish ladder story on November 21st.

Electrofishing surveys

CBC news New Brunswick covered our electrofishing surveys, on an evening news broadcast on September 22nd, the following link at 27 min.

<http://www.cbc.ca/player/play/2675988118>

5.11 Social Media & Website

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

www.shediacbawatershed.com

6 PARTNERSHIP WITH STAKEHOLDERS

Continued partnerships are essential to continue long term remediation efforts. A partnership with the Scoudouc River Canoe Club is still ongoing. Members of the club report to the SBWA on issues they see when canoeing down the river in the spring. The SBWA also has, on many occasions, provided garbage bags to the club members for their run, in an effort to clean up litter that they come across.

An important partnership with the Friends of the Kouchibouguacis watershed group has been ongoing for the past 2 years, to accomplish electrofishing surveys. This activity requires a team of staff certified to do electrofishing, therefore we've been working together to do these activities more efficiently.

The town of Shediac was a partner with the SBWA to increase biodiversity in the various parks around the municipality. We organized native tree planting events and erected bird houses to encourage more biodiversity in the town limits. Interpretation panels were then produced to present the project.

Every summer, a partnership with Homarus Eco-center at the Pointe-du-Chêne wharf is maintained by sharing one of our summer students, to work part-time at the Center. The student is trained to give presentations to groups of visitors of all ages. In the summer of 2015, there were approximately 5,200 visitors at the eco-center.



HOMARUS ECO-CENTRE 2015

6.1 Meeting with Environmental Groups of Southeastern NB

To encourage more partnerships and sharing of knowledge and resources, two meetings were organized with the various watershed groups and other environmental organizations in Southeastern New Brunswick.

The first meeting was hosted by the SBWA on November 24th, in Shediac NB. Members from 7 groups made it to the meeting to present various projects, and also bring to light any human resource skills and equipment that could be useful to others, such as certifications for various activities and access to costly equipment.

The second meeting was organized by the SBWA and the “Groupe de Développement Durable du Pays de Cocagne” on February 18th, with a more specific purpose of sharing knowledge on stream and coastal restoration projects. The guest speaker for this meeting, Ben Wallen of the Kennebecasis Watershed Restoration Committee, gave a one-hour presentation on his 15 years of experience in various restoration techniques and landowner relationships. There were also 7 groups present at the meeting.

6.2 Climate Change Adaptations

Water quality can be negatively affected by a warming climate. Climate models predict that the warmer temperatures will bring an increase in high-intensity precipitation and greater risks of flooding for New Brunswick waterways.

The SBWA is part of a study with Nature NB, the Regional Commission 7 and the University of Moncton to assess the impacts increased events of heavy rainfall due to climate change on the landscape. The study will be looking at how natural landscapes such as marshes and forests help reduce flooding. The study regroups researchers, planners and watershed groups to discuss climate change and adaptations for southeastern NB.

A case study site is on the Shediac River near a new subdivision development in Irishtown. The Shediac Bay Watershed Association has a historical monitoring site in that area and we have updated the information for the purpose of this study. The University will then model this site to determine the effects of current and future land use and various precipitation scenarios on water levels and flooding in the Shediac River.

The group will also examine ecosystem-based adaptations as a strategy for the local service commissions to minimize the risks of flooding. These include preserving green spaces at strategic locations, protections of marsh lands and keeping good forested buffer zones along streams.

The Shediac Bay area is also included in an international study (www.artisticc.net) with the village of Grande-Digue. This study looks at the challenges of climate change in various coastal communities and how research can help develop strategies to adapt to these challenges. The SBWA has participated in several meetings to provide water quality information and local knowledge to the researchers.

7 CLOSING COMMENTS

With a variety of funders and projects the Shediac Bay Watershed had a busy year of monitoring, education and restoration projects.

The SBWA had a strong team to ensure that all the work got done on time. The manager Rémi Donelle was working part-time in 2015 due to a paternity leave from December 2014 to August 2015. Jolyne Hebert assured the interim management of staff and projects during this time then took the position of head technician for the remainder of the year. Helen Hall was hired as a financial administrator during the paternity leave and stayed on until March to further administrative and financial tasks.

We called upon Jim Weldon again to do the project coordination for green crab monitoring, fish ladder installation and the tern platform project. He also helped with proposals and reporting.

Thanks to the Science Horizon program we had Mélissa Trembla as an intern for a seven month term. She did an great job on our water quality database.

Our summer students were Ryan Boudreau and Sara Mills that were kept busy during the summer with a variety of projects.

We accomplished a lot in 2015 and we hope to continue to expand our work to include more monitoring and restoration. The Association will also be able to update its state of the watershed report with recent data in the coming years. After 15 years the SBWA still has an important role to play in preserving water quality in the Shediac Bay Watersheds.

Thanks to our board of directors and other volunteers that supports our various projects. Without their support the Association wouldn't exist.

