Clean Annapolis River Project

2018-2019 Year in Review

June 18, 2019

Message from the Executive Director, Levi Cliche

Reflecting on all that has been accomplished since this time last year, it is sometimes hard to believe that it could all fit into 365 days. We have had tremendous opportunities to work with a great many new partners on ongoing projects, revisiting and ramping up past initiatives, and in taking on some brand new things that we've never done before.

As you read through this annual report, those of you who are familiar with CARP's work over the years will find updates on many familiar projects and programs, as well as a few new additions. Every year we face new challenges, and find new opportunities to make a positive environmental impact in the Annapolis River watershed and beyond.

Adaptation to the many various impacts of climate change on the environment and on communities is a challenge that is shared globally. In this part of the world, increased severity and duration of precipitation events that contribute to runoff, erosion and inland flood risk is one of the major predicted impacts that we are, and will continue to face going forward. In order to support the adaptation process in our local communities, we are working with partners like the Town of Digby, and the Nova Scotia Community College to construct numerous low impact development features such as rain gardens and infiltration trenches in publically accessible areas, which is helping to address stormwater runoff while increasing community awareness.

Ocean plastics, and microplastics in all environments, have come to the world's attention as a major environmental concern. In order to better understand the issue and develop strategies to address it, it is important to understand the distribution, composition, and origin of plastics in the environment. To this end, CARP partnered with Coastal Action, ACAP Humber Arm and Memorial University of Newfoundland to sample microplastics in Atlantic Canada; an effort that will carry forward in 2019.

Agriculture is an important aspect of our local economy and community, and is a big part of the local landscape. Like most things, its benefits come with some challenges including nutrient runoff originating from manure and synthetic fertilizers that are applied to crop fields. Draining crop land is important to allow farmers the ability to access fields for planting in the Spring, though the practice can increase nutrient pollution to waterways. This past year, CARP partnered with Spurr Brothers Farms Ltd. to develop a demonstration site showcasing drainage management technology that can moderate runoff, reduce nutrient pollution, and still allow for regular farming operations. We hope that this will be one of many such projects aimed at improving the health of the Annapolis River.

Looking forward, CARP will be undergoing a strategic planning process in 2019 where we will be taking a close look at all aspects of the organization, our work, our priorities, the challenges we face, and the changing needs of the organization, our partners, the community, and the environment. This is a process every organization should go through periodically, and we feel it is a good time to think ahead, and hear from our partners, stakeholders, and the community so that we can we can set a clear path forward that allows us to have the greatest impact we can on the ecological health of the Annapolis River watershed.

Message from the Board of Directors

2018-2019 Board of Directors

Al Angrignon	Mark Hebert	Britt Roscoe	Maggie Shackleton	Josie Todd
Bob Duff	Orris Orlando	Bob Rowe	Heather Stewart	

It has been another busy year for the volunteers that make up CARP's Board of Directors. In addition to the regular monthly meetings, members have been contributing their valuable time to the Finance committee, Fundraising committee, Human Resources committee and the River Festival committee. These committees focus on various important aspects of organizational management and development, and sustaining CARP financially continues to be an important one.

The Board and CARP staff have worked together to find ways to reduce expenses and increase revenue over time. A recent example is the establishment of a Community Interest Company (CIC) that is able provide a variety of environmental services to the community while allowing the profits to be turned back to CARP's efforts toward an ecologically healthy Annapolis River watershed.

The year end review clearly shows the wide range of projects being carried out in the watershed and the level of community engagement. It is encouraging to see the number of volunteers from various backgrounds that choose to commit their time to helping us in our efforts. Fostering a connection between local residents and the watershed is an important part of encouraging more stewardship.

We have an excellent CARP staff Board that benefit from a strong working relationship between the two. This winning combination and continued community support allows CARP to be a leader in community based environmental science. With your continued support things can only get better.

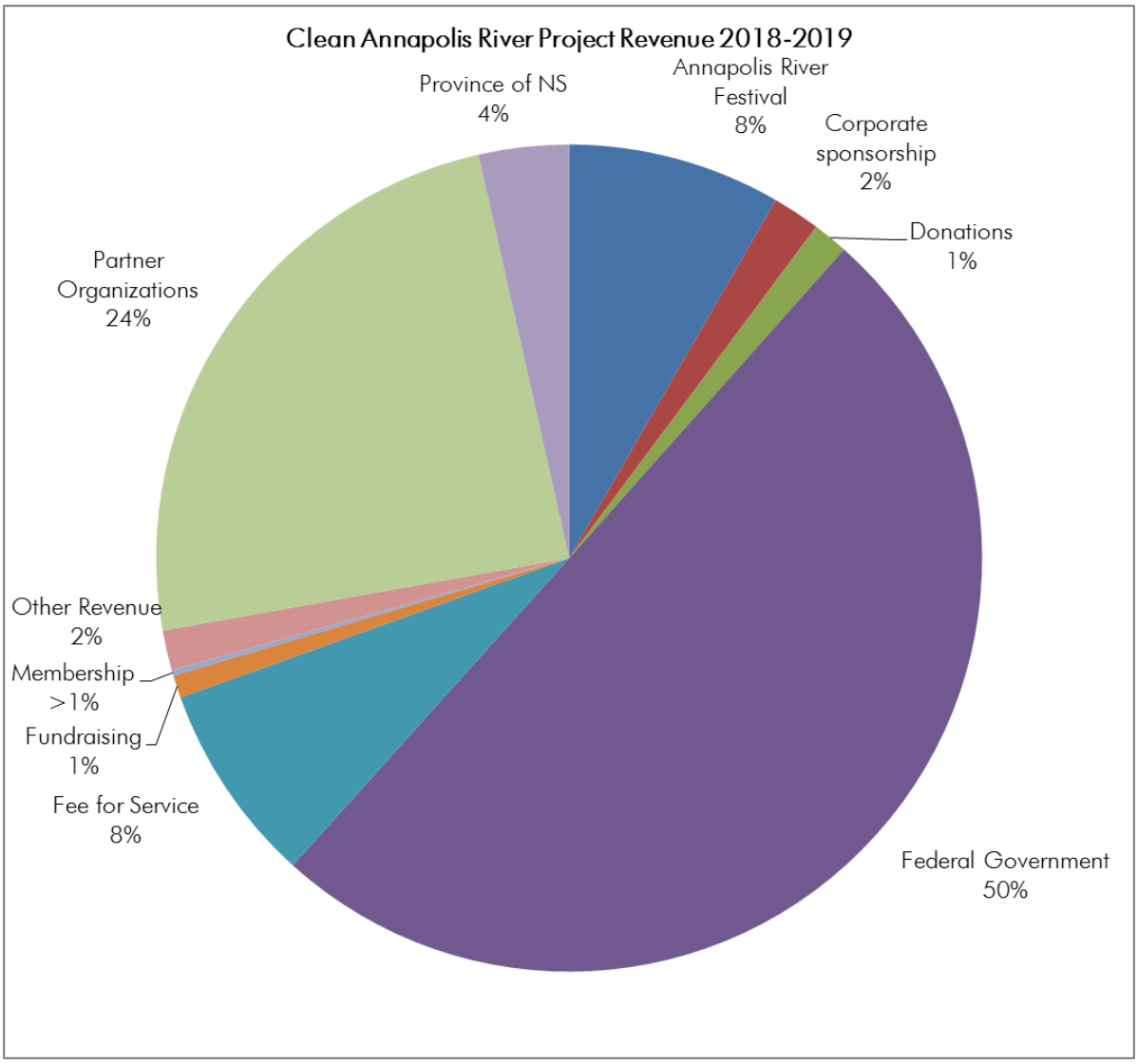
From being a director, lending a hand with River Festival, taking samples as a River Guardian or searching for wood turtles, none of these things would happen if it were not for the support of volunteers. Thank you to all for your contribution in helping us achieve our vision of an ecologically healthy Annapolis River watershed.

Sincerely,
Mark Hebert

Organizational Funding

Securing funds to sustain CARP's work is an ongoing challenge. Most of the organization's funds come in the form of project specific grants, which set out strict limitations. The chart below illustrates the sources of revenue for the 2018-2019 project season. CARP has continued to be successful in attracting grant funds through federal government programs or accessing this funding through partnerships with other organizations.

CARP has been actively seeking options for diversifying funding and to ensure more sustainable funding. In the past year we have registered a Community Interest Company, *Integrated Ecosystem Solutions* (IES) CIC., which will create the opportunity to generate revenue that can be used to support CARP's charitable activities. Our Board of Directors has been looking into new fundraising opportunities and we are currently seeking a Membership Coordinator to help us take better advantage of this potential fundraising opportunity.



Project Index

Support for Education and Training

As a community-based organization, CARP strives to create opportunities to provide education and training to local students, young professionals and partner organizations. During the 2018-2019 program year this included:

- 2 Nova Scotia Clean Leadership Internships
- 1 Canada Summer Jobs position
- 1 Agri Canada Green Internship
- 1 Eco Canada Internship
- 5 high school co-op placements (Digby, Annapolis, West Kings)
- 3 Center of Geographic Science work term placements
- 10 schools engaged in service learning projects and activities
- 32 local youth engaged in the Youth Leading Environmental Change program
- Participation in the International Oceans Institute field tour programming
- A field tour with planning students from Dalhousie University

NSCC Intern Rachel & AWEC Co-op student Ethan measuring a wood turtle

Co-op student turned summer staff Marina helping at a community outreach event.

Annapolis River Festival

On June 14, 2018 CARP hosted the fourth *Annapolis River Festival*. This event was developed as CARP's major fundraiser and thanks to the dedication of an army of volunteers, the Festival has continued to grow in its success. Highlights from 2018 included:

- 1200+ festival attendees
- 500+ participants in water-based activities, including dragon boat races, canoe races, and boat tours
- 120+ community event volunteers
- Over $24,000 raised for Clean Annapolis River Project

On **Saturday July 13, 2019** we will be hosting the 5th Annapolis River Festival at Jubilee Park, Bridgetown. This is our 5th anniversary of the event, so we are hoping to make it extra special. We will have an expanded skills village, allowing more community members and partner organizations to showcase their talents and initiatives. We are excited to have the Clarence 4-H club joining us to run a "Farming, Livestock and Life Skills" demonstration. On the water, Stand Up Paddleboards will be joining in the sprint race. As always, the dragon boat races will be the heart of the Festival, with races beginning 9 AM. With free admission and a tonne of fun activities, we hope you join us for a day celebrating the Annapolis River.

CRMS students building bee houses at their Kindness Conference

Learning about wildlife during a field day at the marsh with CES

Stormwater Management and water conservation

Through the '*Managing Water in Response to a Changing Climate in Southwest Nova Scotia*' project, CARP and Coastal Action are working collaboratively to address climate change impacts affecting communities across Southwest Nova Scotia. Increased frequency and intensity of precipitation events caused by climate change, along with aging infrastructure and an expanding area of impervious surfaces, make managing stormwater a critical issue for coastal maritime communities. Seasonal summer drought conditions are another serious impact of climate change in Southwest Nova Scotia, with 2016 being the driest season recorded since 1880. Some major components of the project include: free public seminars educating community members on the anticipated climate change impacts on water quality and quantity and what actions homeowners can take to adapt, a free home assessment program, creation of low impact development sites (LID), and in-school programming for students in elementary and secondary schools.





2018 Highlights:

- 8 rain gardens were created in Digby and Annapolis counties
- Roughly 1000 perennials planted at rain garden sites
- 1 raised bed was created at one of the LID sites and was planted with perennial pollinator species
- 1 dry creek bed was created to direct water into one of the rain gardens
- 1 infiltration trench consisting of 18 m^2 was created at an LID site in the Town of Digby
- A total of 160 students participated in the home water audit assessment program focusing on water conservation and stormwater management
- A total of 200 low flow devices were distributed to students to install in their homes
- A total of 45 rain barrels were distributed to community members at workshops

Future Directions:

From 2017-2019 CARP and Coastal Action partnered on the delivery of a project titled "Soaking Up Stormwater". Further funding through Environment and Climate Change Canada's EcoAction program has allowed this partnership to continue for an additional two years under the project title '*Managing Water in Response to a Changing Climate in Southwest Nova Scotia*'.

This work was made possible with the financial support of Environment and Climate Change Canada's EcoAction program.

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

Environment and Climate Change Canada | Environnement et Changement climatique Canada

Fish Passage Restoration and Habitat Enhancement

While threats to fish populations are numerous and diverse, degradation of freshwater habitats remains one of the most significant contributors to the observed declines of species. Much of this habitat loss has been attributed to modifications of the physical environment by human land-uses. Habitat fragmentation, a key contributor to habitat loss, is considered a significant threat to fish populations worldwide. Watercourse alterations, such as the construction of watercourse crossings, have the potential to significantly affect the ecological integrity of aquatic ecosystems. Watercourse crossings that are poorly designed, installed incorrectly, or lack regular maintenance can become barriers to fish passage. In addition to habitat fragmentation, other threats to fish populations include in-stream habitat loss through channel modification, sedimentation, and alterations to water quality.

2018 Highlights:

- 40 culverts within the Annapolis River Watershed were assessed for fish passage
- 6 culverts received restoration work, which included: 4 debris removals, 2 fish chute installations, and 2 tailwater control installations. In total, 18.42 km of upstream habitat was made available, and an additional 5.10 km of upstream habitat passage was improved
- 13 juvenile Atlantic salmon were captured in the Fales River via electrofishing
- SandWanding was conducted on a 160 m stretch of the Fales River restoring 560 m^2 of habitat to remove fine, compacted sediments in the streambed
- 2 double digger logs with deflectors, 1 single deflector and 1 log crib were installed on the Fales River. restoring 2.3 km^2 of stream habitat and stabilized 7.3 m of eroding bank to enhance both trout and Atlantic salmon spawning, rearing, and migration habitats.

Future Directions:

In 2019, the project will continue the improvement of habitat connectivity and in-stream habitat restoration within the Annapolis River watershed. The fish habitat connectivity of several watercourse crossings will be surveyed as well as their barrier status determined, and these results will be recorded on the new, web-based Aquatic Connectivity Analytical Database (ACAD). Continued improvement and restoration actions that target barrier watercourse crossings within the Annapolis watershed, specifically fish passage through culverts, will be addressed with the goal of improving a total of 4 km of upstream habitat. In addition, 4 culverts within the Round Hill sub-watershed will also receive culvert assessments, restorations, water quality testing and electrofishing to help create a long-term record of the river's health. In-stream habitat restoration work will also be undertaken with continued SandWanding actions to directly remove fine sediments in the Fales River and the installation of habitat enhancement structures in both the Fales River and South Annapolis River to continue to improve and enhance the complexity of these river systems and the habitat within.

This work was made possible with the financial support of Nova Scotia Salmon Association NSLC Adopt a Stream program, and Eco Canada.

Wood Turtle Monitoring and Stewardship

The overall goal of the Wood Turtle Monitoring and Stewardship project is to ensure the long-term persistence of the wood turtle and its habitat in the Annapolis River watershed. For the 2018-2019 program year the project specifically focused on expanding knowledge of wood turtle habitat in tributaries of the Annapolis River that have received no or limited past survey effort. Other objectives of the program include: developing local capacity to participate in volunteer and land stewardship activities, to educate members of the public living or working in areas that support wood turtle habitat in order to foster community wide stewardship efforts, to encourage public reporting of SAR sightings and to identify new priority properties and land owners/managers for CARP's private land stewardship program.

2018 Highlights:

- 24 individual turtles observed through visual and nesting surveys (some individuals seen on multiple occasions)
- 12 "first captures", turtles that have not previously been recorded
- 349.67 hours of visual survey effort, 92% of effort by volunteers
- 84.75 hours of nesting survey effort, 99% contributed by volunteers
- 1 protected nest successfully emerged
- 60+ new volunteers trained
- 75+local students engaged in field activities and special projects

Future Directions:

In 2019, CARP will continue conducting visual surveys and providing volunteer training to support visual surveys and nest surveys, protection and monitoring. CARP will continue to work with landowners to support the implementation of stewardship actions. Any new stewardship plans developed will take a multi-species approach, considering other species at risk and their habitat(s).

CARP will continue to work with partner organizations to build capacity to monitor and conserve wood turtles and their habitat across Nova Scotia. In 2019, CARP will work with the Jijuktu'kwejk Watershed Alliance and the Mi'kmaw Conservation Group to develop a monitoring and stewardship program in the Jijuktu'kwejk (Cornwallis) River watershed.

This work was made possible thanks to partnerships with Mersey Tobeatic Research Institute and Acadia University. This work was made possible with the financial support of Nova Scotia Species at Risk Conservation Fund, Environment & Climate Change Canada's Habitat Stewardship Program for Species at Risk and WWF Go Wild.

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

Environment and Climate Change Canada | Environnement et Changement climatique Canada

NOVA SCOTIA | Mersey Tobeatic Research Institute | ACADIA UNIVERSITY

Restoration and Enhancement of Wetlands on Working Landscapes

This project focused on restoration and enhancement of the ecological health of wetland habitats found on agricultural landscapes in and around the Annapolis River watershed. Agriculture is the predominant land use in the watershed, and has resulted in significant loss of wetland habitats in and adjacent to pasturelands, forage, and crop fields. This project built on the strong partnerships developed through CARP's Agri-Stewardship project to implement actions that enhanced/restored wetland habitats that have been in-filled, cleared, drained, or otherwise lost and/or degraded.

2018 Highlights:

- 400 meters of fencing installed to exclude livestock from existing wetlands
- 400 trees/shrubs planted to establish vegetated buffers around existing wetlands
- 1/4 hectare shallow water wetland excavated to provide habitat for waterfowl
- Evaluation of 15 additional sites with strong restoration potential for any future wetland restoration work
- 5 stewardship plans developed for restoration and enhancements sites

Future Directions:
In spring 2019, tree and shrub planting was conducted at the new wetland site. CARP will continue to work with the landowners at this site to monitor its progress over time and support the recommendations outlined in the stewardship plans. The Restoration and Enhancement of Wetlands in Working Landscapes project officially concluded in March 2019.

This work was made possible with the financial support of Environment and Climate Change Canada's National Wetland Conservation Fund.

This project was undertaken with the financial support of:
Ce projet a été réalisé avec l'appui financier de :
Environment and Climate Change Canada / Environnement et Changement climatique Canada

Youth Leading Environmental Change

Youth Leading Environmental Change is a free program that engages youth throughout the Annapolis River watershed in environmental education, stewardship actions and leadership development training. Youth have the opportunity to learn how landscape features and functions impact human and environmental health, as well as community wellbeing. Participants reinforce their understanding of these concepts and apply them through a variety of environmental restoration and stewardship activities that will positively impact their community and the health of the ecosystem.




2018 Highlights:

- 32 Youth participants from communities across the watershed
- Activity sessions covering topics such as: wood turtle monitoring, benthic invertebrate sampling and identification, fish sampling methods and identification, swift and swallow habitat surveys, beach cleans, tree ID, forestry, microplastic pollution and wetlands
- The delivery of public outreach events including activities at YMCA Healthy Kids Day, a touch tank during Annapolis Royal Natal Days and Wetland Day at the Annapolis Basin Marsh

Future Directions:
CARP hopes to continue offering the program and partial funding has been received to support the program in 2019. CARP has opened registration to 40 students and is working to find youth to represent communities from across the watershed. Activities commenced in May will continue through October. In 2019, CARP hopes to work with participants to support them in developing and delivering their own projects.

This work was made possible with the financial support of Nova Scotia Habitat Conservation Fund (contributions from hunters and trappers), Annapolis Active Kids Healthy Kids, Blomidon Field Naturalists Society and the Parker Mountain Wind Turbine Society.

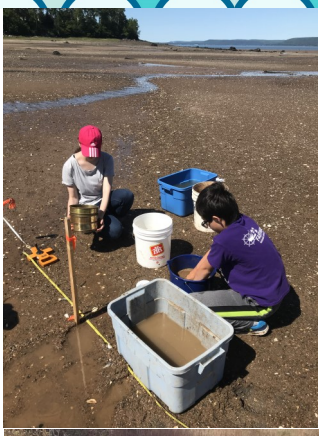
Atlantic Canada Marine Microplastics Research Project

The Atlantic Canada Microplastic Research Project, led by Coastal Action, is a partnership aimed at addressing the environmental problems of marine plastic pollution, specifically microplastic (<5 mm in diameter). The project is an ecosystem-based research initiative that will quantify microplastic distribution and concentration across three locations in Atlantic Canada; the Bay of Fundy, the Bay of Islands (Gulf of St. Lawrence), and the LaHave River Estuary (Atlantic Coast).

The project includes two years of microplastic sampling and analyses within the three study areas. Samples will be collected from surface water trawls and benthic sediment grabs to quantify microplastic particles and determine concentrations.

2018 highlights:

- 6 beach sites sampled within the Annapolis watershed
- 6 surface water trawl sites sampled within the Annapolis Basin
- Field sampling conducted in the LaHave River Estuary by Coastal Action and in the Bay Islands (Gulf of St. Lawrence) by ACAP Humber Arm
- Samples sent to the Civic Laboratory for Environmental Action Research at Memorial University for analysis; results anticipated in June 2019



Future Directions:

In year two of the project, sampling will be conducted at any "hot spots" identified through analysis of samples from 2018. Both sediment and surface water samples will be collected in 2019 and sent for visual and chemical analysis. In fall of 2019, project partners will share results and participate in a summit coordinated by the Clean Foundation focused on the topic of marine waste and ocean pollution.

This work was made possible with the financial support of Environment and Climate Change Canada's Atlantic Ecosystem Initiative.

This project was undertaken with the financial support of:
Ce projet a été réalisé avec l'appui financier de :
Environment and Climate Change Canada / Environnement et Changement climatique Canada

Lawns to Gardens

The Lawns to Gardens pilot project aimed to support Nova Scotians in developing positive connections to nature by encouraging them to convert grass lawns to gardens or other uses that incorporate a more diverse array of plant species and habitats. The promotion of food gardens also has co-benefits including the promotion of healthy eating and improved access to fruits and vegetables. Experienced gardeners volunteered as mentors to provide advice to novice gardeners who participated in the program. Youth volunteers helped participants with some of the physical components of garden creation, such as building raised bed frames, turning soil and spreading manure.

2018 Highlights:

- 10 volunteers trained to help support new gardeners
- 15 participants provided with consultation and educational resources to support the creation of new gardens for food and pollinator habitat
- Manure, compost, hay and other materials donated by local community members and distributed to participants
- 14 raised bed frames constructed by AWEC students and distributed to new gardeners

Future Directions:

The Lawns to Gardens campaign was well received by participants, but due to funding constraints, CARP is unable to continue this program. CARP hopes to work with partners in the future to coordinate workshops that address questions and topics of interest expressed by pilot project participants.

This work was made possible thanks to partnership with Annapolis West Education Center and Nikian Farm Enterprises. This work was made possible with the financial support of Nova Scotia Age Friendly Communities program.

Annapolis Changemakers

The Annapolis Changemakers was an outreach initiative that supported the engagement of community members by creating and supporting opportunities for citizens in the watershed to actively participate in monitoring, conservation and restoration actions that address environmental threats to their communities. Key issues for the project included: (1) water quality degradation in the Annapolis River, (2) surface water pollution from stormwater run-off, (3) species at risk conservation and monitoring, (4) migratory fish habitat fragmentation and (5) coastal and marine litter.

2018 Highlights:

- Community rain garden planting days in Digby in support of CARP's work through the Soaking Up Stormwater project
- Volunteer training and group survey coordination in support of wood turtle monitoring efforts
- Public education programs about native migratory fish and the threats they face
- In class education about water quality issues in the Annapolis estuary with the Annapolis West Education Center Oceans class
- 13 beach clean-up events
- Field based microplastic education activities and sample collection with Lawrencetown Education Center and Berwick & District School

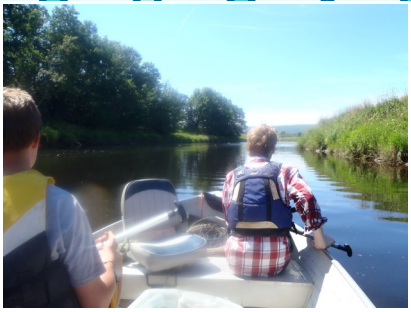
- Solitary bee house building with students at Clark Rutherford Memorial School

Future Directions:

The WWF Go Wild small grant that supported the Annapolis Changemakers program was for activities conducted in the 2018 field season and supplemented other ongoing projects. CARP will continue to conducted similar public engagement activities through its various projects and programs.

This work was made possible with the financial support of a WWF Go Wild Community grant.

Annapolis River Guardians



The Annapolis River Guardians program, an extensive volunteer-based water quality monitoring program, is CARP's longest running project and has contributed to the collection of over 28 years of data on the Annapolis River. The program was initiated in the early 1990's by Dr. Graham Daborn and the late Dr. Mike Brylinksy of the Acadia Centre for Estuarine Research, with the intent of providing a long-term record of the river's health and an early warning for environmental problems. Since its inception, over 150 volunteers have participated in the program, and more than 4,500 water samples have been collected and analyzed.

2018 Highlights:

- 88 water samples collected biweekly between June through to the end of October
- Parameters measured : conductivity (C), specific conductivity (SpC), pH, total dissolved solids (TDS), dissolved oxygen (DO), DO (SAT), salinity (SAL), and water and air temperatures, E. coli
- Overall, water temperature, pH, dissolved oxygen, and DO (SAT) all fell within the acceptable thresholds, with a "good" score for the 2018 field season
- Of 78 E.coli samples that were collected, 19 had minimal bacteria levels detected, 24 fell under the 'Unacceptable for livestock watering' category, 17 in the "Unacceptable for irrigation", and 18 "Unacceptable for human recreation"

Future Directions:

CARP is dedicated to ensuring that long term data record gathered through this program continues and is currently seeking sponsors and partners in order to secure the financial resources required. Some project funding has been secured with the Atlantic Water Network, which allowed sampling to commence in May 2019.

This work was funded by a sponsorship from Hamilton Eel Fisheries Ltd.

Addressing Nutrient Runoff in Bay of Fundy Watersheds

The characteristics of watersheds have a direct impact on the freshwater, estuarine, and marine ecosystems into which they drain. A common impact of human land-use on these aquatic systems is eutrophication, which is an increase in primary productivity due to elevated nutrient levels that can be derived from sources such as wastewater plants, on-site septic system, and agricultural operations. Though more productivity may sound like a good thing, eutrophication can often lead to severe degradation of ecosystems, and imbalances in species structure and interactions.

Beginning in 2015 Eastern Charlotte Waterways and CARP have been collecting data about nutrient levels in selected estuaries of the Bay of Fundy in order to gain a better understanding of current baseline conditions, contribute to a long term health record, and identify priority areas for more focused monitoring efforts. Through 2018 and 2019, efforts were

focused on sampling priority tributaries, identifying contributing sources of agriculturally-derived nutrient contamination, and identifying and showcasing potential strategies for mitigating the eutrophication impacts from these sources.

2018 Highlights:

- Sample locations selected throughout five Bay of Fundy tributary watersheds: Annapolis River, St. Croix River, Shubenacadie River, Salmon River, River Hebert
- Nutrient sampling in the Annapolis River conducted at 20 sites and analyzed for 5 parameters: nitrate, nitrite, total nitrogen, total phosphorus, chlorophyll a
- 2 tile-drained agricultural fields totaling 9.5 hectares selected for draining water management demonstration site
- 4 inline water level control structures installed on tile drain outlets to reduce nutrient loading in adjacent watercourses
- 3 fact sheets developed to promote management practices for the reduction of nutrient-laden runoff from agricultural lands
- A GIS based model for predicting runoff based on 200+ scenarios at 2 resolutions was produced

Future Directions:

Monitoring wells will be installed at the demonstration site to allow monitoring of water levels and quality at multiple points throughout the demonstration site. The site will be used to host demonstration days to showcase the project to the agricultural community and the public. Ongoing monitoring of runoff from the site will be conducted to determine the effectiveness of the water level control structures toward reducing nutrient contamination to receiving waters; this information will be incorporated into future outreach materials and shared during demonstration events and site visits.

This work was made possible with the financial support of Environment and Climate Change Canada's Gulf of Maine Initiative, Agriculture & Agri-Food Canada and with the support of the RBC foundation.

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

Environment and Climate Change Canada | Environnement et Changement climatique Canada

Agriculture and Agri-Food Canada

RBC

Engaging Private Landowners in Species at Risk Recovery in Southwest Nova Scotia

Building on past work focused on the wood turtle, CARP is working to expand its private land stewardship program to take a multi-species approach in order to benefit other species at risk present within the watershed. This project will involve working directly with landowners and managers to promote and support the implementation of BMPs on their land as well and working with partner organizations and species at risk practitioners across southwest Nova Scotia to strengthen partnerships and improve synergies between initiatives.

2018 Highlights:

- Coordination of pre- and post-field season phone calls with SAR practitioners working in southwest Nova Scotia
- The initial development of a best management practices (BMP) digital library to facilitate work by species at risk practitioners

- Best management practice education for farmers and agricultural landowners through a series of free workshops
- A series of interviews with farmers to gain perspective on how to best work with them to achieve conservation objectives related to SAR

Future Directions:

This 2 year project will continue through the 2019-2020 project year. The 2019 field season will include development of stewardship plans and implementation of restoration and habitat enhancement actions. Public outreach efforts will include recruiting community members to assist with citizen science programs such as Maritime Swift Watch and turtle nest monitoring. Year 2 of the project will also include continued work with other SAR practitioners to develop resources to support recovery initiatives across southwest Nova Scotia.

This work was made possible with the financial support of Environment and Climate Change Canada's Habitat Stewardship program for Species at Risk.

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

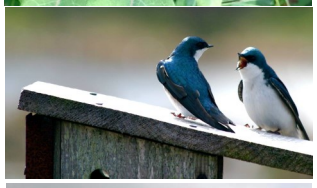
Environment and Climate Change Canada | Environnement et Changement climatique Canada

Wildlife habitat restoration and enhancement

CARP continually aims to support landowners and managers in stewardship activities that restore or enhance wildlife habitat with a view to maintain the biological diversity of native wildlife species and their habitat. CARP works with landowners to develop voluntary stewardship agreements, which provide recommendations for landowners or managers to consider.

2018 Highlights:

- 100 meter shelterbelt/wildlife corridor planted with a variety tree/shrub species
- 100 trees and shrubs planted to enhance wetland habitat at pond site and a riparian site to enhance habitat complexity and stabilize riverbanks
- Swallow nest box distribution and installation
- Sharing of best management practices resources with landowners/managers



Future Directions:

Landowner follow up will be conducted with 2018 participants in order to assess the success of project activities and conduct any maintenance activities. CARP has applied for funding for similar activities in 2019 in order to support the engagement of additional landowners.

This work was made possible with the financial support of Nova Scotia Habitat Conservation Fund (contributions from hunters and trappers)

Nova Scotia Habitat Conservation Fund
Contributions from Hunters and Trappers

Mindshift!

In late winter/spring 2018 CARP partnered with Young Company Productions to stage a production MindShift. MindShift was developed as a way for youth to influence the culture in their schools and communities toward environmental sustainability. Under the direction of Gillian Ormerod, and with the support of the YCP team, 12 talented youth prepared in time to deliver the production on Earth Day 2018. The group performed for students at Clark Rutherford Memorial School in Cornwallis and Annapolis West Education Center in Annapolis Royal. Additionally, two public performances were given, one in Middleton as part of the Annapolis Valley Home School Expo and the second at the Granville Ferry Community Hall.

Future Directions:

MindShift was CARP's first foray in the world of community theatre. The production created opportunity for new partnerships and create new ways to engage the community. CARP is hoping to work with YCP and other community partners on similar endeavors in the future.

This work was made possible through a partnership with Young Company Productions. This work was made possible with the financial support of Awesome Annapolis.

Powering Innovation in the Annapolis Valley

The Powering Innovation in the Annapolis Valley project will support activities that engage youth, students, homeowners and the business community in order to develop the local knowledge and capacity required to pursue the use of renewable energy technology and support clean growth initiatives.

2018 Highlights:

- Solar PV system design project conducted by students in the NSCC Energy Sustainability Engineering Technology
- Planning for the installation of a 10 kW PV system in the Town of Annapolis Royal commenced

Future Directions:

CARP is working with the Town of Annapolis Royal to plan the installation of a 10 kW PV system, which will serve as a teaching tool to provide renewable energy education. The program will involve a variety of educational components including workshops and seminars for residents and business owners, and the delivery of an energy sustainability fair in fall 2019. The project will also include the sourcing of hands on renewable energy education kits and the development of curriculum linked educational modules for delivery in schools that utilize these tools.

This work was made possible with the financial support of Farm Credit Canada and the Nova Scotia Low Carbon Communities Fund.

Ocean Acidification

The ocean, once considered a good carbon sink for the absorption of worldwide CO2 emissions resulting from human activities, has been shown to be experiencing rapid changes in seawater chemistry from absorption of CO2. The weak acid nature of CO2 results in a release of protons (H+) into seawater, increasing its acidity. Rapid changes in the acidity of coastal and marine waters can have devastating effects on aquatic habitats and biodiversity. While there has been much study into ocean acidification, less is understood about coastal acidification in estuaries. Coastal acidification in estuarine and near shore environments is influenced by a complicated set of relationships, and can be affected by a wide variety of factors such as:

- nutrient loadings and nutrient cycling processes from watersheds,
- the underlying geology and landform structures in watersheds and estuaries,
- metabolic activity in intertidal sediments,
- the amount of freshwater and marine water exchange happening within an estuary or near shore environment.

2018 Highlights:

- Sampling was initiated in 2016 and continued in the 2017 and 2018 field seasons with the collection of monthly acidification water samples throughout the winter, spring, summer and fall, and collection of radium samples in the late summer

Future Directions:

The sampling phase of this project has been completed. Sample processing, data analysis, and interpretation of results will be led by Dalhousie University going forward.

This work was made possible thanks a partnership with Eastern Charlotte Waterways and Dalhousie University.

Eastern Charlotte WATERWAYS

DALHOUSIE UNIVERSITY


The Annapolis River
OURS TO ENJOY,
OURS TO PROTECT