Bluenose
Coastal Action
Foundation

2016 Annual Report

A Healthy Environment Supporting Thriving South Shore Communities




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Species Illustrations

Page 2 Atlantic Whitefish (*Coregonus huntsmani*)
Page 5 Monarch Butterfly (*Danaus plexippus*)
Page 12 American Eel (*Anguilla rostrata*)
Page 19 Barrow's Goldeneye (*Bucephala islandica*)
Page 25 Porbeagle Shark (*Lamna nasus*)
Page 36 Leatherback Turtle (*Dermochelys coriacea*)

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About Coastal Action

The Bluenose Coastal Action Foundation is a community-based charitable organization with a mandate to address the environmental concerns along the South Shore of Nova Scotia. Coastal Action's goal is to promote the restoration, enhancement, and conservation of our ecosystem through research, education, and action. The organization has been an established member of the Lunenburg County community since its inception in December 1993. Over the past 20+ years, Coastal Action has successfully completed a number of projects in the South Shore region of the province. Project themes have included such issues as River Restoration on the Mushamush, Petite Rivière, Gold, and LaHave River systems; Water Quality Monitoring in the Petite, Gold, and LaHave River watersheds; Endangered Species Projects addressing the roseate tern, Atlantic whitefish, Atlantic salmon, and American eel; Climate Change and Pollution Prevention initiatives (i.e., Active Transportation, Water and Energy Conservation, Solid Waste Education, etc.); Environmental Education Programs; and Clean Boating.

A Healthy Environment Supporting Thriving South Shore Communities

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Table of Contents

Introduction

About Coastal Action 3
Message from our Executive Director 6
Board Members 6
Staff Members 7
Financial Statement 8

Projects

Research

American Eel 10
Atlantic Whitefish 13

Education

Morton Centre Educational Programs 15
Rural H_2O Project 18
Growing Green Sustainability Festival 20
Vermicomposting and Waste Management 21
Impacts of Invasive Species - Biology 11 22
Cooks Brook Field Trip 23
Outreach Events 24

Action

LaHave River Watershed Project 26
Petite Rivière Watershed Project 28
Wildcat Shale Pit Restoration Project 30
Stormwater Management and Climate Change Education 32
Living Shoreline and Community Greenspace Project 34
Bridgewater Community Energy Initiative 35
Agricultural Stewardship Project 37

Consulting

Fox Point Lake Water Quality Monitoring 38
Brookside Cemetery Pond 39
"LaHave River- Our Living Future" Public Consultation 40
Town of Mahone Bay Harbour Management 42
Marine Protected Areas 43

Table of Contents

Community-Based Coastal Management in Sweden 44

Coastal Action Stories

Rum and Chowder Social 12
Stella's Science Project 17
Watershed Tour 19
Project Coastline: Picton Castle Tour 25
Adopt-a-Highway 31
Riv-Temp Monitoring in the LaHave 36

Tables & Figures

Table 1: Coastal Action funding breakdown for 2016-17 8
Table 2: East River, Chester 2015-16 eel comparision 11
Table 3: Oakland Lake stream summary of annual eel catches 12
Table 4: Total fish capture from rotary screw trap during Spring 2016, by month 14
Table 5: Coastal Action outreach events in 2016 24

Figure 1: Coastal Action funding breakdown for 2016-17 9
Figure 2: North Branch mean water temperature from August 10- September 25, 2016 36

Message from our Executive Director

After receiving many accolades for our first Annual Report, I am pleased to announce the launch of Coastal Action's second Annual Report! Once again, this report showcases all of our projects, programs, contract work, and committee participation from the April 2016 to March 2017 fiscal year. Although easier the second time through, I must still give a shout out to all the hard work and effort that was put into this document by the Coastal Action senior staff members! If you would like more in-depth information on any of the topics summarized in this report, please visit the Coastal Action website at ***www.coastalaction.org*** or contact any of our staff (all staff contact information can be found on the website).

2016-17 continued to be a growth year for Coastal Action with the staff and board working diligently on transitioning into a new organizational business plan and annual review process with the wonderful support of Jamie O'Neill with Uprise Consulting. Emphasis was placed on diversifying our partner base and generating new sources of revenue for the organization. Major achievements that stemmed from our 2016 Business Plan included the hiring of a new Communications and Event Planning Coordinator position (we welcomed Bernice Theriault to our staff); continued efforts to ramp up our communications through social media, public events, and exploring new collaborations; a concerted effort to reconnect with our five Lunenburg County Municipal partners as well as expand our reach and connect with other South Shore municipal units (i.e., Region of Queens, Town of Shelburne, and the Municipality of the District of Shelburne); as well as making great strides in getting our own house in order through the development of a new HR policy and governance structure. Coastal Action is extremely energized and enthusiastic about the success achieved to date through this new business planning approach, yet there is still much more that needs to be accomplished in the coming years. Coastal Action is committed to continuing our work on improving the organization as a whole with the much appreciated help and support received from Jamie O'Neill.

Coastal Action would also like to take the time to officially thank all of those dedicated volunteers who continue to support and strengthen our organization – our success is your success! From our Board Members to the student projects to project-specific committee members to those who come out and support our events, every contribution is appreciated.

Brooke Nodding

2016 Coastal Action Board Members

Rick Welsford **CHAIR**
Biologist / Project Manager

Granville Veinotte **VICE CHAIR**
Retired DFO Fisheries Officer

Kelly Wilson **PAST CHAIR / TREASURER**
Retired Engineer / Brew Master

Jeremy Hopkins
Michelin North America (Canada)

Jesse McLean
Inspector, Nova Scotia Environment

Karl Nauss
Councillor, Town of Mahone Bay

Mike Allen
Inspector, Nova Scotia Environment

Paul MacLellan
Heritage Carpentry Program, NSCC

Michael Graves
Councillor, Town of Bridgewater

John McGee
Councillor, Town of Lunenburg

Brian Gilbert
Retired NS DNR Deputy Minister

Andre Veinotte
Councillor, Municipality of the District of Chester

2016 Coastal Action Staff

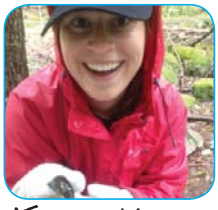
Shanna Fredericks
Assistant Executive Director

Carol Josselyn
Office Manager

Andy Breen
Atlantic Whitefish Project Coordinator

Danielle Pernette
American Eel Project Coordinator

Jennifer McKinnon
Graphic Designer *and* Field Technician



Emma Kinley
Watershed Projects Coordinator

Ariel Smith
Coastal and Marine Projects Coordinator

Amy Buckland-Nicks
Climate Change Projects Coordinator

Claire Kellock
Environmental Education Projects Coordinator

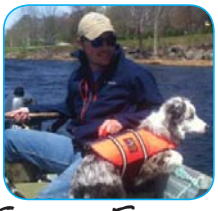
Sam Reeves
Agricultural Stewardship Project Coordinator

Bernice Theriault
Communications *and* Event Planning Coordinator

Philip Longue
Fisheries Technician

Blaire Slaunwhite
Field Coordinator

Shauna Barry
Field Technician



Shawn Feener
Fisheries Technician

Alisha Kelly
Field Technician

Melissa Rafuse
Field Technician

Cate de Vreede
Morton Centre Program Consultant

Philicity Byers
Watershed Projects NSYCC crew member

Nicolas Wentzell
Watershed Projects NSYCC crew member

Emma Beaton
Morton Centre Education Programs NSYCC crew member

Financial Statement

Table 1: *Coastal Action funding breakdown for 2016-17.*

Breakdown of Funding 2016-17	
Federal Government	$325,253
	Habitat Stewardship Program for Species at Risk
	Habitat Stewardship Program Prevention Stream
	Fisheries and Oceans Canada
	Canada 150 Fund
	Recreational Fisheries Conservation Partnerships Program
	National Wetland Conservation Fund
	Canada Summer Jobs Program
	Eco Canada Youth Internship Program
	Agricultural Youth Green Jobs Initiative
Provincial Government	$65,315
	NS Summer Student Skills Incentive Program
	NS Dept. of Fisheries and Aquaculture
	Thrive After School Program Funds
	NS Dept. of Health and Wellness Regional Development Grant
	NS Strategic Co-operative Education Incentive
	NS Dept. of Transportation & Infrastructure Renewal
	NS Graduate to Opportunities Program
	Workforce Innovation and Productivity Skills Incentive
Municipal Government	$64,022
	Municipality of the District of Lunenburg
	Town of Bridgewater
	Bridgewater Public Service Commission
	Municipality of the District of Chester
	Town of Mahone Bay
Industry	$87,180
	Michelin North America (Canada) Inc.
	Canadian Council for a Sustainable Eel Fishery Inc.
	Shell Canada
	High Liner Foods Inc.
	Royal Bank of Canada
Charities / NGOs	$110,690
	Sage Environmental Program
	Atlantic Salmon Conservation Foundation
	NSLC Adopt-A-Stream Program
	TD Tree Days
	TD Friends of the Environment Foundation

Table 1: *Coastal Action funding breakdown for 2016-17 (continued).*

Breakdown of Funding 2016-17 *(continued)*	
	Green Communities Canada
	Nova Scotia Youth Conservation Corps
	Resource Recovery Fund Board
	NS Federation of Agriculture Water Funds
	Lunenburg County Community Health Board Wellness Grants
	Kitchener-Waterloo Community Fund
	Small Change Fund
	Clean Annapolis River Project
Academia	$10,685
	Acadia University
Donations / Program Fees	$16,862
	Morton Centre Program Registration fees
	Donations / Fundraising Events
Total	$680,007.00

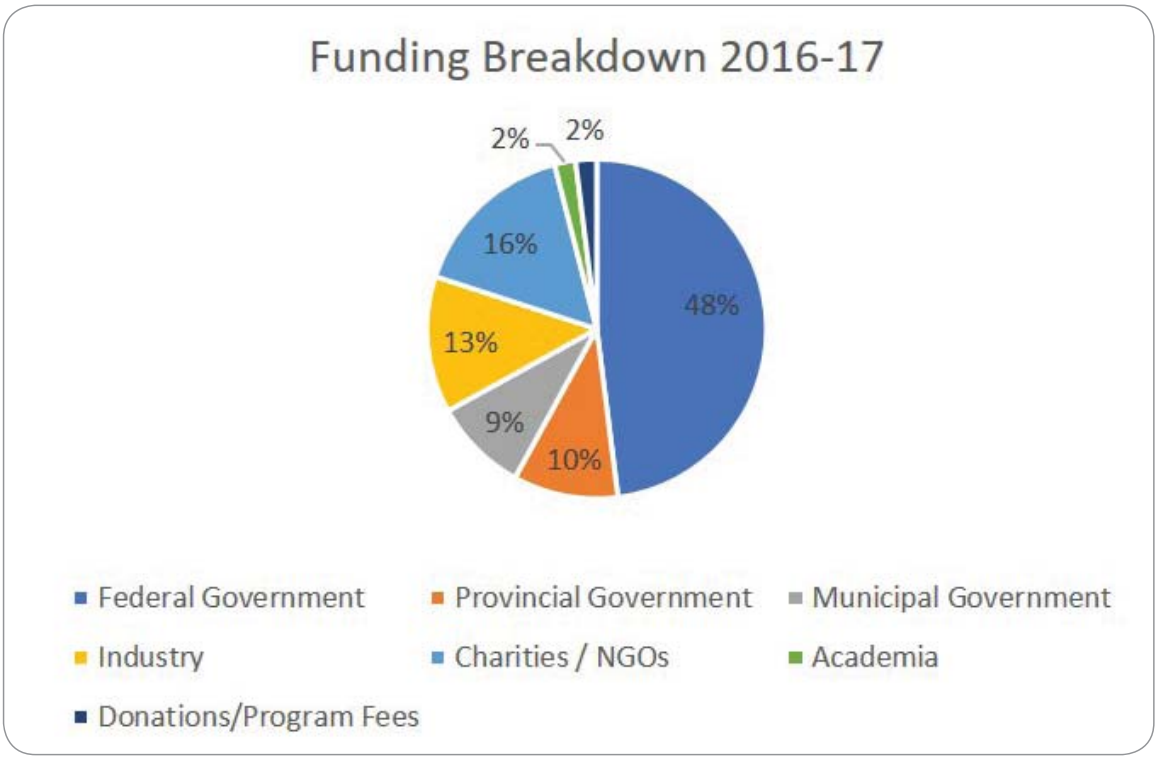


Figure 1: *Coastal Action funding breakdown for 2016-17.*

American Eel

Blaire and Danielle measure the length of an adult eel.

This year marked the tenth consecutive year of a joint venture project between Fisheries and Oceans Canada, commercial elver fishers, and Bluenose Coastal Action Foundation.

The **East River, Chester Elver Abundance Study** began in 2008, with the objective of estimating the number of elver recruited (i.e., entering the river) annually. Elvers make their way up the coast from the Sargasso Sea, where they are born, and into rivers and lakes, typically arriving in early spring until mid-summer. Four traps, each consisting of a ramp and holding box, are placed below the falls in East River, Chester, just above Highway 3. These ramps attract elvers by providing a less turbulent water flow, which elvers follow and then get swept into holding boxes where they can be emptied, counted, and released upstream. The first elvers appeared in the mouth of the river in early April, about a month earlier than the previous year. Traps were set up in late April, as elvers made it upstream from the mouth of the river when water levels dropped, and continued to fish until early July. The traps were checked and emptied daily, often twice during the heavy runs such as spring tides. Biological sampling of 100 randomly selected elvers occurred three times a week, noting the length, weight, and pigmentation of each elver in the sample, which changes throughout the season. In past years, volumetric-based estimates of elvers were completed; however, a new weight-based method was introduced in 2016, and was continued throughout the season as it was found to be more efficient. The peaks of the run occurred on May 2 and May 11, catching an estimated 200,000 elvers on each night, before tapering off gradually into July. The grand total of elvers recruited to the East River reached a record high of 2,377,902 elvers!

Elvers collected from traps for weighing.

After elvers enter rivers and lakes, they typically remain in freshwater systems throughout the yellow eel stage, before they reach sexual maturity. Silver, or sexually mature, eel

leave rivers and lakes throughout late summer and fall, in large downstream migrations on their way to the Sargasso Sea where they spawn as one population, and then die.

Collecting measurements from an eel in East Chester.

The **Oakland Lake Silver Eel Study** began at Oakland Lake stream in 2009, to capture eel migrating from the lake. The stream study has continued annually, with the exception of 2010. The wire trap essentially catches everything moving downstream from the lake, including any previously tagged eel from the Oakland Lake Potting Study (2008-2014). In 2016, the stream trap was in place from late August to early November. Throughout the entire season the trap was problematic, with issues including low water, eel escapement, and mink predation, resulting in most of the silver eel not being captured. However, a total of 153 eel were caught, including two tagged eels from the previous potting study on the lake. Catches in previous years have been over 500, indicating that many eel were missed due to trapping issues.

The **East River, Chester Silver Eel Study** began in 2014 as the trial year, and has continued annually with several modifications. Activities now occur throughout the East River, Chester watershed, including several upstream tagging sites and a recapture site downstream of the confluence. Similar to Oakland, traps were in place from late August to early November. Due to summer drought conditions, water levels remained extremely low until mid-October, at which point water levels rose rapidly following several heavy rainfalls; both low and high water inhibited trap function. Due to the low water level, the first eels only appeared at the end of September. Despite issues with water levels and traps, a total of 636 eel were captured at the three upstream sites; Connaught, Whistler, and Little Whitford; with 610 of those successfully tagged with PIT (Passive Integrated Transponder) tags. Only 62 eel were caught at the recapture site; however, four of them were recaptures (three from Connaught and one from Little Whitford).

In addition to the mark and recapture activities, a number of silver eel were sacrificed from East River, and the two recaptured eel from Oakland were also sacrificed. Sacrificed eel were measured and sexed, otoliths were extracted

Table 2: *East River, Chester 2015-2016 eel comparison (Note that the Officer Camp site was replaced in 2016 by Whistler).*

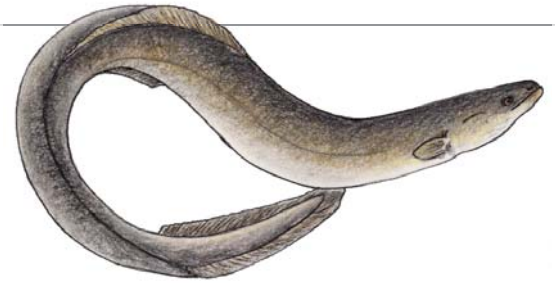
	2015		2016	
Site	Tagged	Total catch	Tagged	Total catch
Connaught Lake	215	249	261	270
Little Whitford	63	99	124	136
Officer Camp (2015) Whistler (2016)	16	16	225	230
Recapture site	5 recaptures	987	4 recaptures	62

for aging, and swim bladders were examined for presence of the parasite, *Anguillicoloides crassus*. Of the 24 eel sacrificed from the East River, one male was infected with the parasite, as well as one female eel from Oakland Lake stream.

The objective of both silver eel studies is to determine a population estimate, while also looking at run timing and biological characteristics. The results from these projects are used in American eel conservation and management decisions by Fisheries and Oceans Canada.

Table 3: *Oakland Lake stream summary of annual eel catches (Note that the days and eel captured in 2016 indicate that despite the length of time the trap was placed, many eel were missed as the trap was not functioning properly).*

	2009	2011	2012	2013	2014	2015	2016	Total
Days trap was in place	29	26	45	81	70	70	*73	
Total eels captured	221	283	405	559	513	555	*153	2689
Recaptures	2	1	13	17	10	9	2	54



Coastal Action Stories: Rum and Chowder Social

The 2016 Rum & Chowder Social was the most successful to date. We are growing this event into a bigger public awareness campaign and fundraiser. Moving the event from the Captain Angus Walters House to the Lunenburg Community Center allowed us room to increase ticket sales. We had 14 restaurants and individuals donate a variety of chowders, two local bakeries who donated buns, and welcomed back Iron Works Distillery and first-timer Terra Beata as event partners. Tyler Haydon added some fun to the event with the addition of a cake auction.

Guests of our 2016 Rum and Chowder Social line up to sample a wide selection of local chowders.

Special donations from Charles Ley (stained glass Schooner) and Peter Zwicker (framed beach photo), along with a Coastal Action Mahone Bay map, were used for a raffle ticket draw. The South Shore Breaker was our media sponsor for the event this year, twice running a ¼ page advertisement, as well as printing both posters and save-the-date postcards. This event has the potential to grow in both fundraising capacity and relationship building. The 5th Annual Rum and Chowder event is scheduled for June 9, 2017, the end of National Environment Week, and in connection with both World Oceans Day and Coastal Action's planned Canada 150 celebrations. Hope to see everyone there!

Atlantic Whitefish

Andy and Philip collecting data at Milipsigate Dam, May 2016.

The Atlantic whitefish (*Coregonus huntsmani*) is a naturally anadromous, endangered fish species, which is endemic to Nova Scotia. Currently, the only known wild population is located within three inter-connected lakes (Minamkeak, Milipsigate, and Hebb Lakes) in the Petite Rivière watershed, Lunenburg County, Nova Scotia; an area of 16 km². Historically, an anadromous population was known to inhabit the Tusket River watershed in Yarmouth County; however, that population has since been extirpated from that system. In 1984, the Atlantic whitefish became the first Canadian fish species to be classified as "endangered" by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Its "endangered" status was reconfirmed by COSEWIC in 2000, and more recently in 2010. The Atlantic whitefish was also recognized as being threatened with imminent extinction and listed as "endangered" under Schedule 1 of the Federal *Species at Risk Act (SARA)* in 2003. It is protected under the Maritime Fishery Regulations, the Federal *Species at Risk Act*, and the Nova Scotia *Endangered Species Act*.

Coastal Action has been working toward the recovery of Atlantic whitefish since 2003. Our main goal in 2016, was to continue the monitoring work that started in 2013, as well as draw attention to the rapid decline in the population of the species due to the introduction of two invasive species (chain pickerel and smallmouth bass). Over the year, the project was featured on CBC television and radio, CTV television, and was featured in an article printed in the Chronicle Herald (please visit our Facebook page for links to these stories).

First, the good news; the rotary screw trap (RST) often provides us with some important information and this year was no exception. In 2015, we had been fortunate to capture four larval Atlantic whitefish at Milipsigate Dam. In 2016, we assumed that the larval fish were migrating downstream over the dam and, therefore, moved the RST two metres closer to the dam in an attempt to improve the efficiency of the trap. This plan was successful and the highlight of the year was the capture of 53 larval Atlantic whitefish. This capture allows us to state that during the winter of 2015, there was still a breeding population of Atlantic whitefish in either Milipsigate or Minamkeak Lakes.

The bad news; there are several examples that show the precarious state of the last remaining Atlantic whitefish population. Coastal Action is concerned about the exponential growth of the chain pickerel and smallmouth bass

populations, the fact that no adult Atlantic whitefish have returned to the Hebb Dam fishway since 2012, and that no adult whitefish have been observed anywhere in the watershed since 2014. However, in 2016, the most disturbing news came from a floating trapnet comparison study. In 2007, a floating trapnet was used to capture fish in Hebb Lake. In 2016, the same trapnet was placed in the same location, at the same time of year, by the same person. In 2007, over 300 fish were caught, including 216 white perch and 20 Atlantic whitefish. In 2016, only one fish was caught, a 23-inch chain pickerel.

For a more detailed description of the work conducted by Coastal Action's Atlantic whitefish team, please visit Coastal Action's website and Facebook page.

Larval Atlantic whitefish at Milipsigate Dam, May 2016.

Table 4: *Total fish capture from rotary screw trap during Spring 2016, by month.*

Species	April	May	June	Total
American Eel	15	109	60	184
Atlantic Whitefish	0	53	0	53
Brown Bullhead	1	0	1	2
Chain Pickerel	0	3	6	9
Gaspereau	0	6	48	54
Golden Shiner	0	1	0	1
Smallmouth Bass	0	5	7	12
White Perch	0	0	3	3
White Sucker	3	11	8	22
Yellow Perch	0	10	0	10
Total Captures	**19**	**198**	**133**	**350**

Floating trapnet on Hebb Lake, October 2016.

Morton Centre Educational Programs

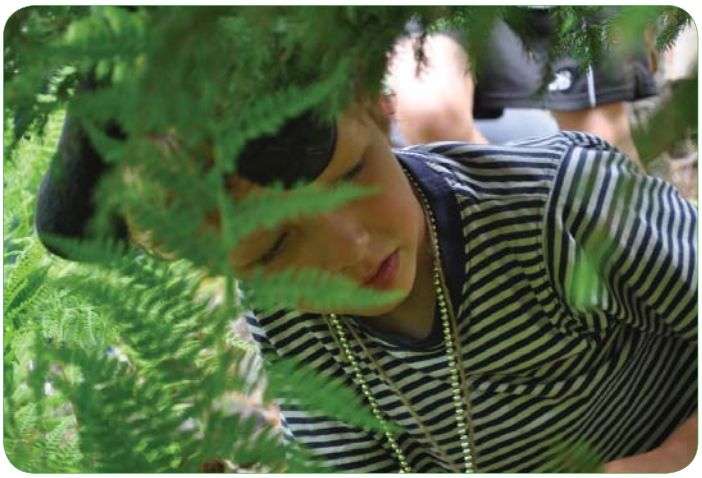
Pirates' Cove campers on an earth walk, July 2016.

The Morton Centre is a 99-acre property located on Heckman's Island, near Lunenburg, Nova Scotia. The property is ecologically diverse and is comprised of five different ecological areas: secondary-growth mixed coniferous and deciduous forest, two large hay fields, freshwater ponds, a salt marsh, and nearly two kilometers of shoreline. A network of trails run across the property. The property also boasts a cottage, with amenities to accommodate summer staff and retreat visitors, a variety of outbuildings, and a 17-foot yurt which provides further programming space in the summer months. The Morton Centre was originally an active farm, owned by Dr. Harry and Rachel Morton. Their wish was to see the property protected and used for environmental research and education. They gifted the property to Acadia University in 1995, and since then, the Centre has been used primarily as a field station for Acadia student research. Recently, Acadia has shifted the purpose of this site to become a place for public environmental education, and in 2013, they partnered with Coastal Action to deliver environmentally-themed programs to engage and educate local children and youth. These programs intend to help participants build a connection with the natural world, increase environmental stewardship and awareness within the community, and address the lack of environmentally-focused education within our public education system.

Grade four students learning about the water cycle at 'Cycle Savers', October 2016.

Building off the successes from previous seasons, a similar but slightly expanded suite of programs was offered in 2016. The six programs delivered in spring, summer, and fall of 2016 included Trailblazers, Cycle Savers, Junior Leadership Program, Pirates' Cove, Wild Adventurers, and two community events. All the programs took place outdoors and were designed to provide participants with opportunities to enjoy

experiential learning, science, discovery, and being active in nature. Each day included games, stories, creative projects, exploration and physical activity, as well as hands-on learning related to the theme of the camp/event.



Pirates' Cove camper exploring at the Morton Centre, July 2016.

This was our first year offering Trailblazers, an all-outdoors after-school program for students in grades 6-9 at Bluenose Academy and Bayview Community School, during the spring and fall of 2016. Two leaders met the group at the school at dismissal time, and then walked to a nearby wild area once a week for approximately 10 weeks. We played active, heart-pumping games, prepared and ate nutritious snacks, and spent structured and unstructured time playing and building skills in the forest. The program was offered free of charge and ran in all kinds of weather. The overall goals were re-connecting kids to nature, stimulating outdoor free play, and building outdoor leadership skills.

Cycle Savers is an intriguing, hands-on, earth education program for grade 4 students based on a mystery code and club theme. This program incorporates a leadership component for high school students, who are given two days of program and leadership training, then lead the groups of grade fours, in pairs, on a captivating adventure to appreciate, understand, and respect the cycles of life through an action-packed field trip at the Morton Centre. Students complete activities in a natural setting, which address grade 4 science curriculum outcomes, as they decipher the lost manual of the Cycle Savers Club, learn how their household is affecting the environment, and what they can do to make a difference. We ran this program in the spring and fall of 2016.

The Junior Leadership program was a new initiative in 2016. Six local youth were given two days of program and leadership training. During this training, they were acquainted with the program site and staff, introduced to the principles of earth education, and to the benefits of leadership and team-building. The youth also practiced leading games and activities and then assisted the on-site program coordinators during our day camps. Many of these youth volunteers had never worked in a leadership role with children, and expressed an appreciation at having the opportunity to build their leadership skills.

A class of Cycle Savers from Bridgewater Elementary School with high school leaders, May 2016.

Pirates' Cove is a half-day camp for our younger participants, ages 6-8. The campers were immersed in a week of exploration and investigation to reduce their impact on the natural environment, to reuse old materials in up-cycling efforts, to learn proper recycling methods, and to rethink the ways we use resources and materials.

Wild Adventurers is a full-day camp for youth ages 9-12. Campers become adventure-seekers that learn from wild creatures about how to explore and survive in the natural world and how to live in harmony with our environment. At the end of the week, campers put their wilderness survival skills to the test by building and sleeping in their own tarp shelters!

Coastal Action's other events at the Morton Centre included our Open House & Family Picnic and our Family Campfire Nights. The Open House & Family

Picnic is a fun, community-building and awareness-raising event which includes a free BBQ, informational displays, nature activities, crafts for kids, and a walking tour of the property. The Family Campfire Nights are intended to reconnect families with nature and build awareness about the Morton Centre property and Coastal Action within the community. The evenings include nature activities, a tour of the property, and a fun-filled evening of stories, songs, and snacks around a campfire.

Overall, we celebrated many successes in the 2016 season. We offered two new programs, both of which went very well. Participant numbers increased by 31% and the feedback from participants, teachers, and parents continues to be overwhelmingly positive and encouraging. Coastal Action aims to continue delivering quality educational programs to youth, and offer more opportunities for children, adults, and families.

Clare reads the story of the 'Rainbow Gems' on a family earthwalk, August 2016.

Coastal Action Stories: Stella's Science Project

Coastal Action began monitoring the water quality of the LaHave River in 2007. We have been actively addressing the issue of straight pipes in the LaHave for 10 years now. It took a 12-year old girl to make the message go viral; the passionate plea from a girl who just wants to swim in her river. Stella Bowles singlehandedly inspired, not only the community, but also all three levels of government to work towards addressing the issue of straight pipe septic systems discharging untreated sewage into the LaHave River estuary.

Stella, now 13 years old, lives along the LaHave River in Upper LaHave. She recently discovered that the river she grew up beside was not as clean as she had initially believed after her mother shared some disturbing water quality data that was posted on the Coastal Action website. Stella has since been conducting her own science project on the LaHave River and publicly posting her results on social media. She has compared her testing results for enterococci bacteria to Coastal Action's data for validation. She has also joined the Straight Pipe Citizens Group, a sub-committee derived from Coastal Action's LaHave River Watershed Committee, and has accompanied Coastal Action field staff to conduct our water quality data collection throughout the LaHave River watershed.

Stella's efforts have helped drive a campaign to end the discharge of raw sewage from straight pipes by replacing them with proper septic systems in homes along the LaHave River. Stella has been interviewed and published in the local news and has also received national media attention from CTV, CBC, and Global news outlets. She was awarded the TD Future City Builder Award and asked to present at multiple events. Coastal Action, along with the greater community, are incredibly proud of Stella's achievements and thank her for inspiring the need for change along the LaHave.

Stella collecting water samples from the LaHave River.

Rural H20 Project

Sam inspecting a well in Lunenburg County.

In Nova Scotia, it is estimated that 40% of people obtain their water from private sources, and many are unaware of exactly from where their water comes. Since beginning the Rural H20 Project in September of 2016, Coastal Action has been working with the Clean Annapolis River Project (CARP) to educate homeowners about water quality, source water protection, and water conservation. During the project, Coastal Action was responsible for reaching out to a total of 25 homeowners in Lunenburg, Shelburne, and Queens Counties. In attempts to reach out to rural homeowners, two workshops were offered by Coastal Action; one in Shelburne County and the other in Lunenburg County. These workshops involved a PowerPoint presentation, a variety of information booklets, and the opportunity to sign up for a free home assessment. Each home assessment involved a series of questions relating to wells, septic systems, water quality, and water conservation. Each assessment typically took 45 minutes and included advice on water testing. To make testing more attractive, bottles were provided along with a $100 rebate. For many participants, this covered the cost to test for arsenic, uranium, lead, fluoride, nitrate/nitrites, and bacteria.

Sam checking the condition of a well head.

Due to Nova Scotia's underlying rock types, arsenic and uranium are both common throughout the province and can both negatively impact human health. Many parameters such as arsenic and lead have no colour, taste, or smell in water, meaning it can be ingested through drinking water without notice. Water testing is crucial to ensure that the water coming from a well is safe to drink; testing is the only way to detect harmful contaminants.

Another important aspect of the project was source water protection. Groundwater can become

contaminated in a variety of ways including septic system malfunction, agricultural and industrial runoff, fuel spills, and even large amounts of road salt. Many of the homeowners who participated in the project were already aware of what they should and should not do in the areas around their well.

Many homeowners expressed great interest in the water conservation component of the project and often accepted any advice that could help reduce water usage in their homes. This was especially true in the case of Shelburne County, where many homeowners experienced their wells going virtually dry during the summer and fall months of 2016. All homeowners were advised to have low-flow devices installed on faucets, showers, and toilets and to use rain barrels to harvest rain water.

Coastal Action is hoping to partner with CARP to continue the Rural H20 Project again in 2017-18, to further educate rural homeowners on drinking water safety, water conservation, and source water protection.

Coastal Action Stories: Watershed Tour

Coastal Action, in partnership with the Municipality of the District of Lunenburg, led the Watershed Tour as part of the annual Growing Green Sustainability Festival. Leading the tour was Watershed Projects Coordinator, Emma Kinley. The tour showcased Coastal Action's stream restoration work in the LaHave River watershed that took place within the Town of Bridgewater at Hebb Brook, Grouse Brook, and Cooks Brook. These particular sites enabled participants to learn about fish chutes, weirs, and baffles designed to improve fish passage through culvert structures, as well as digger logs and natural deflectors to improve fish habitat and water quality.

Watershed Tour guests get a closer look at the fish chutes. Photo: Michael Lee.

A rare visit to see the Morgan Falls fish ladder on the LaHave River, operated by Fisheries and Oceans Canada, was a highlight for many, as the public is not typically given access to this site. The tour concluded with a visit to the Wildcat Shale Pit and Wetland Expansion Project in the Petite Rivière watershed, where an acidic shale pit is being transformed into wetland habitat.

Growing Green Sustainability Festival

Yummy treats enjoyed by all at the Growing Green Festival.

The **Growing Green Festival** is dedicated to all things sustainable. It is a fun and colourful introduction to the idea that all people can live within the Earth's means, while meeting their basic needs. The festival features exhibitors and vendors, educational activities, a natural playground, and lots to do for children and youth. The festival is organized by the Town of Bridgewater, the Municipality of the District of Lunenburg, community volunteers, organizations, and businesses. Coastal Action played a lead role in this year's festival, providing two staff to sit on the planning committee as well as providing staff and volunteers to help support key festival activities, while leading two events of our own during the weekend.

The **Earth Savers of Tomorrow** event was created to include schools and brought out over 1,400 students in grades 3-6 to visit, participate, and engage with businesses and organizations who focus on supporting our natural environment. Students participated by visiting some of the 64 booths and enjoying hands-on activities. Coastal Action hosted three booths, including a touch tank that allowed students to touch and hold local sea creatures. The highlight of the event was the Living LaHave River – created by over 700 students. This was to shed light on the problem of straight pipes dumping raw sewage into the river. The drone video will be used to continue conversations at the schools.

The Coastal Action team led a tour of the **LaHave River watershed** and spoke about some of the many projects we are working on to support clean rivers, while showcasing our stream restoration work. Bringing the public to our completed and future worksites, as part of this festival, builds public awareness and increases the community input on ongoing projects.

Coastal Action also led the **TD Friends of the Environment Tree Days** tree planting event at the new public greenspace located behind the Cineplex Theatres in Bridgewater. It was a wonderful event with over 120 plants, trees, and shrubs being planted along the water's edge. Volunteers included many of the TD staff, community members, and town councillors and staff. The 2016 Growing Green Sustainability Festival drew hundreds of visitors and was an event that showcased research, education, and action using a variety of examples of Coastal Action's great environmental work.

Vermicomposting and Waste Management

Our 2016 shoreline cleanup to celebrate World Oceans Day in Mahone Bay, in partnership with Kirk Symonds at Region 6 Solid Waste Management.

Coastal Action's partnership with Region 6 Solid Waste Management continued in 2016, rounding off three years of partnership between the organizations. In the spring of 2016, we joined Kirk Symonds at Bluenose Academy's Grade 5 classes to monitor their progress with in-class vermicomposting and provide other classes with bins and tools to begin their own vermicomposting process. Visits to Bluenose Academy also included class presentations on the importance of compost soil for plant growth and health, with demonstrative examples of such differences in plant growth.

Other collaborations with Region 6 included the 2016 Folk Harbour Festival Green Team, which brought volunteers out to the festival to monitor and manage recycling and waste to ensure proper disposal during the event. Coastal Action has also participated alongside Region 6 during town cleanups and a shoreline cleanup held on World Oceans Day 2016 in Mahone Bay. Our partnership with Kirk Symonds and Region 6 Solid Waste Management will continue to grow as we expand and enhance our Marine Debris Program which focuses on education, action, and research regarding the impact of plastic pollution on our coastlines, rivers, lakes, and oceans.

Impacts of Invasive Species – Biology 11

Philip showing students the stomach contents of smallmouth bass (Micropterus dolomieu).

In May, Coastal Action staff conducted a biological sampling and stomach content analysis workshop for three Grade 11 biology classes at the Park View Education Centre. The workshops were based on the daily routine and protocols followed by our staff during a typical day on the Atlantic Whitefish Recovery Project.

Approximately 30 fish, mainly smallmouth bass and some chain pickerel (*Esox niger*), were used for the workshop. The students worked in groups of four and all observations were recorded. This guaranteed that each group had at least two fish to sample, as each class consisted of around 20 students. The students took several measurements; fork length (cm), weight (g), and mouth gape (cm). Next, the students took scale samples to age the fish. Using tweezers, the students removed six to eight scales from the left side, posterior to the pectoral fin, and below the lateral line. The scales were carefully placed on a glass slide and then analyzed using a microscope or microfiche.

During the final part of the workshop, students were asked to conduct an internal examination of the fish. All internal organs were identified and their purpose explained to the students. Finally, an incision was made in the stomach and its contents were exposed and identified (if possible). Normal stomach contents typically consist of fish, often young gaspereau (depending upon the time of year); invertebrates, such as dragonfly nymphs; and sometimes rarities like amphibians, reptiles, or mammals. During this workshop, one of the student groups found the remains of a juvenile snapping turtle, a species listed as “vulnerable” under the Nova Scotia *Species at Risk Act (SARA)*.

Cooks Brook Field Trip

Park View Education Centre biology class at Cooks Brook.

Coastal Action and Park View Education Centre's Biology teacher, Jamie Mason, organized a day for high school biology students to get out of the classroom and into the river! The students actively participated in conducting stream habitat and riparian health assessments, as well as collecting water quality data. Students also learned why this information is important and how to analyze the results of the data collected.

Approximately 40 students from Park View Education Centre walked from the school to one of Coastal Action's stream restoration sites in Cooks Brook on May 24, 2016. Once there, Coastal Action staff taught the students how to measure water quality parameters in the field and explained how various wildlife species depend on healthy waterbodies. Measurements of water temperature, pH, total dissolved solids, dissolved oxygen, and conductivity were recorded by the students. They learned how to take in-stream measurements as part of a fish habitat assessment as well as the different techniques used to improve in-stream fish habitat. Lastly, students helped Coastal Action staff conduct a riparian health assessment at the site. This assessment involved a series of questions on the surrounding riparian habitat, which provide a score for the health of the riparian area.

Park View students returned to class, where they completed a written assignment on what they learned on the field trip. Students enjoyed their time out of the classroom where they could apply some of what they've learned in school in a practical, hands-on way to improve the local environment.

Outreach Events

Indian Point Young Naturalists Club members construct and paint their very own American eels in St. Margaret's Bay.

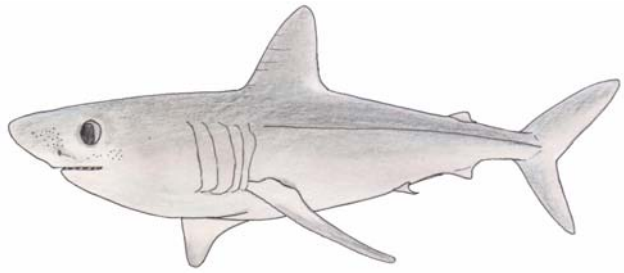
Education and outreach is one of Coastal Action's three core pillars and a very important component of our ongoing operations. Coastal Action attended numerous outreach events and festivals throughout 2016, which are all listed below. Many children's events were attended, along with the Bridgewater Growing Green Sustainability Festival, and various other festivals and events. In addition to events, Coastal Action delivered several presentations including at the Fishermen and Scientists Research Society 24th Annual Conference, Career Day presentations at Bayview Community School, and various other presentations and activities at local schools and youth groups about caring for the environment in which we live and the importance of conserving our Earth and native species.

Table 5: *Coastal Action outreach events in 2016.*

Date	Event
Thursday, February 23, 2016	Fishermen & Scientists Research Society Annual Conference
Friday, March 17, 2016	White Point Beach Resort March Break Fun for the Family Event
Friday, April 15, 2016	NSLC Adopt-A-Stream Sale 2016
Friday, June 3, 2016	Being Mindful at Hebbville Elementary School
Friday, June 10, 2016	Bluenose Coastal Action Foundation 4th Annual Rum and Chowder Social
Saturday, June 11, 2016	Lunenburg's Be a Tourist in Your Town Celebration
Saturday, June 11, 2016	Michelin Health and Safety Fair
Saturday, June 11, 2016	Career Day presentations at Bayview Community School
Tuesday, June 14, 2016	Lunenburg Tennis / Swimming Registration Day
Thursday, June 16, 2016	Bayview Community School Camp Mushamush Activities
Thursday, June 30, 2016	Lunenburg Farmer's Market

Table 5: *Coastal Action outreach events in 2016 (continued).*

Date	Presentations
Saturday, July 9, 2016	Lunenburg Street Festival
Saturday, July 23, 2016	Morton Centre Open House and Family Picnic
Thursday, July 28, 2016	MARC Event- "Horton Hears a Who"
June - August (various dates)	Indian Point Young Naturalists Club
Friday, August 5, 2016	Lunenburg Folk Harbour Festival
Sunday, August 21, 2016	Morton Centre Family Campfire Night
Thursday, August 25, 2016	Bridgewater Children's Fair
Friday, September 16, 2016	Bridgewater Growing Green Sustainability Festival



Coastal Action Stories: Picton Castle Tour

Coastal Action was approached by the Fisheries Museum of the Atlantic to collaborate on a project aimed at engaging youth to become better connected to our coast and oceans. The initiative, entitled Project Coastline, is a government-funded mentorship and creative leadership program that provides a unique opportunity to celebrate our nation's coast with events and activities that took place across Canada in the fall and winter of 2016. Project Coastline aims to encourage youth to take charge in their communities to amplify the responsibility of marine stewardship.

In Lunenburg, Coastal Action and the Fisheries Museum teamed up with The Blue Dream Project and the Picton Castle crew to provide tours of the historic tall ship, an opportunity that does not come often for the community. Four tours took place on a blistery cold Saturday in December 10, with over 50 kids, youth, and adults making it out to tour the magnificent vessel. In addition to a historic tour of the classic Picton Castle vessel, Coastal Action and The Blue Dream Project joined each tour to provide a brief introduction of our work and projects in the community that focus on coastal and marine protection, as well as specific work dedicated to preventing marine plastic pollution. This introduction provided a discussion surrounding our collective responsibility to help protect vital marine ecosystems across Canada and around the world.

The Picton Castle. Photo: www.picton-castle.com.

LaHave River Watershed Project

LaHave River Watershed Project 2016 crew.

Coastal Action began the LaHave River Watershed Project (LRWP) in 2007, recently marking the 10th year of the water quality monitoring program. The purpose of the project is to identify and reduce harmful environmental impacts within the LaHave River watershed. The LRWP is guided by an advisory committee representing various government departments, academia, industry, non-profit organizations, and community members. Project activities for the 2016 field season involved the collection of monthly water quality data, stream habitat and culvert assessments, as well as fish habitat restoration projects and community outreach and education.

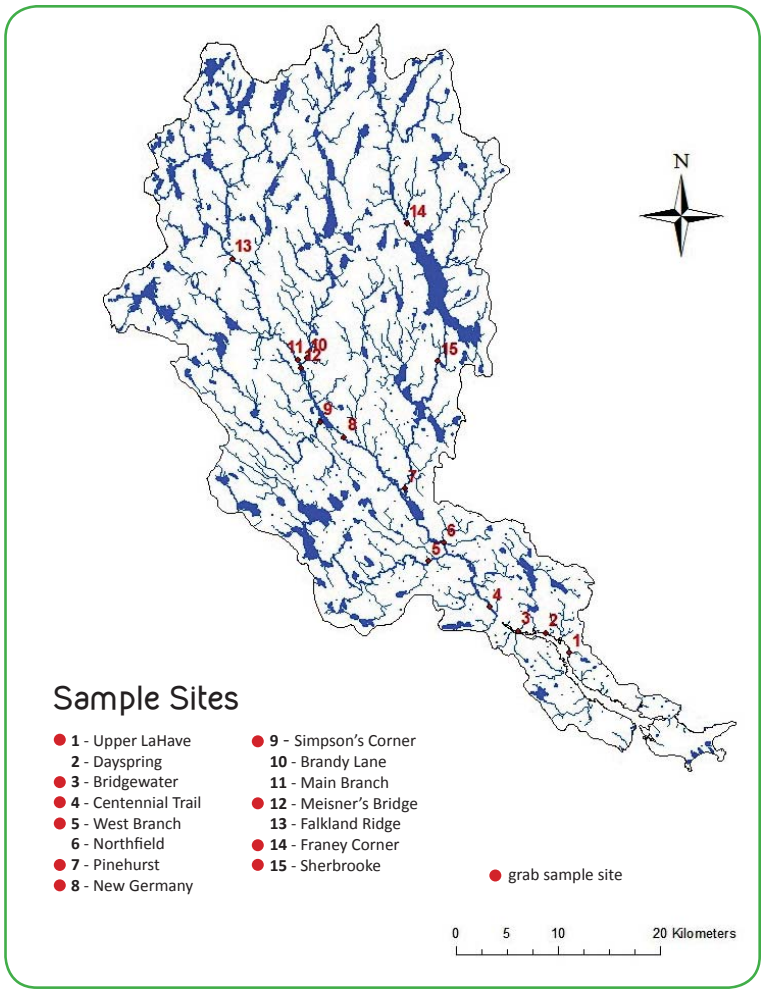
Wagner Brook chute installation.

Monthly water quality monitoring occurs at fifteen sites throughout the LaHave River watershed year-round. The water is tested for physical, chemical, and biological water quality parameters using a YSI water meter and through the collection of water samples for laboratory analysis. Results of this monitoring program are summarized in annual report cards.

Coastal Action assessed aquatic connectivity throughout the Main River and North Branch sub-watersheds of the LaHave in the 2016 field season. A total of 107 stream crossings were assessed and 58 culvert assessments were performed to identify crossings which do not allow fish to migrate up/downstream to access the various habitats they need throughout their life cycles. Coastal Action completed a total of five culvert restoration projects in the Main River sub-watershed, and four in the North Branch sub-watershed. These projects are meant

to restore fish passage to habitat that is inaccessible due to barrier culverts. These projects have restored access to a total of 17,300 m of upstream habitat for our local fish populations.

Work in the Main River sub-watershed involved restoration of two culverts along Wagner Brook, two culverts along Hebb Brook, and one culvert on Ross Brook. The Wagner Brook culverts displayed slope and outflow drop barriers and wooden baffles and chutes were installed to restore fish passage. The first culvert restored on Hebb Brook had an outflow drop and outflow lip barrier and was restored by cutting a notch into the outflow lip and installing a chute to address the outflow drop. The cutting of the notch was completed by the Town of Bridgewater using a concrete saw. The second culvert along Hebb Brook had a debris and depth barrier and was restored by removing debris and constructing a flow control barrier. The Ross Brook culvert suffered from depth, slope, and outflow drop barriers and was remediated by installing eight concrete baffles and a chute at the outflow. A total of 9,200 m of upstream habitat were opened up in the Main River sub-watershed.



Water sampling sites in the LaHave River watershed.

Culvert restoration work completed in the North Branch sub-watershed involved culverts on Patten Brook, Penny Road Brook, Shingle Brook, and Lake Paul Brook. Restoration at Patten Brook involved the removal of a debris blockage and a tail-water control built to address a depth barrier in the culvert. Restoration at the other culverts in the North Branch sub-watershed involved removal of large debris blockages at Penny Road Brook, Lake Paul Brook, and a medium-sized blockage at Shingle Brook. Removal of debris was all conducted by hand. Total upstream habitat gain was 8,100 m in the North Branch sub-watershed.

An in-stream fish habitat restoration project was completed on Cooks Brook in the Main River sub-watershed. This work involved repairing five existing digger log structures, four deflector structures, and creating step-pool habitat along 200 m of the brook. The structures were restored to enhance their effectiveness, and a sixth digger log was removed from the site due to improper spacing.

In 2016, Coastal Action also completed stream habitat assessments along Wagner Brook, Juniper Brook, and Grouse Brook. A total of 61 assessments were conducted along these brooks. These assessments are used to identify areas along a stream that may require attention to improve fish habitat and determine what kind of in-stream restoration activities may be needed.

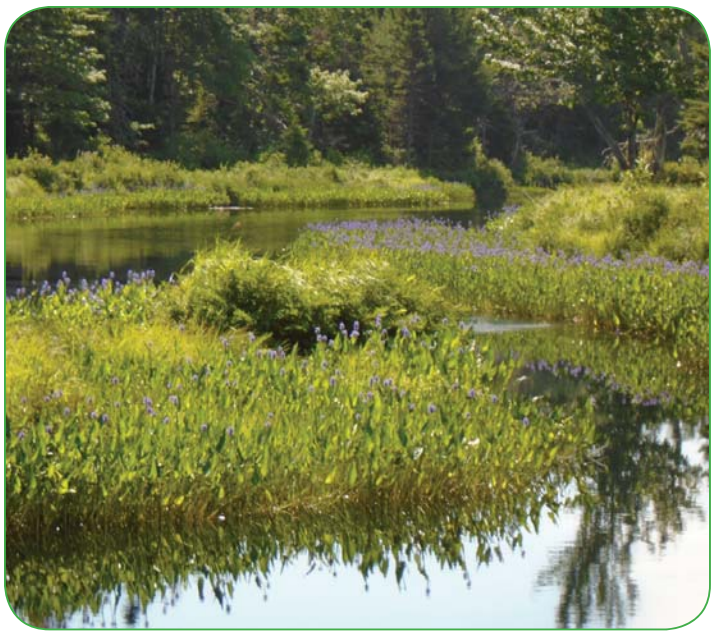
For this coming season, Coastal Action plans to continue our water quality sampling, as well as our restoration efforts focused on fish passage and fish habitat throughout the watershed. In 2017, Coastal Action's efforts will be expanded in the LaHave River watershed to include an agricultural stewardship project and an invasive species research project.

Petite Rivière Watershed Project

Conducting a culvert assessment.

The Petite Rivière Fish Habitat Restoration Project began in 2014 with the goal of evaluating the health of the watershed through assessments of water quality, stream habitat, aquatic connectivity, riparian health, and land-use activities. The 2016 field season involved collecting monthly water quality data, conducting stream habitat and culvert assessments, fish habitat restoration projects, and community outreach and education initiatives.

The Petite Rivière watershed is 244 km² in size, with eight main tributaries, 26 lakes, and many wetland habitats. The largest bodies of water in the system are Fancy, Milipsigate, Minamkeak, and Hebb Lakes. Although much smaller than its neighbour, the LaHave River watershed, the health of the Petite system is incredibly important as it hosts the only known population of the globally endangered Atlantic whitefish (*Coregonus huntsmani*) and serves as the drinking water supply for the Town of Bridgewater.



Brown Branch Brook.

The monthly water quality monitoring program for the Petite Rivière was established in 2011, and occurs at 18 sites throughout the watershed. The water is tested for several water quality parameters using a YSI Professional Plus water meter. These results are posted online and can be viewed by the public on the Community-Based Environmental Monitoring Network website with permission from Coastal Action.

In addition to water quality monitoring, Coastal Action has been assessing aquatic connectivity in the Petite Rivière watershed. Aquatic connectivity is a significant factor in the health of watersheds and fish populations. Petite Rivière

watershed is known to be highly fragmented from years of damming on the river, making aquatic connectivity an important issue throughout the system.

In 2016, Coastal Action completed a total of 63 stream crossing assessments and 32 culvert assessments to identify crossings which do not allow fish to migrate up/downstream to access the various habitats they need throughout their life cycles. These assessments have identified several full and partial barriers to fish migration in the Petite Rivière watershed. Coastal Action selected eight barrier culverts for restoration during the 2016 field season, opening fish habitat that was previously inaccessible. These projects have restored a total of 9,200 meters of upstream habitat for our local fish populations.

Tannery Brook culvert with flow control barrier.

Culvert restoration projects took place on Tannery Brook, Fancy Lake Inlet Brook, Swamp Brook, Fitch Brook, and Publicover Lake Brook. Two culvert restoration projects were completed along Tannery Brook involving the construction of a tail-water control and flow barrier in one culvert, and the removal of a large debris blockage and construction of a tail-water control structure at the other, addressing depth barrier issues in both culverts. The installation of flow barrier structures improves connectivity through a culvert by redirecting the flow of water into one culvert in a multi-culvert crossing, thus increasing water depth at low flow, but still allowing water to pass through the other multi-culvert at high flow. Fancy Lake Inlet Brook had a tail-water control and a flow barrier constructed to address a depth barrier and outflow drop. Debris blockages were removed by hand at Swamp Brook, Publicover Lake Brook, and at three culverts along Fitch Brook. Restoration at Fredericks Brook was planned for the 2016 field season to address depth and outflow drop barriers, but was not completed due to high water conditions in the fall. A chute and flow barrier will be installed at this site in 2017.

Stream habitat assessments were conducted on Tannery Brook and Brown Branch Brook. There were 19 assessments conducted along these brooks, totalling 12 km of stream assessed. These assessments are used to identify areas along a stream that may require in-stream restoration work to improve fish habitat.

Coastal Action plans to continue our efforts in the Petite Rivière watershed with water quality sampling and restoring fish habitat and passage at problematic areas. The successes and lessons learned from the 2016 field season will be used to further develop the Fish Habitat Restoration Plan for the Petite Rivière watershed. This coming season, Coastal Action plans to improve fish passage at the Crousetown Dam and conduct electrofishing throughout the watershed to determine the diversity and abundance of various fish species.

Wildcat Shale Pit Restoration Project

Constructing swallow nesting boxes.

Wildcat Brook is a 7 km long tributary within the Petite Rivière watershed which suffers from acidification due, in large part, to the presence of several abandoned shale pits within its drainage basin. The exposure of the pyritic shale to oxygen causes the release of sulfuric acid into the surrounding environment. As rainwater collects in these pits it becomes highly acidic (average pH in pits = 4.2). During heavy rainfall events, several of these pits have been observed discharging into Wildcat Brook, causing acidic shocks to the stream, which is detrimental to aquatic life.

Coastal Action and project partners, East Coast Aquatics Incorporated (ECA), have completed the Wildcat Shale Pit Remediation and Wetland Expansion Project for one of the abandoned shale pits adjacent to Wildcat Brook. The completed remediation site is 1.1 hectares in size, where the pyritic shale landscape has been covered by organic soils and vegetation transforming this area into a highly productive, water-filtering wetland. This transformation will reduce the amount of sulfuric acid and toxic metals washing into the brook, which will improve water quality and the new landscape will also provide a highly productive wetland habitat for many wildlife species, both terrestrial and aquatic.

Coastal Action's partner, ECA, is an experienced biological consulting firm that specializes in aquatic habitat restoration and rehabilitation design and implementation. Their role in the project was to develop the remediation plan, design the new wetland habitat, provide equipment and labour, and consult with Coastal Action. Coastal Action's role was to consult with landowners, seek funding opportunities, source material, conduct a baseline study and environmental monitoring, and provide labour.

Prior to restoration, the shale pit landscape consisted of some small wetland areas, as well as upland areas of exposed shale and four acidic ponds. The remediation site required approximately 3,400 cubic metres of organic soils to completely cover the exposed pyritic slate. These soils were sourced from development projects for compensation, landscaping companies, and from municipal compost. The organic soils were then hand-planted with native wetland vegetation and the compost was seeded with a native reclamation grass mix. The placement of these soils and vegetation will prevent the exposure of the underlying shale to the atmosphere, thus eliminating the production of acids and protecting the nearby aquatic environment.

Site preparation included the construction of berms to retain water and create wetland conditions, a weir to control the level and outflow of water from the wetland, and the relocation of piles of shale into depressions across the site. Lastly, duck, swallow, and bat boxes were installed around the perimeter of the site to attract wildlife to the new wetland habitat.

Environmental monitoring has occurred throughout the entire project and will continue to measure the success of the remediation efforts and the benefits to the surrounding environment. Wells were installed for long-term monitoring of water levels and water quality within the restoration site. One well was placed in the western side to monitor water level, and two wells were placed in the eastern side to monitor water levels and pH levels with data loggers. Other monitoring includes water quality sampling, macroinvertebrate sampling, electrofishing, and vegetation and wildlife surveys.

Remediation planting.

Coastal Action is currently investigating an expansion of this project by applying this same method to other shale pits within the drainage area of Wildcat Brook. These shale pits are significantly larger than the completed restoration site, the largest of them 7 hectares in size, and would require a greater volume of organic material. The eventual conversion of these exposed shale sites surrounding Wildcat Brook will greatly improve the water quality of the stream and its ability to support aquatic life, as well as create valuable wetland habitat.

Coastal Action Stories: Adopt-a-Highway

Nova Scotia's Adopt-a-Highway program was created to offer volunteer groups an opportunity to contribute to their communities by collecting litter and beautifying our roadsides. The program started in 1997, with only 18 volunteer groups, and now has over 170 groups across the province who have adopted more than 1,000 kilometres of secondary roadsides and 18 100-series highway exits. On average 5,000 bags of garbage and recyclable materials are picked up each year.

Coastal Action adopted Route 3, between Lunenburg and Mahone Bay, in 2010. Since then, our staff have participated in bi-annual clean ups along this stretch of road to do our part in keeping our community clean. This year, we picked up 18 bags of garbage along Route 3. We continue to be surprised by the amount of garbage we find each year, and we hope that by sharing these results more people will realize that roadside littering is still a problem in Lunenburg County and the province at large. Our roadsides are habitat for many species and it's important to keep them clean. To learn more about recycling and sorting waste in Lunenburg County, visit the Recycling and Waste page at *www.novascotia.ca* or the Region 6 Waste Management Facebook page at *www.facebook.com/Region6SWM*.

The Adopt-a-Highway clean-up crew.

Stormwater Management & Climate Change Education

Generations Active Park planting crew, October 2016.

Stormwater runoff is one of the primary contributors to the pollution found in our streams, rivers, lakes, and oceans. When stormwater runoff cannot be infiltrated into soil, evaporated, or processed by combined sewer systems, it flows across hard surfaces and drains into waterways, bringing contaminants from the landscape with it, and increasing the speed and volume of water in the system. The amount of stormwater entering waterways is expected to increase as climate change progresses. As the frequency and intensity of precipitation events and storms increase, Nova Scotia's towns and cities must be prepared to adapt. Coastal Action aims to improve our local communities' capacity to adapt to the effects of climate change.

A volunteer crew planting a hay bale rain garden at Generations Active Park, October 2016.

Coastal Action was involved in piloting several Low Impact Development (LID) projects and programs for stormwater management in the Town of Bridgewater in 2016. LID seeks to infiltrate, retain, and evaporate stormwater at the source, and can be used in conjunction with traditional methods that involve piping excess runoff to the nearest water body. Coastal Action developed an Innovative Stormwater Management Guidebook for the Town of Bridgewater that is now available on our website. Coastal Action hosted a rain barrel workshop on July 17 at the Michelin Social Club in Bridgewater. We provided fifteen 55-gallon plastic barrels that were purchased locally, with two donated from the Bridgewater Farmer's Co-op, along with equipment and training to build rain barrels. Our 13 workshop participants got to build their own rain barrels and learn about Low Impact Development. Each participant received a guidebook that provided instructions for maintaining, installing, and

A demonstration rain barrel at the Captain Angus Walters House.

building rain barrels. We also built a demonstration rain barrel for the Captain Angus Walters House which was painted with Coastal Action project themes; it was quite useful for watering plants during the dry summer!

The Generations Active Park hybrid rain gardens finally went in the ground this October, after delays from Fall rain storms and soil remediation issues at the park. The gardens now cover two sites at Generations Active Park. Site 1 includes eight staked hay bale rain gardens on an exposed slope and site 2 is a temporary pond with inflow/outflow stream beds and four rain garden beds.

These rain garden systems were constructed in October, with assistance from Helping Nature Heal Inc., NSCC's Natural Resources and Environmental Technology students, Town of Bridgewater staff, and Lions Club volunteers; a total of 27 individuals in addition to Coastal Action staff. These best practices will help to retain and absorb runoff in the highly permeable soil beds planted with native plants. We included native wild edibles such as black chokeberry, wild raisin, serviceberry, wild blueberries, and strawberries. There are also sedges, ferns, and flowering plants such as irises, foam flower, and milkweed for monarch butterflies. These gardens will be creating diverse habitat for local wildlife in addition to reducing stormwater runoff for the HB Studios Parking Lot and downstream of the woodland garden. Interpretive panels will be installed at both locations to help educate community members about Low Impact Development, native plants, and wildlife habitat.

In early 2016, planning began for a Depave Paradise project, which is a program of Green Communities Canada. Depave Paradise events engage community members, school groups, and organizations in ripping up large surfaces of unused asphalt and planting it with trees, rain gardens, or food and herb gardens, creating a green space for the community. Coastal Action will be hosting the first Depave Paradise project in Atlantic Canada in May 2017! To find out more about Depave Paradise, visit their website at *www.depaveparadise.ca*.

Coastal Action also participated in the Clean Foundation's RainYards Program in 2016. RainYards is a training program, that provides online training and resources on how to conduct stormwater home assessments for community groups like Coastal Action. The home assessments are designed to help homeowners find solutions to the stormwater issues on their properties. Three staff were trained in this program and conducted the first stormwater home assessment in November 2016. We intend to continue to offer this service in 2017, funding dependent.

The team of rain barrel workshop participants with their rain barrels, July 2016.

Living Shoreline & Community Greenspace Project

The team of volunteers for our TD Tree Days event, September 2016.

Coastal Action continued work on this project in 2016, with help from the NSCC Heritage Carpentry Program, by building the platform and installing it on site as well as continuing with planting and naturalization activities. We organized a TD Tree Days planting event on September 17 at the Living Shorelines Demonstration and Community Greenspace site, located behind the Cineplex Theatre along LaHave Street. The space is adjacent to the LaHave River and features a platform that will have a seating area for school or community groups which is easily accessible from the main road by a trail. We planted 123 trees, shrubs, ferns, and other plants including edible shrubs such as wild blueberries, wild rose bushes, and milkweed for monarch butterflies. We planted 19 trees that included larch, black spruce, yellow birch, and white pine. Coastal Action was joined by 28 youth and community volunteers including Mayor David Walker and Deputy Mayor Bill McInnis. The Town of Bridgewater chipped in by donating the use of wheelbarrows and shovels and Helping Nature Heal Inc. provided watering and nutrient services; it was a great community effort. The enhancement of the riparian area will help to stabilize the banks of the LaHave River as well as create habitat for wildlife.

A tree planted along the LaHave River for TD Tree Days.

Bridgewater Community Energy Initiative

The community gathers to support energy education in Bridgewater.

Coastal Action is a primary partner with Energize Bridgewater, which is a community-wide initiative developed to accelerate the transition of the community into a "sustainable energy future". Started in summer 2016, the 18-month initiative will result in practical energy demonstration projects, innovative new partnerships, and new knowledge and skills.

The community's shared vision and commitments will be recorded in a Community Energy Investment Plan which will provide practical financial tools to make energy solutions more affordable for residents, businesses, and organizations. Through this initiative, the Town of Bridgewater and its network of Energy Partners will engage a broad cross-section of the community to achieve this goal by taking concrete action on innovative energy solutions. This bold initiative will be unique not only in Nova Scotia but across Canada, and the Town will work with leading experts in energy and economics to assist with the project.

Focused on ensuring that environmental impacts are considered, while building relationships and fostering partnerships, Coastal Action is part of the core team in the Energy Partnership. The Bridgewater Energy Partnership is a learning and action program for local businesses and organizations that encourages innovative energy solutions and increases the collective knowledge on energy sustainability. The partners help lead our community's planning and action for energy sustainability by exploring various challenges and opportunities such as emerging energy technologies, affordability, environmental and health impacts, shared service delivery, and much more. Partners learn about these issues and how to address them through bi-monthly workshops. Partners also help the community choose and lead actions that provide an immediate benefit, and are working to shape initiatives and policies that will create Bridgewater's local energy economy.

ENERGIZE BRIDGEWATER

The Living Energy Laboratory works to answer the question - "What would happen if our community had

no fear of experimenting with innovative ideas and tools to achieve a local energy economy, and instead, actively gathered resources and support to make them happen?" Coastal Action's partnership supported the distribution of cash prizes collected through sponsorship.

The final piece of this project is an Energy Fair. The goal is to host a two-day event with a key-note speaker, trade show, private energy consultations, and youth engagement. The goal is an increase in Energy Sustainability, and awareness building in the community. This event is scheduled for the fall of 2017.

Support for this project comes with a contract for consultation services from Coastal Action's Communications and Event Planner. The work will include community engagement, workshop preparation and delivery, social media, relationship building, as well as Energy Fair planning, delivery, and reporting.

Coastal Action Stories: Riv-Temp Monitoring in the LaHave

After joining the Riv-Temp Network in 2016, Coastal Action has installed a water temperature data logger in the North Branch of the LaHave River. The Riv-Temp project brings together universities, watershed and community groups, as well as provincial and federal government bodies who have an interest in conserving wild Atlantic salmon populations. Each year, the staff at Riv-Temp send out temperature data loggers to be placed in rivers all over eastern Canada.

Each fall, the loggers are sent back to Riv-Temp where the data is extracted and added to the Riv-Temp database. Water temperatures in the North Branch of the LaHave River displayed an average of 20.3°C from August 10, 2016 to September 25, 2016.

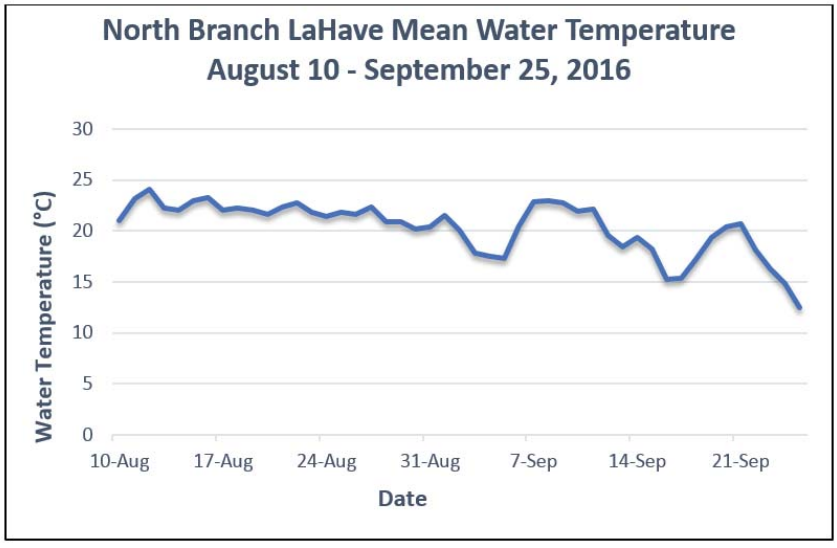
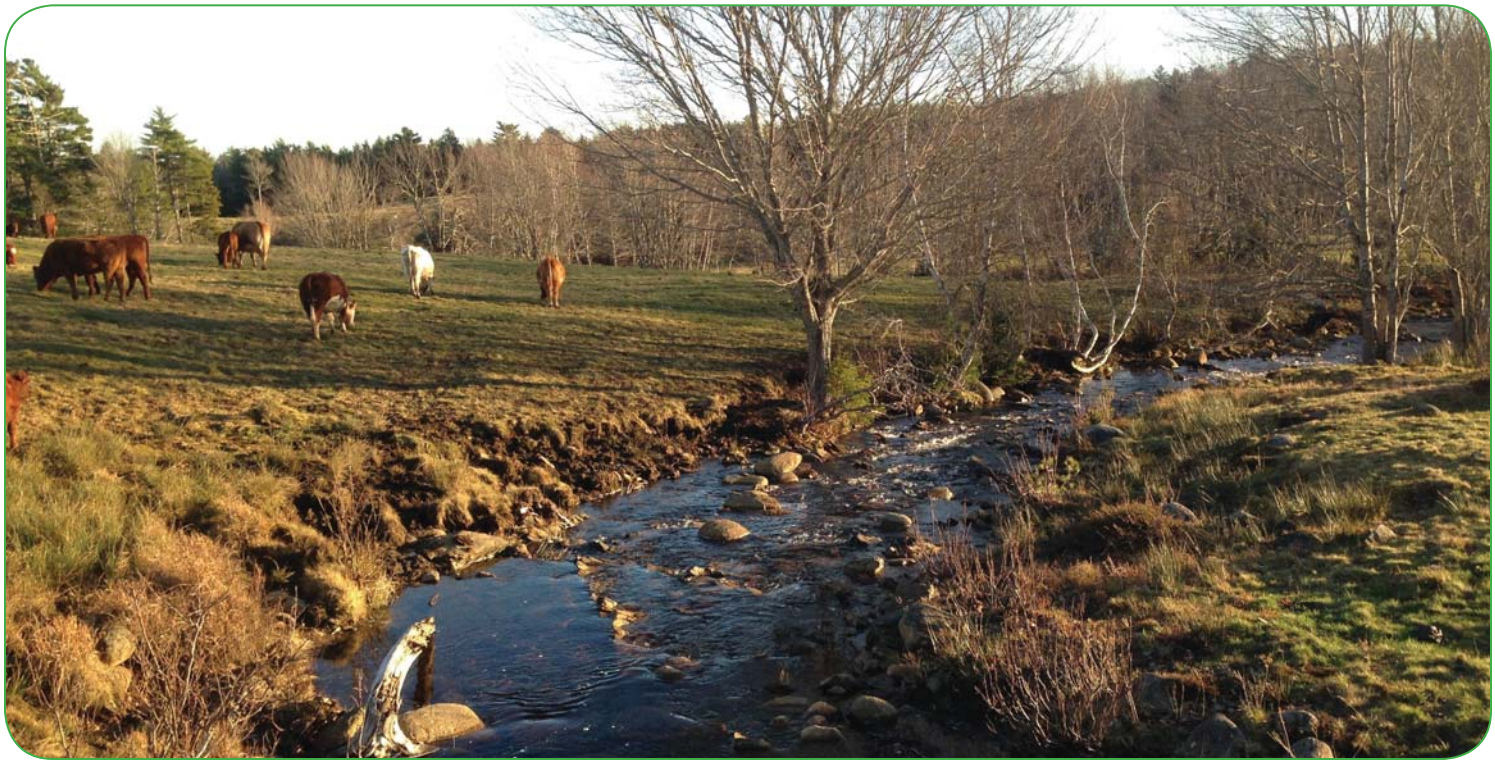


Figure 2: *North Branch mean water temperature from August 10 - September 25, 2016.*

Agricultural Stewardship Project



Cows next to Juniper Brook in Pleasantville, Lunenburg County.

After receiving funding in the summer of 2016, Coastal Action began the Agricultural Stewardship Project. The project was developed with a goal of improving the relationship between agriculture and watershed health in Lunenburg County. To achieve this goal, Coastal Action began to reach out to local farmers who may be interested in reducing their impact on the surrounding environment. Loss of riparian area, pollution, stream/river bank erosion, and sedimentation are all common impacts that farms can have on waterways.

Coastal Action successfully reached out to two farmers in 2016; one located in West Northfield and the other in Barss Corner. Agricultural Biodiversity Conservation (ABC) Plans were completed on both farms in collaboration with the Nova Scotia Department of Natural Resources (NS DNR). These plans highlighted current features and management practices that were enhancing biodiversity on the farms. ABC plans also include recommendations on what each individual farmer can do to improve biodiversity on their farm. If the farmer decides they want to implement the recommendations provided, Coastal Action can, in some cases, offer financial and physical support to complete the project.

Indian Brook flowing through DeLong Farms property.

Common recommendations include enhancing or building wetlands, riparian fencing, and placing swallow, owl, and bat boxes around the farm, which will help to protect and increase biodiversity. Coastal Action plans to work with 2-3 local farmers in 2017 on projects such as riparian fencing and planting, habitat enhancement, ABC plans, and possibly stream restoration.

Fox Point Lake Water Quality Monitoring

Volunteer, John McNeil, collecting water quality data from his boat on Fox Point Lake.

In 2016, Coastal Action was, once again, contracted by the Municipality of the District of Chester to deliver the Fox Point Lake Water Quality Monitoring Program in Mill Cove, Nova Scotia. The Municipality of the District of Chester appointed a Water Quality Monitoring Committee in 2015, in response to growing public concern over the impacts of a large-scale development project on the nearby Fox Point Lake. Coastal Action designed a monitoring program and trained a dedicated group of volunteers to monitor the health of the lake and its inlet and outlet streams. Following the initial monitoring period of May-October 2015, Coastal Action produced the Fox Point Lake Water Quality Monitoring Report (2015), summarizing the results of the program and providing a number of recommendations for future monitoring seasons.

In 2016, Coastal Action managed the delivery of the monitoring program, with some modifications, and provided refresher training for the local volunteer group. The volunteers monitored on a bi-weekly basis, while the Coastal Action Project Manager joined them monthly for laboratory sample collection. Upon completion of the second monitoring season, the 2016 Fox Point Lake Water Quality Monitoring Report was submitted to the Municipality of the District of Chester and all reports are available on their website at *www.chester.ca*.

Brookside Cemetery Pond

Adult common goldfish (Carassius auratus) caught in a trap at the Brookside Cemetery pond.

Coastal Action was contracted by the Town of Bridgewater to conduct an environmental assessment of the pond in the Brookside Cemetery from June to October 2016. Both the aesthetic value and the environmental health of the pond have been declining for several years due to poor water quality, degraded riparian habitat, run-off and sedimentation issues, duck feeding activity, and the introduction of non-native common goldfish (*Carassius auratus*). Several environmental assessments were conducted in order to characterize the current state of the pond and identify restoration activities which would improve its health and protect the nearby LaHave River from the threats of water quality degradation and invasive species. This health assessment included water quality monitoring, riparian health assessment, aquatic connectivity assessment, and a fish species survey.

Water quality was monitored monthly at three sample sites to assess a variety of parameters, including an analysis of metals in both the water and bottom sediment. An aquatic connectivity assessment was performed on the pond's outflow pipe to determine whether native fish could access the pond and if invasive common goldfish could escape the pond. An assessment of the riparian habitat identified erosion and sedimentation issues and highlighted areas in which to focus restoration efforts. A fish species survey was completed over several days by setting traps to determine if the pond was supporting any native fish populations.

The results of these assessments and various recommendations were summarized in a report for the Town of Bridgewater. Coastal Action hopes to work with the Town in the future to implement some of these recommendations to improve the health of this valuable natural feature in the Brookside Cemetery.

"LaHave River – Our Living Future" Public Consultation

The LaHave River, at a site near Bridgewater.

The Municipality of the District of Lunenburg (MODL) Council included addressing the issue of straight pipe septic systems discharging raw sewage directly into the LaHave River as a strategic priority for the 2016-17 fiscal year. MODL staff identified public support and understanding of the project as a risk to successfully tackling the straight pipe issue. As a result, in February 2016, MODL Council approved hiring a communications team through an RFP process to create an education and awareness campaign with the aim of encouraging understanding of the issue and support among affected property owners. Coastal Action, in partnership with Warburton Communications, was awarded the RFP by the Municipality of the District of Lunenburg to deliver the Education and Awareness component of the LaHave River Sewer Solutions Project and began work on the contract in the spring of 2016.

MODL developed this project in an effort to rid the LaHave River estuary of an estimated 600 straight pipes which continue to illegally discharge untreated sewage into the river every day. Coastal Action's main role in the project involved educating the public about straight pipes and the health risks associated with exposure to water contaminated with fecal bacteria based on the organization's approximately 10 years worth of water quality data collected throughout the LaHave River watershed.

The main components of the "LaHave River – Our Living Future" education campaign included:

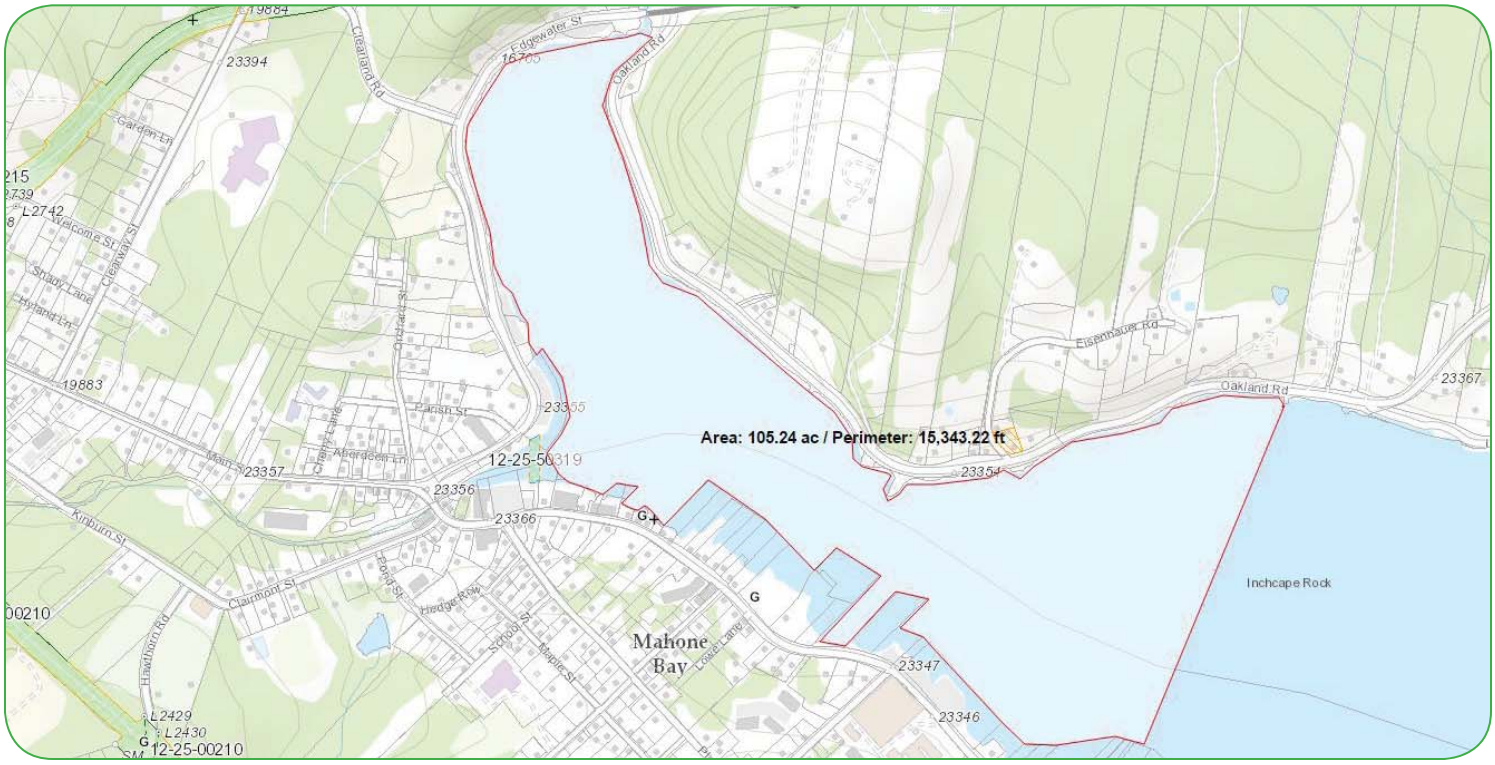
- Brand development – program title, logo, colours
- Social media campaign – Facebook, Twitter
- Media relations – press release, interviews, articles, etc.
- Short video
- Public information sessions

The key element of the education campaign was the public information sessions which were held in the communities of LaHave, Conquerall Bank, Dayspring, and Riverport during the month of April 2016. The intent of the public sessions was to provide residents with information about the straight pipe problem, the shared responsibility to tackle the

issue, and the possibility of implementing a capital replacement program using infrastructure grants. These sessions were well received by the public, with over 270 people in attendance; however, with varying degrees of support for moving forward with a program. Coastal Action, MODL staff and council, partner stakeholders (i.e., NS Environment and Town of Bridgewater), as well as Stella Bowles were all on hand to provide information about straight pipes and the development of a replacement program supported by federal, provincial, and municipal funds.

A summary report based on the feedback received at the public sessions was drafted and submitted to MODL Council for review and consideration in May 2016. Later that summer, Council directed staff to submit an application for funding to the Build Canada Fund, a federal-provincial infrastructure partnership program, for the development of a Wastewater Management District for those communities bordering the lower LaHave River. MODL is still awaiting a decision on this application.

Town of Mahone Bay Harbour Management



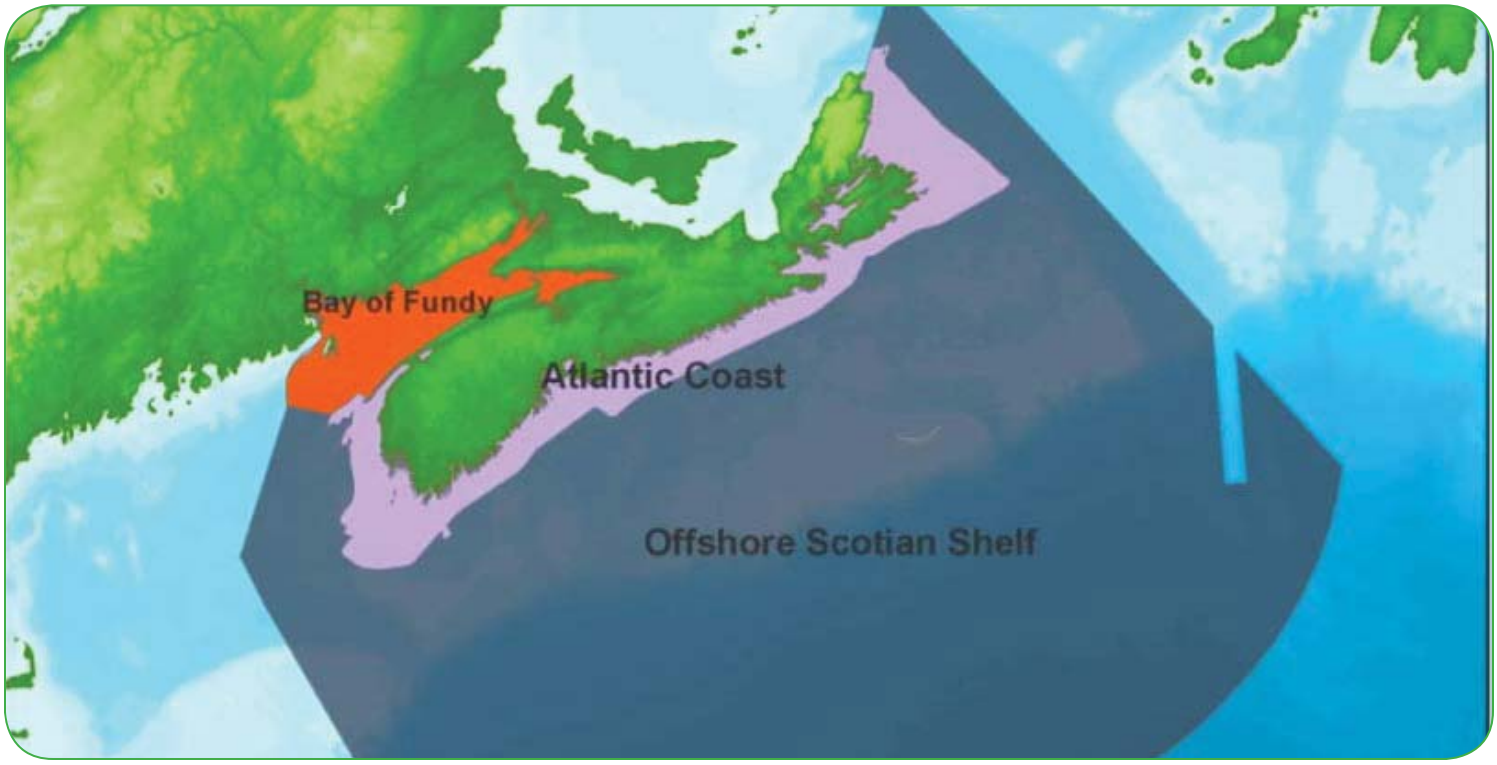
Map showing proposed lease area for Mahone Bay Harbour management.

The Town of Mahone Bay has been concerned with the orderly use of Mahone Bay Harbour and the importance of this natural asset to the town for several years. More recently, Town Council and its Harbour Development Committee have been discussing the state of the harbour, along with its impact on the town, and a number of recommendations were developed. One of those recommendations included the formal lease of the harbour from the Nova Scotia Department of Natural Resources, in order to take over the management of Mahone Bay Harbour. As part of this formal application process, the Town of Mahone Bay contracted Bluenose Coastal Action Foundation to undertake those activities necessary to complete the lease application.

The three main components of the application that Coastal Action were responsible for addressing included the following: (1) the identification of upland property owners; (2) the development and delivery of a public consultation process and a dispute resolution process; and (3) obtaining letters of consent from effected stakeholders. This work was carried out over the winter and spring months of 2017 (January to April) by Coastal Action's Executive Director, Brooke Nodding, in partnership with Allan Billard, a private sub-contractor hired by Coastal Action.

The area of interest to the Town of Mahone Bay for the proposed lease was the inner harbour, from the area located north of the boundary beginning at the southwest corner of the Inscape Shoal berm and continuing an east/west line extending to the low water mark of the adjacent shoreline on the east and west sides of Mahone Bay. Coastal Action identified approximately 100 shoreline properties within the area of interest which included approximately 30 upland/waterfront owners in both the Town of Mahone Bay as well as those within the Municipality of the District of Lunenburg. Letters outlining the Town's intentions to apply to the province for a Harbour Management Lease were sent out to all upland property owners. A press release was sent to all local media outlets and a public information session was held on April 12 at the Mahone Bay Legion, with approximately 35 people in attendance. All in all, there was no negative feedback received. All parties who responded to Coastal Action on the issue were in favour of the Town moving forward with their Harbour Management proposal.

Marine Protected Areas



Fisheries and Oceans Canada Marine Protected Area (MPA) planning areas in the Scotian Shelf Bioregion.

In the summer of 2016, Coastal Action began working with Fisheries and Oceans Canada's (DFO's) Oceans and Coastal Management Division as an independent group interested in conservation on Nova Scotia's South Shore by better understanding the public view on establishing marine protected areas (MPAs) in the region.

This MPA project is in accordance with federal goals to expand MPA networks by protecting 10% of Canada's marine environment by 2020, with DFO leading this planning effort on behalf of the federal government. The process for identifying coastal priority areas began with a focus on Ecologically and Biologically Significant Areas (EBSAs) that have been identified for the Atlantic coast of Nova Scotia and the Bay of Fundy, with a total of 54 EBSAs outlined.

In the fall of 2016, Coastal Action began conducting interviews and public consultations to gather feedback about two of these important areas: Mahone Bay and the LaHave Islands. More information was gathered during a public session held on December 7, 2016, which was open to community members, organizations, and interested individuals and was organized by DFO to provide feedback on all areas identified. In the future, Coastal Action will be available to meet and consult with the Oceans and Coastal Management Division of DFO, to act as an environmental community leader for the South Shore of Nova Scotia and provide information about any subsequent feedback, research, and consultation. More consultation and communication is needed to better understand the range of community feedback on marine protection in coastal Nova Scotia.

For more information on Fisheries and Oceans Canada plans and processes for marine protected areas in Atlantic Canada, visit *www.dfo-mpo.gc.ca/oceans/mpa-zpm-aoi-si-eng.html*. To discuss Coastal Action's specific work on this project, please contact Ariel Smith (Project Coordinator): ariel@coastalaction.org.

Community-Based Coastal Management in Sweden

Brooke, with Swedish workshop delegates, in Älmhult, Sweden.

Coastal Action's Executive Director, Brooke Nodding, has been working with a PhD student at the World Maritime University in Malmö, Sweden for the past year on the development of a community-based coastal management model. Brooke has been lending her support to Jenny Larsson through the provision of resources and information from the Canadian perspective.

Through her research, Ms. Larsson became aware of the Atlantic Coastal Action Program (ACAP), the former federal Environment Canada program under which the Bluenose Coastal Action Foundation was founded in 1993. The ACAP program (1991-2008) recognized the importance of involving local organizations and residents in addressing environmental issues within their own communities. Brooke was able to share her 16 years' worth of experience and success in leading Coastal Action in the South Shore region of Nova Scotia with those interested in bringing a similar program to the south of Sweden.

Brooke travelled to Malmö, Sweden to participate in stakeholder engagement workshops held in the Region of Skåne during the week of September 19-23, 2016. There were three separate workshops/meetings held during the week to discuss the possibility of initiating a community-based coastal management model for the Hanöbukten Bay area. Brooke presented on the ACAP model, as well as her experience with Bluenose Coastal Action Foundation, to a variety of Swedish stakeholders, including government, academia, NGOs, media, private sector, and funding organizations. The level of interest and enthusiasm from the Swedish delegates in collaborating with Coastal Action in moving this model forward was amazing!

Brooke looks forward to continuing to collaborate with Jenny Larsson on this project into the future. Next steps included the development and submission of proposals for securing some funding to bring a Swedish delegation to Canada to gain first-hand experience as to how the ACAP model works on the ground. Coastal Action is excited at the prospect of hosting our Swedish friends sometime in 2017!

Bluenose
Coastal Action
Foundation

A Healthy Environment Supporting Thriving South Shore Communities

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