

Water Quality Monitoring in the Tantramar River Watershed



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By

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Cover photo credit: M. Corkum at Robinson Brook

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Summary

Healthy watersheds are a vital component of healthy, vibrant communities and critical to the overall health and sustainability of New Brunswick. In 2021-2022 with support from the New Brunswick Environmental Trust Fund, EOS Eco-Energy returned to the Tantramar River Watershed to obtain a second year of baseline data about the state of water quality and provide ongoing public education and outreach about the importance of healthy watersheds and actions residents can take to help.

A second year of monitoring allowed EOS to compare 2021 with 2018 results, to better understand current baseline conditions and plan potential future restorations in the face of climate change impacts. The benefits of this project are: increased understanding and awareness of watershed issues, how they might connect to climate change in our region, and contributing to a more resilient population.

This report summarizes the project goals, methodology, water quality monitoring, education and outreach activities, staff training, priority measures, benefits and recommendations.

The goals of the project were:

1. The execution of a water quality monitoring program
2. A report summarizing the current state of our watersheds
3. The protection of aquatic resources in Silver Lake
4. Public education to build awareness of the importance of healthy watersheds in the face of climate change

The project methodology consisted of water quality monitoring in the Tantramar River Watershed, reviewing and disseminating our data in a variety of ways, helping to protect aquatic resources in Silver Lake, providing education and outreach on local watershed issues, and taking part in professional development opportunities to continue building watershed management capacity at EOS.

During 2021, water quality measurements were taken from 12 sites across the Tantramar River Watershed. In-situ measurements, consisting of pH, temperature, conductivity, dissolved oxygen, total dissolved solids and salinity were taken from May to October using a Hanna Multiparameter Meter. Water samples were collected from June to September and brought to the RPC Laboratory in Moncton for analysis of 59 parameters. Additionally, although not part of our original proposal, EOS decided, as an added initiative, to also measure Chlorophyll-a from June to September and analyzed results in the ACME laboratory at Mount Allison University. The average WQI for all sites in 2021 was 83.4 which indicates the overall health of the watershed is "Good".

EOS disseminated the results in a variety of ways include a state of the watershed report, public outreach, sharing data with the New Brunswick government and Atlantic Data Stream, and with an online interactive map available on the EOS website.

EOS helped protect aquatic resources in Silver Lake with “Clean Drain Dry” signage at the boat ramp, a public invasive species workshop, and gaining and sharing knowledge about cyanobacteria.

EOS coordinated, partnered, promoted and hosted a variety of educational public workshops and educational activities, including for youth. We promoted our work and findings on social media, and had Mount Allison University students volunteer with our water monitoring staff to learn about water quality parameters.

Our two priority measure indicators (water quality improvements and increasing environmental awareness) were achieved successfully. As planned, we completed 1 management activity which was water quality monitoring of our 12 sample sites in the Tantramar River Watershed. And we exceeded our measures to increase awareness. While we had planned for 11 events, 36.5 hours and 1000 people, we actually had 20 events, 58 hours of interaction and 1509 people were reached via our project.

Overall, EOS had a very successful year of water quality monitoring and public education. This project provided us with valuable additional baseline data that can be used to ensure the health of the Tantramar River Watershed area. Furthermore, it has given us the opportunity to better understand our watershed and share our findings with the public. The continuation of baseline data collection across all Chignecto Watersheds can be used to develop a watershed management plan that will ensure long-term, sustainable water resources which are essential for a resilient Tantramar region. As we continue to collect more data, we will be able to identify trends in the water quality and develop a better understanding of what the “normal” water quality is in our waterways as well as how climate change may impact them.

EOS recommends that the knowledge gaps in our watersheds continue to be addressed through our long-term water quality monitoring program. We would also like to expand our knowledge of our watersheds through the collection of CABIN data, hydrological data, riparian health data, and fish and habitat data. EOS believes that this program should return to the Cape Tormentine Peninsula Watershed Composite area in 2022-23, which was last sampled in 2019, to obtain a second year of information about the current state of water quality within that watershed. This is our next step in building a long-term water quality monitoring program within the Inner Bay of Fundy and Northumberland Strait Watersheds. In addition, we wish to coordinate a variety of public education and outreach activities in the area including bulk well-water testing and a workshop series with hands-on events such as how to use rain barrels, ground water protection, living shorelines, and create a team of youth Water Rangers to assist with recreational water quality testing.

Introduction

Healthy watersheds are a vital component of healthy, vibrant communities and critical to the overall health and sustainability of New Brunswick. Water quality faces threats from climate change across the province and the Tantramar region is among one of the most vulnerable regions to climate change impacts due to its low-lying coastal location. Water monitoring is essential in managing and protecting our water resources in the face of climate change. The New Brunswick Water Strategy (2017), as well as local sustainability, climate change adaptation, and emissions reduction plans (all funded by ETF) all include the need to monitor water quality and maintain healthy aquatic environments within the Tantramar region. Monitoring provides data that can be used to provide benchmarks of water quality that we can strive to maintain and identify problem areas within our watersheds that we can work on improving.

With support from the New Brunswick Environmental Trust Fund, EOS established the Chignecto Watersheds Committee and a long-term water monitoring program in 2017. Over the last four years, EOS has collected water quality data within the Tantramar River Watershed, Cape Tormentine Peninsula Watershed, and the Rockport & Dorchester area. In 2021-2022 the program returned to the Tantramar River Watershed to obtain a second year of information about the state of water quality and provide ongoing public education and outreach about the importance of healthy watersheds and actions residents can take to help. The continuation of baseline data collection across all Chignecto Watersheds can be used to develop a watershed management plan that will ensure long-term, sustainable water resources which are essential for a resilient Tantramar region.

Concerns in the Tantramar River Watershed during 2018 sampling included elevated phosphorus and select metals, high surface water temperatures, and low dissolved oxygen. A second year of monitoring allowed EOS to compare 2021 with 2018 results, to better understand current baseline conditions and plan potential future restorations in the face of climate change impacts. The benefits of this project are: increased understanding and awareness of watershed issues, how they might connect to climate change in our region, and contributing to a more resilient population.

This report summarizes the project goals, methodology, water quality monitoring, education and outreach activities, staff training, priority measures, benefits and recommendations.

Goals

The goals of the project are:

1. The execution of a water quality monitoring program
2. A report summarizing the current state of our watersheds
3. The protection of aquatic resources in Silver Lake
4. Public education to build awareness of the importance of healthy watersheds in the face of climate change

Methodology

The project methodology consisted of four interconnected parts. Specifically, we followed all COVID-19 safety precautions and charted these steps:

1. Continue long-term water quality monitoring

A total of 12 sample sites were selected by the Chignecto Watersheds Committee. These sites were monitored in 2018 and revisited in 2021 for monthly monitoring over the field season (May - October). In-situ measurements were taken with a Hanna Multiparameter probe from May to October, and water samples were collected and shipped to the RPC laboratory for the full suite of surface water analysis from June to September.



Map of Chignecto Watersheds with Tantramar River Area (Source: J. Campbell)

2. Review and disseminate data

EOS supported the New Brunswick Water Strategy (2017) Goal 1, Action 1 by issuing a report on the current state of water quality within the Tantramar River Watershed area. The report includes water quality scores using the Canadian Council of Ministers of the Environment's Water Quality to better communicate results to community members. Data collected through our monitoring program was sent to DELG and uploaded to the Atlantic DataStream database. All data collected was analyzed and summarized in a report that can be found on the EOS website

(<https://eosecoenergy.com/en/wp-content/uploads/2022/02/EOS-Water-Quality-Report-Tantramar-2021-FINAL.pdf>). The report provides an overview on the state of the watershed.

EOS produced interactive maps (using Google Earth files) containing current and previous water quality monitoring and habitat assessment sites. The maps are available on the EOS website at <https://eosecoenergy.com/en/projects/chignecto-watersheds-committee/>. Finally, a presentation on the water quality results was given to the Chignecto Watersheds Committee on February 22nd and a

public presentation is planned for World Water Day on March 22nd along with further public outreach and promotion of the results throughout March.

3. Help protect aquatic resources in Silver Lake

Silver Lake is lived on year-round and has immense recreational and economic value for the Town of Sackville. EOS met with the Town to discuss better signage around Silver Lake and in partnership with the New Brunswick Invasive Species Council (NBISC) provided new free “Clean, Drain, Dry” signage at the lake. EOS also coordinated a virtual workshop with the NBISC for the public on invasive species. Finally, there is increasing concerns about algal and toxic cyanobacterial blooms in NB. Thus, we attended a training workshop on cyanobacteria in February and have provided resources on the Chignecto Watersheds webpage of the EOS website. We have plans to share and promote these resources more in March.

4. Education and outreach

Education is key to enhancing sustainable, resilient communities across Tantramar and increasing peoples’ understanding of impacts in our watersheds and risks associated with poor watershed health. EOS coordinated, partnered, promoted and hosted a variety of educational public workshops and educational activities, including for youth. We also had some community members, namely Mount Allison University students, volunteer with our water monitoring staff to collect water samples and learn about water quality parameters.

Water Quality Monitoring

During 2021, water quality measurements were taken from 12 sites across the Tantramar River Watershed. In-situ measurements, consisting of pH, temperature, conductivity, dissolved oxygen, total dissolved solids and salinity were taken from May to October using a Hanna Multiparameter Meter. Water samples were collected from June to September and brought to the RPC Laboratory in Moncton for analysis of 59 parameters.

Additionally, although not part of our original proposal, EOS decided, as an added initiative, to also measure Chlorophyll-a from June to September and analyzed results in the ACME laboratory at Mount Allison University. The water quality report includes a detailed methodology for Chlorophyll-a analysis.

The objective is to continue to collect baseline water quality in the Tantramar River Watershed, with the intention to continue with a long-term water quality monitoring program. This data will help EOS gain a better understanding of our local watershed and could lead to the undertaking of any necessary restoration or protection activities, ultimately ensuring a healthy watershed, sustainable ecosystems and resilient communities. This knowledge could also be used to educate the public on local watershed issues and how they connect to climate change in our region.

The Tantramar River Watershed is focused around the Tantramar River whose headwaters start northwest of Cookville and wind down to the Highway 2 (TCH) near Sackville, New Brunswick. The

watershed also has another > 4th order river, the Aulac River. Both rivers ultimately flow into the Cumberland Basin of the Inner Bay of Fundy. The rest of our watershed is made up of a series of brooks and creeks.



Tantramar River, upstream of bridge on Cookville Road in October 2021 (Source: M. Corkum)

The water quality results were compared to provincial water quality guidelines, CCME water quality guidelines for the protection of aquatic health, Health Canada Guidelines for Recreational Activities, and to our previous monitoring results from 2018. While we could speculate on some of the potential causes for variations between sites and years and fluctuation in parameter concentrations, this is only the second year of data collection in our Tantramar River Watershed monitoring program. More years of data are required to look at trends and relationships within the water quality datasets.

The summer of 2021 was generally warm and dry, with a wet July, and water levels were typically observed as normal across sites (Appendix 1). Generally, we saw higher temperatures in our more impacted waterways, though temperatures exceeded guidelines (20°C) only twice. In-situ water pH was within CCME guidelines (6.5 – 9) for the most part, with the exception of East Brook which was below guideline from June to October. Dissolved oxygen was below the New Brunswick guideline (6.5 mg/L) occasionally from June to September which could correspond with higher water temperatures as DO decreases with increased temperature. There are no water quality guidelines for conductivity, TDS, and salinity. However, all three were typically higher in our more impacted rivers and creeks, with the exception of Harper Brook. All three were also significantly higher in our La Coupe River site. *Escherichia coli* levels only surpassed the Health Canada Recreational Guidelines on two occasions. From June to September total phosphorus levels frequently exceeded the New Brunswick guideline (0.03 mg/L) with 31 samples exceeding the guideline and only 17 coming out below the guideline. Most of our sites are considered eutrophic. Chlorophyll-a levels were generally highest earlier in the season and decreased later in the season. Surface water metals were well below the detection limits with the exception of iron and aluminum (found over guidelines at all sites except Harper Brook), zinc (exceeded at 7 locations) and cadmium (exceeded at 4 locations). The average WQI for all sites in 2021 was 83.4 which indicates the overall health of the watershed is “Good”.

EOS had a very successful second year of water quality monitoring in the Tantramar River Watershed that provided us with valuable data which can be used to ensure the health of our watershed. This project was another great step towards building a long-term water quality monitoring program within the watershed. As we continue to collect more data, we will be able to see trends in the water quality and develop a better understanding of what the “normal” water quality is in our waterways as well as how climate change may impact them.

Review and Disseminate Data

EOS shared results of the water quality monitoring in a number of ways including a state of the watershed report, online interactive maps, presentations and social media posts. Data was also shared with New Brunswick Department of Environment and Local Government, and Atlantic Data Stream.

State of the Watershed Report

EOS supported the New Brunswick Water Strategy (2017) Goal 1, Action 1 by issuing a report on the current state of water quality within the Tantramar River Watershed area. The report includes specific water quality monitoring methods used, site descriptions, including any noted changes since 2018, and results and discussion about in-situ water quality measurements, surface water chemistry and bacteria, and results by sample site. A total of 3338 data points contribute to our baseline understanding of water quality moving forward. Conclusions and recommendations are also provided. Water quality scores using the Canadian Council of Ministers of the Environment’s Water Quality are provided for the first time. They help to better communicate results to community members. As noted above, the average WQI for all sites in 2021 was 83.4 which indicates the overall health of the watershed is “Good”. The full water quality report can be accessed on the Chignecto Watersheds page on the EOS website: (<https://eosecoenergy.com/en/projects/chignecto-watersheds-committee/>).

Interactive Watershed Maps

EOS produced interactive maps (using Google Earth files) which include current and previous water quality monitoring and habitat assessment sites across the Tantramar region. Users can access a variety of photos for each sample site, latitude and longitude, sampling dates and times. Results for water quality parameters are provided in the water quality monitoring maps. Habitat assessment field sheets are provided in the habitat assessment maps. The maps are available on the EOS website at <https://eosecoenergy.com/en/projects/chignecto-watersheds-committee/>. They serve as an interactive tool that can be utilized during presentations to communicate monitoring efforts and results. At the time of writing this report the maps have been viewed over 100 times each (the Dorchester Water Quality Interactive Map has been viewed an impressive 252 times).



Tantramar River Watershed Interactive Map showing photos and links to data.

Each map can be viewed below:

Tantramar River Watershed Interactive Map

https://www.google.com/maps/d/edit?mid=1_HiAfdqvA8lamgbjiLcVgCm1AXFzPHLb&ll=45.984800995729216%2C-64.33427499999999&z=11

Cape Tormentine Watershed Interactive Map

<https://www.google.com/maps/d/edit?mid=1Mhpo3YZoHyng2yikZURvO8i1VtVOqsga&ll=46.113072295620896%2C-63.945199999999986&z=12>

Dorchester-Rockport Watershed Interactive Map

https://www.google.ca/maps/d/u/0/edit?mid=1iX_QYrUc6rmrifa1VncxkBACH163Qxel&ll=45.81943679352937%2C-64.44374999999998&z=11

Presentations and Promotion

A virtual presentation on the water quality results was given to the Chignecto Watersheds Committee on February 22nd. Eight of the committee members attended. Committee members discussed the results and suggested future projects could look at the presence/absence of fish in the watershed, research and outreach about cyanobacteria, investigating the high amounts of certain metals in Silver Lake (such as cadmium), looking at land uses, installing flow meters at certain choke points, conducting landowner outreach, and organizing clean ups, etc.



Chignecto Watersheds Committee Meeting February 2022

A virtual public presentation is planned for noon on World Water Day on March 22nd along with further public outreach and promotion of the results throughout March.



Poster for public presentation

Helping Protect Aquatic Resources in Silver Lake

Silver Lake is the largest lake in the Tantramar River Watershed. It is lived on year-round and has immense recreational and economic value for the Town of Sackville. People swim, boat, fish, and ice fish on the lake. It is also the location for an annual music festival, Levee on the Lake. Thus, EOS wanted to help protect aquatic resources and educate the public about their importance.

Clean Drain Dry Signage

EOS, in partnership with the New Brunswick Invasive Species Council (NBISC), provided free “Clean, Drain, Dry” signage at the lake. The bilingual sign is located adjacent to the boat ramp and reminds boaters to clean, drain and dry their boats, canoes, kayaks, gear, etc. so that any potential invasive species cannot spread from one water body to another.



Clean Drain Dry Signage at Silver Lake, Photo credits: Town of Sackville

Invasive Species Workshop

On Monday, June 14th, EOS hosted a Clean, Dry, Drain webinar on invasive aquatic species which featured speaker Kristin Elton, Project Coordinator with the NBISC. EOS promoted the webinar in various places (EOS newsletter, website, social media, event calendars, etc.) as did members of our networks such as the Town of Sackville in the June Sackville community newsletter:

<https://sackville.com/wp-content/uploads/2021/06/June-2021.pdf>



Invasive species webinar poster

Sixteen participants attended the webinar, which began with concrete examples of what was and what was not considered an invasive species. Kristin then went on to explain the many destructive impacts that these harmful pests can have on ecosystem services, infrastructure, and recreation when not dealt with right away. Before-and-after photos of waterbodies filled with thick patches of Eurasian Watermilfoil, and pipes covered in Zebra mussels quickly drove home this point. After learning about the threat of invasive species, participants gathered information on what they could do to prevent an outbreak. Clean, drain, dry were the three key calls to actions from this presentation: Clean plants, animals, and mud from your boat and gear; Drain all water from your boat and gear onto land; Dry all parts of your boat and gear completely.



Kristin Elton, NBISC explains the threat of invasive phragmites during the webinar. Photo: A. Marlin

Following the webinar, participants expressed their satisfaction regarding the event, insisting that the speaker was very engaging and knowledgeable about the subject. Another response stated that the information covered in the presentation would be very valuable in their job and education going forward. Overall, it can be said that the webinar was a success and that those who attended got a lot of benefit from it.

Cyanobacteria

There is increasing concerns about algal and toxic cyanobacterial blooms in New Brunswick and there have been scares in Silver Lake in the past. Thus, we attended a training workshop on cyanobacteria in February to learn more ourselves and have provided new resources on the Chignecto Watersheds webpage of the EOS website (<https://eosecoenergy.com/en/projects/chignecto-watersheds-committee/>). The resources include links to educational videos about cyanobacteria, the provincial government's blue green algae page, and how to report as suspected bloom. We have plans to share and promote these resources more in March via our social media pages and in the EOS spring newsletter.

Education and Outreach

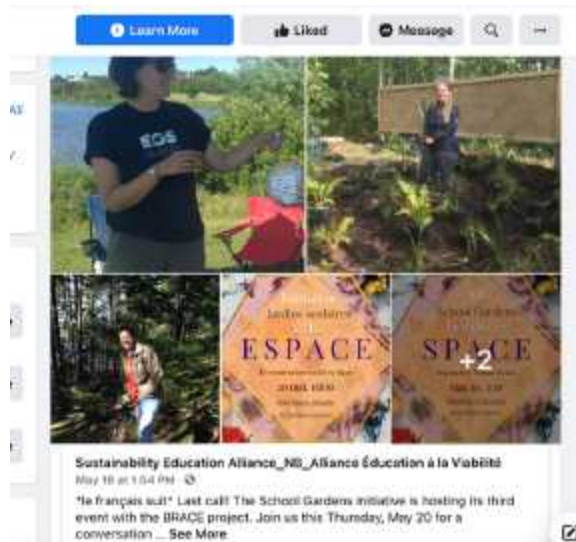
Education is key to enhancing sustainable, resilient communities across Tantramar and increasing peoples' understanding of impacts in our watersheds and risks associated with poor watershed health. EOS hosted and partnered on a variety of workshops and outreach activities.

Workshops and Webinars

During 2021-2022 EOS staff helped promote watershed issues during a series of webinars and outdoor workshops including topics such as rain gardens, animals in our watersheds, rain barrels, and protecting our watersheds from invasive species.

Rain Garden Workshop for Teachers

On May 20th, and in partnership with New Brunswick Environmental Network, EOS presented on rain gardens and their many benefits. This was part of the NB School Gardens Initiative by the NBEN. Eighteen teachers and school staff attended the webinar. EOS staff helped them go through a mock process to design a rain garden on a school property and select appropriate plants.



Social media post promoting the rain garden session for teachers.

Frog Walk

During the evening of June 3rd, 2021, a group of 16 people gathered safely by the Sackville Reservoir Gate to participate in a bilingual Frog Walk, a free event organized by EOS Eco-Energy. All covid-19 safety precautions were followed including masks and distancing. Leading the excursion was Roland Chiasson, a wildlife biologist and environmental educator, with over thirty years of ecological surveying experience. The group listened intently, as Roland described the various frogs and toads found in the Tantramar region. Playing recordings off his iPad, the guide demonstrated what sorts of calls the participants ought to be watching out for. As we arrived by the pond however, there was no longer a need to listen to the recordings; the Spring Peepers had treated us to an evening concert. High-pitched peeping, slightly reminiscent of the sound of jingle-bells, filled the air, interrupted occasionally by the banjo-like twang of the green frog. As we headed back, Roland showed us pictures of the bullfrogs often found in nearby Silver Lake. A group of francophone participants burst into laughter when the guide confirmed that the French name for this giant amphibian was indeed “ouaouaron”.



Bilingual promotional posters for the Frog Walk

Following the event, we received positive feedback with comments expressing appreciation for Roland's knowledgeability, with several people indicating that they had learned a lot during the workshop and were interested in checking out the links to additional resources EOS had provided. There was also a lot of interest in future workshops relating to birds and herbs. In all, it can be said that the frog walk was a definite success and something EOS hopes to do again next year.



Roland Chiasson leads the frog walk near the Sackville Reservoir. Photo credit: C. Priemer

Rainwater Harvesting and Ground Water Protection Workshop

The Village of Memramcook asked EOS to help coordinate and promote a bilingual workshop on rainwater harvesting and ground water protection in September 2021. Residents in the village have experienced wells going dry in the past and the Village wanted to offer some tips and information to help their residents. EOS connected the Village staff with Eco Container Co., a local business with expertise on rain barrel designs and uses recycled food grade barrels and other containers. Our previous rain barrel workshops were very popular, and we were happy to help put on a similar workshop in Memramcook. EOS staff attended the workshop and provided some information about EOS, what we do and shared some resource materials. This event was done in person, following covid-19 safety measures. Ten people attended the workshop.

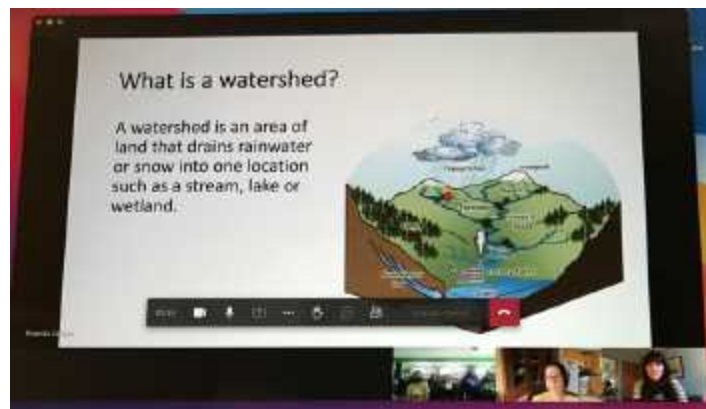


Rainwater harvesting and groundwater protection workshop

EOS also helped to promote water conservation and the usefulness of rain barrels in an article featuring EOS and other groups which was reported by the CBC on June 1st, 2021: <https://www.cbc.ca/news/canada/new-brunswick/rain-barrel-hot-dry-summer-1.6047014>

School Visits

On November 23rd EOS staff virtually visited Port Elgin Regional School's grade 6 to 8 classes to talk about watersheds, watershed management and how students can get involved. We visited two 1-hour classes and talked to about 40 students. We helped the classes come up with group projects that address aquatic and marine Sustainable Development Goals. We also asked them questions at the end to see if they were listening and gave out prizes including reusable sandwich bags (which can help reduce waste in the watershed). Questions included: what is a watershed? What is the name of the watershed where they live? What are some watershed pollutants? What are project ideas that could be done to help protect our watershed? Students were very engaged and it was an effective learning opportunity.



Miranda and Amanda's virtual visit with classes at PERS in November

Community Garbage Clean-Up

The Town of Sackville, EOS, Sackville Rotary Club, Anglophone East School District and Community Forests International partnered to put on Earth Day events including a community clean up. Hundreds of local students and community members cleaned up various sites in the community of Sackville, including key sites in the Tantrammar River Watershed including the Lorne St. Stormwater Retention Ponds, the Sackville Waterfowl Park, Silver Lake, etc.



Community garbage pick-up day in Sackville, Photo credit: Town of Sackville

Media Stories

EOS shared updates about our water quality monitoring via our seasonal newsletters and social media pages. Here is an example from the EOS Fall Newsletter which was sent to over 480 readers including EOS members and other local residents. In this issue student volunteers from Mount Allison University are featured learning about the work we do and helping us collect samples.



Excerpt from the EOS Fall 2021 Newsletter

Invasive species have the potential to threaten more than just Silver Lake in our Chignecto region watersheds, so we provided additional outreach about invasive species in general on our social media and EOS website as shown on the following page.



INVASIVE SPECIES

Be on the lookout!

What is an invasive species?

An invasive species is an organism that causes ecological and economic harm in an environment where it is not native.

Emerald Ash Borer

Did you know?
Up to 99% of all ash trees are killed within 8-10 years once the emerald ash borer arrives in an area.

Green Crab

As indicated by this graph, the green crab population is growing rapidly in our region. This invasive species can damage aquatic ecosystems, by demolishing shellfish stocks, attacking local fisheries, and destroying eel grass beds, which provide an essential spawning area to many native fish and crustaceans.

Green Crab Population Monitoring in the Shediac Bay

Shediac Bay Association Data

Purple Loosestrife

Purple loosestrife is an invasive species that can be found throughout New Brunswick, particularly in disturbed areas as well as in natural areas along river shores and in shoreline wetlands. It was introduced to North America on many occasions both intentionally as a garden herb, and accidentally in ship ballast. Despite its attractive appearance, this quickly spreading species can have detrimental ecological effects as it outcompetes and replaces native grasses and other flowering plants that provide high quality food and habitat for wildlife. It also forms dense stands that restrict native wetland plants and alter the structural and ecological values of wetlands.

How to prevent an outbreak:

- cleaning, draining and drying any equipment used in the water before storing it or moving it to a different body of water
- never moving species, organisms or water from one body of water to another
- never moving firewood
- cleaning your shoes and boots
- keeping any aquatic plant or animal, such as live bait or pets from aquariums, out of the natural environment or sewers do not let invasive species loose!

Social media posts

Because water quality monitoring is still relatively new in our region, EOS tries to continually educate the public about what we do and the types of parameters we monitor and why they are important. This past year, we created the following posters which are also available on our website at: <https://eosecoenergy.com/en/projects/chignecto-watersheds-committee/>



Social media posts created by EOS summer intern

The Town of Sackville, located within the Tantramar River Watershed, also helped us promote our events and initiatives. For example, they promoted our workshops in their monthly newsletters, which goes out to about 1000+ residents.



Excerpt from Town of Sackville June newsletter

Professional Development

Because EOS is still building capacity for our long-term water quality monitoring program, we continue to access any available training, workshops and learning opportunities. Here are just some of the events we attended during 2021-2022:

- Wetpro Training – April 2021
- Leadership Training, Sustainability Network – various days in April 2021
- Financing and Funding Equitable Adaptation, Antioch University – May 6, 2021
- Campaign Advertising, Sustainability Network – May 13, 2021
- First Aid Training – June 17-18, 2021 (workplace standard first aid course with CPR C & AED)
- NBEN Watershed Caucus Meetings
- Atlantic Water Network Meetings
- Cyanobacteria in New Brunswick: Exploring Current and Future Monitoring Efforts, ACAP Saint John – February 3, 2022

Results: Priority Measure Indicators

1. **Protecting our Environment - Water quality improvements (e.g. water quality monitoring, benthic invertebrate sampling).**

We aimed to complete 1 management action, which was water quality monitoring of the Tantramar River Watershed. We achieved this priority measure indicator successfully.

2. **Increasing environmental awareness**

Increasing environmental awareness is measured by the number of events, type of events, number of participants and number of hours. As the results table below indicates, we exceeded our priority measure indicators.

Results of Efforts to Increase Environmental Awareness

Events/Initiatives	Targets <i>(According to June 23rd, 2021 Updated Workplan and Priority Measures Submission to ETF)</i>	Results
Workshops (active learning)	3 workshops 30 people 4.5 hours	Indicators were met or exceeded. 4 workshops (invasive species, frog walk, rainwater harvesting, rain gardens for schools) 6.5 hours More than 42 participants
CWC meetings (active discussions)	2 meetings 5 people	Indicators were met.

	2 hours	One 1hr spring meeting was held and a second 1hr meeting was held February 22 with 8 people.
WQ presentations (observing)	2 presentations 40 people 4 hours	Indicators will be met by end of March 2022. 1 presentation has been made to 8 (1hr) and 1 presentation is planned for the public on March 22nd. It is estimated to be a 2hr event with 20 people.
Kids activities (active learning)	1 activity 20 kids 2hrs	Indicators were met or exceeded. Total activities = 2 visits Total hours = 2hrs Total students = about 40 (EOS visited 2 classes at Port Elgin Regional School (a grade 5-6 class and a grade 7-8 class). Each visit was 1 hour and consisted of presentations, discussions and a trivia quiz with prizes.)
Social posts and newsletters (observing)	~1000 people reached	Indicators were met or exceeded. Total number of people reached via online platforms = over 1000 (482 reached via the EOS newsletters where we shared project updates and workshop invites. 1002 follow EOS on Facebook where we post events and other information. 476 follow EOS on Instagram where we posted about events and information about the parameters we monitor. About 1000 people receive the Town of Sackville monthly newsletters which include some of our events.)
Field days (active learning)	2 field days 2 Volunteers learning/helping 16 hours (2 days)	Indicators were met or exceeded. 5 field days (June-October) x 6.5 hours/day = 32.5hrs Also 4 days in the lab helping with Chla-a analysis (June-Sept) x 2hr/day = 4hrs 2 volunteer Mount Allison students

		Total hours =36.5hrs
Community garbage pick-up day (active participation)	1 day 400 kids 8 hours	Indicators were met. 1 day 3 schools participated and many local residents as well as Town staff. It is estimated that about 400 people took part.
Totals	1000 people 11 events (active and observing) 36.5 hours	Total Indicators were exceeded. People = 1,512 Events = 20 Hours = 58

Impacts and Community Benefits

The project had a positive impact on communities, environments, and aquatic resources in the Tantramar-Memramcook region. The collection, review and dissemination of additional baseline water quality data helped EOS and local citizens to gain a better understanding of our watershed and was a necessary step towards building a long-term watershed management plan. As EOS continues to collect more data, we will be able to identify trends in water quality and develop a better understanding of what the “normal” water quality is in our waterways, how climate change may impact them, and ultimately work to protect and restore the watershed. Through partnerships with the NBISC and the Town of Sackville, EOS helped protect aquatic resources in Silver Lake and raise awareness about invasive species, the importance of “clean, drain, dry”, and cyanobacteria. Finally, our variety of education and outreach activities resulted in increased understanding and awareness of watershed issues, contributing to a more resilient population.

Summary and Recommendations

Overall, EOS had a very successful year of water quality monitoring and public education. This project provided us with valuable additional baseline data that can be used to ensure the health of the Tantramar River Watershed area. Furthermore, it has given us the opportunity to better understand our watershed and share our findings with the public. The continuation of baseline data collection across all Chignecto Watersheds can be used to develop a watershed management plan that will ensure long-term, sustainable water resources which are essential for a resilient Tantramar region. As we continue to collect more data, we will be able to identify trends in the water quality and develop a better understanding of what the “normal” water quality is in our waterways as well as how climate change may impact them.

EOS recommends that the knowledge gaps in our watersheds continue to be addressed through our long-term water quality monitoring program. We would also like to expand our knowledge of our watersheds through the collection of CABIN data, hydrological data, riparian health data, and fish and habitat data. EOS believes that this program should return to the Cape Tormentine Peninsula

Watershed Composite area in 2022-23, which was last sampled in 2019, to obtain a second year of information about the current state of water quality within that watershed. This is our next step in building a long-term water quality monitoring program within the Chignecto region watersheds. In addition, we wish to coordinate a variety of public education and outreach activities in the area including bulk well-water testing and a workshop series with hands-on events such as how to use rain barrels, ground water protection, living shorelines, and create a team of youth Water Rangers to assist with recreational water quality testing.