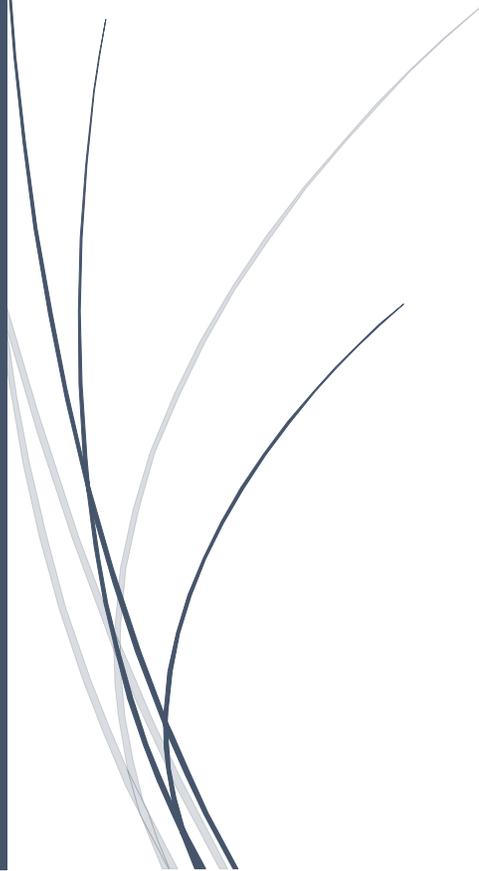




December 2017

Agricultural Stewardship Project

Final Report 2016-17



Sam Reeves

BLUENOSE COASTAL ACTION FOUNDATION

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Project Partners and Supporters



Agriculture and Agri-Food Canada
Agricultural Youth Green Jobs Initiative

Introduction

Bluenose Coastal Action Foundation

Bluenose Coastal Action Foundation (Coastal Action) is a community-based charitable organization with a mandate to address the environmental concerns along the South Shore region of Nova Scotia. Coastal Action's goal is to promote the restoration, enhancement, and conservation of our environment through research, education, and action. The organization receives direction from a volunteer board of directors supported through a full-time Executive Director and has been an established member of the Lunenburg County community since our inception in December of 1993.

Over the past 20+ years, Coastal Action has successfully completed a vast number of projects within the South Shore region of the province. Project themes have included such issues as River Restoration on the Mushamush, Gold, and LaHave River systems; Water Quality Monitoring in the LaHave River and Petite Rivière 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.); and Clean Boating, to name but a few.

Project Background & Description

The LaHave River Watershed is a large (1700 km²), highly branched river system, with a significant amount of riparian habitat and some of the richest floodplain habitat in southwestern Nova Scotia. Agriculture is widespread throughout this watershed and plays an important role in the local economy. The goal of the Agricultural Stewardship Project was to engage this important stakeholder group within the watershed, in a way which would create strong partnerships and benefit both the environment and our local farmers. Without the implementation of environmental best management practices, agricultural activities can lead to many negative impacts on water quality, biodiversity, and riparian and in-stream habitat health. This project directly addressed these impacts by promoting best management practices, and by protecting and improving water quality, riparian health, biodiversity, and fish habitat conditions. The project promoted watershed stewardship within the local community by engaging multiple partners and providing volunteer opportunities.

Coastal Action has been involved in the protection of the LaHave River Watershed since 2007, through the LaHave River Watershed Project. The goals of the project were to implement a long-term water quality monitoring program and develop a comprehensive watershed management plan. Now in its tenth year, the water quality monitoring program has created one of the most valuable long-term water quality datasets in Atlantic Canada. Monitoring occurs year-round at 15 sites throughout the watershed, which provides important information on both the natural variability of the system as well as any negative impacts on water quality as a result of various land-use activities. Additional project activities include habitat assessment and restoration work, community outreach and education, and the development of sub-watershed fish habitat restoration plans. The project is guided by a multi-stakeholder advisory committee with representatives from several government departments, academia, industry, non-profit organizations, and community members.

The Agricultural Stewardship Project has drawn on the extensive knowledge and data obtained through the LaHave River Watershed Project. The project spanned a two-year timeframe, with the goal of working with three local farmers per year, for a total of six farms. Agricultural properties with riparian habitat

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were targeted, with a preference for livestock operations; however, all types of agriculture were considered. Project activities would include the completion of an Agriculture Biodiversity Conservation (ABC) Plan, an interview with the farmer, a review of any existing plans (environmental farm plan, nutrient management plan, etc.), a variety of environmental assessments, the development of a recommendations report, and the implementation of various restoration projects and/or best management practices.

The delivery of ABC Plans were to be completed in partnership with the NS Department of Natural Resources. The purpose of an ABC plan is to identify existing practices which are contributing to biodiversity and encourage the implementation of various best management practices in order to increase/enhance biodiversity conservation opportunities.

Environmental assessments were to include the following: riparian health assessment, in-stream fish habitat assessment, culvert assessment (for fish passage), fish survey (electrofishing/netting), benthic invertebrate sampling, and water quality monitoring. The results of these assessments, along with the ABC Plan, interview with the landowner, and review of any existing plans, were used to generate a recommendations report outlining the current environmental conditions as well as potential restoration activities to improve water quality, riparian habitat, in-stream fish habitat, and/or biodiversity.

Based on these recommendations, various restoration activities would take place, as needed, including: riparian fencing, riparian planting, bank stabilization, culvert remediation, invasive species management, in-stream fish habitat structures, and alternative livestock watering sources.

Farmers were encouraged to work in partnership with Coastal Action towards the development of a stewardship agreement. This agreement may include many of the recommendations outlined in the report as well as any future restoration activities or best management practices that the farmer has agreed to adopt.

Riparian Areas

Riparian areas are the land that runs adjacent to a stream, lake, river, brook, or wetland. These areas are often covered with trees, grasses, mosses, shrubs, and ferns and play an important role in keeping water systems healthy. Riparian areas should extend at least 10 meters on either side of a watercourse to provide proper shade, bank stabilization, as well as act as a filter removing contaminants from surface runoff.

The major goal of the Agricultural Stewardship Project was to identify riparian areas on agricultural land in need of restoration and/or protection. A common example of a negative impact resulting from cattle farming is streambank erosion. Allowing cattle free access to a stream causes bankside erosion and loosening of soil, this in turn causes increased sediment levels in the stream, negatively impacting aquatic life. Through fencing and bank stabilization measures, these impacts can be mitigated and stream health restored.

Agricultural Biodiversity Conservation (ABC) Plans

Agricultural Biodiversity Conservation (ABC) Plans involve assessing species, habitats, forest types, current biodiversity enhancements, and potential biodiversity improvements on a particular farm. ABC plans were completed through a collaboration with the Nova Scotia Department of Natural Resources (NS DNR).

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Prior to his retirement, NS DNR Biologist, Reg Newell, provided Coastal Action project staff with training and support regarding the development of these plans. Riparian areas are always considered a high priority when completing the assessment; Coastal Action staff assess riparian areas using the Nova Scotia Riparian Health Assessment Guide (2008). Streams were present on two of the three farms that were assessed, recommendations were made accordingly, although the riparian areas were exceptionally healthy on both farms.

Once the overall biodiversity assessment has been completed, a report is created for each participating farmer which highlights the different habitats found on the farm. Each ABC Plan generally includes separate sections for riparian areas, wetlands, and uplands (further broken down into shelterbelts, woodlands, pasture, and hayfields). A summary is included for each habitat along with recommendations for improving biodiversity (see Figure 1 below). These recommendations are often referred to as beneficial management practices (BMPs).

Potential Biodiversity Enhancement

Overall, the amount and variety of shelterbelts on the farm in combination with the woodland edge are adding substantially to the biodiversity composition of the farm landscape. In addition to providing habitat for a wide variety of birds, mammals, amphibians/reptiles, and invertebrate species, these shelterbelts provide travel corridors and access to much of the farm. If possible, maintain the diversity of shelterbelts on the farm.



RECOMMENDATIONS:

- ◆ Continue to conserve these areas by doing minimal cutting/land development to ensure that the current habitat remains.
- ◆ Where possible and safe to do so leave standing dead trees along woodland edges, this will provide excellent places for birds and small mammals to nest in.
- ◆ If desired continue to increase the amount of shelterbelts on the farm through planting/seeding.

Figure 1: Summary of recommendations from Newbury Hill Farm ABC Plan.

Throughout the duration of the project, three ABC Plans were completed; farms included Silver Hill Farm located in Cookville, The Little Red Tractor Farm located in Barss Corner, and Newbury Hill Farm located in Farmington. Two of the three farmers were approached by Coastal Action project staff, while the third was referred to Coastal Action by Reg Newell. Assessments for two of the farms were completed in November 2016 and the third in August 2017; two of the plans have been presented to the farmers and the third will be presented in the new year due to the farmer currently being out of the province. Recommendations for biodiversity enhancements were similar for each farm, mostly involving forestry management, wetland enhancement, and hayfield management. Coastal Action plans to incorporate each of these farms into future projects.

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Riparian Area Restoration Projects

Juniper Brook Remediation Project

An agricultural property near Pleasantville, N.S. was engaged to participate in the project during the summer of 2016 . This property included a large cattle pasture with unrestricted access to 400 m of Juniper Brook, a 3 km tributary of the LaHave River. Restoration activities on this property were to begin in July 2016 and would have included riparian fencing, riparian planting, alternative watering sources, and the installation of in-stream fish habitat structures. Unfortunately, after three months of planning and project design, the project fell through as the farmer Coastal Action project staff had been dealing with turned out to not be the actual land owner but was only leasing the land from someone else. When the actual landowner was approached about the project, they were not interested in moving forward and, therefore, that project had to be abandoned.

DeLong Farm Cattle Crossing

DeLong Farm is a family operated farm located in Barss Corner. The farm is well known for producing Christmas trees, wreaths, eggs, and beef. The DeLong's have several cattle pastures spread throughout their many properties, some of which border tributaries to the Main Branch of the LaHave River. A particular section of an unnamed tributary was the focus for a riparian area restoration project due to interest expressed by the farms co-owner James DeLong. Essentially, cattle were walking through the stream to access pasture on the other side, in turn this was causing the stream bank and bottom to become eroded and unstable (see Figure 2). After collaborating with NSLC Adopt-A-Stream staff and Mr. DeLong, a decision was made to create a crossing over the stream so the cattle could continue to access the pasture on both sides without causing further damage. With the help of NSLC Adopt-A-Stream program staff, Amy Weston and Will Daniels, a crossing design was created (Appendix A). The plan was to place a 1.2m wide x 6.1m long corrugated plastic culvert into the stream to then be covered with various sizes of rock.



Figure 2: Impacted section of stream on DeLong Farm.

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The project was meant to be completed by the end of September 2017, but was delayed due to heavy rain in the days leading up to installation. After receiving a special permit extension granted by Fisheries and Oceans Canada (DFO) and NS Environment, installation commenced on October 25, 2017.

Prior to installation, a coffer dam was put in place and a fish rescue was conducted. Coastal Action staff were able to relocate 500+ native species of fish, including white sucker, creek chub, stickleback, and brook trout. Once the electrofishing was completed, an excavator dug out a dissipation pool and prepared the stream bottom for the culvert to be put in place. The culvert was then placed onto the stream bed and covered with a combination of rock, essentially creating a road over the stream (Appendix B). All loose or exposed soils were then covered with a combination of grass seed and hay to help stabilize any loose sediment. The completion of this project resulted in an approximate 30m section of stream being restored, as well as lowered sediment levels downstream of the site. Coastal Action plans to approach the DeLongs in 2018 about installing a solar powered water pump to eliminate the need for cattle to access the stream.

Public Outreach

Public outreach is a crucial component of all Coastal Actions projects; however, engaging the local farming community for this project proved to be rather difficult.

In the spring of 2017, Project Coordinator Sam Reeves reached out to the Lunenburg/Queens Federation of Agriculture and was invited to attend one of their board meetings. Sam later attended the meeting where he explained the project and his intentions. Peter Morine, Chair for the board, suggested that Sam contact Maxine Mclean at the Nova Scotia Federation of Agriculture (NSFA) to help contact farmers in the area. After connecting with Maxine through email and phone calls, Sam provided her with information to be posted in the NSFA's next newsletter. Unfortunately, no calls or emails from farmers interested in the project were ever received.

As another communications tool, a project brochure was created (Appendix C). This would be used as a hand out for farmers during personal interactions. 15 pamphlets were handed out to farms in both the LaHave and Petite areas, once again with no interest expressed by those farmers receiving the material. Coastal Action staff also attended "*Grow Southwest Nova Scotia's Agriculture Day*", where they had a booth with information about the project. It was concluded that face to face meetings with local farmers was the most effective form of outreach. Most of the farmers who participated in the project were found through personal connections with Coastal Action staff. Unfortunately, many of today's rural farmers do not communicate through social media, making it difficult to get the word out to such a specific audience.

Results

Project activities, taken directly from the original NS Federation of Agriculture Water Fund application were to include the following:

- Consultation with local partners (farmers, Lunenburg-Queens Federation of Agriculture, NS Department of Agriculture) to identify areas of the watershed or specific landowners to target for the project.

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Coastal Action project staff reached out to individual farmers through one-on-one meetings as well as through a display/information booth at the Grow Southwest Nova Scotia's Agricultural Day. Project staff also presented to the Lunenburg-Queens Federation of Agriculture at one of their monthly meetings and the NSFA included project information in one of their newsletters. Brian MacCullough, with the NS Department of Agriculture was also approached to help identify potential farmers to be included in the project.

- Develop information fact sheet/pamphlet for potential project participants, explaining the purpose and benefits of the project.

An informational brochure was developed and is included in Appendix D.

- Engage 3 farmers in the project each year, over 2 years, for a total of 6 farms.

A total of 5 farmers participated in the project over the two years.

- Perform ABC Plans on each farm in partnership with Department of Natural Resources staff.

ABC Plans were conducted on three farms in partnership with Reg Newell, biologist with NS DNR.

- Conduct interviews with farmers and review any existing plans or implemented best management practices (Environmental Farm Plan, Nutrient Management Plan, etc.).

Interviews were conducted with all 5 participating farmers.

- Perform various environmental assessments on the farm properties (riparian health assessments, water quality monitoring, stream assessments, culvert assessments, fish surveys, and benthic invertebrate sampling).

Riparian health assessments, water quality monitoring, stream assessments, culvert assessments, fish surveys, and benthic invertebrate sampling were completed at all five participating farms.

- Develop recommendation reports for each farm based on the results of all assessment activities performed.

Three formal ABC Plans were developed with recommendations and the other two farmers received more informal reports with recommendations. Field designs were developed for two participating farms – DeLong's and the Juniper Brook farm.

- Engage the local community to seek volunteers to assist with restoration activities.

Over the two year time frame of the project, Coastal Action staff attended approximately 30 public festivals and events where the project was highlighted.

- Perform recommended restoration activities and/or best management practices.

Recommended restoration activities were only completed on one of the five participating farms. A project was planned for a second farm but fell through due to landowner issues as explained above. Coastal Action does plan to go back to the three farmers who received the ABC Plans in 2018 to gauge their interest in completing any of the recommendations outlined in their respective reports.

- Develop stewardship agreements with each landowner to ensure that the project benefits continue into the future.

A stewardship agreement was developed with the DeLong's and a second restoration project is being proposed for their farm for 2018.

Actual results, compared to the projected activities are below each bullet in blue.

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Appendix A – DeLong Cattle Crossing Project Design

Application for Approval – Division 1 Water

DeLong Cattle Crossing Design & Calculations

DeLong Cattle Crossing Design

Calculations and design prepared by Amy Weston and Will Daniels with the Nova Scotia Salmon Association (NSSA) and in accordance with the NS Watercourse Alterations Standard.

Target sp. Brook trout, Atlantic Salmon + all other native species that may be present.

Culvert Specifications:

- 1200mm diameter
- 6.1m in length
- Plastic corrugated material

*Diagrams not to scale.

Before

The diagram shows a cross-section of a watercourse with eroded banks on both sides. A red rectangular box highlights the 'Impacted Area/Crossing', which is approximately 6m long. The banks are 2m wide. A callout shows a 'Mixture of shrubs/non-woody plants' that are currently present in the area.

After

The diagram shows the completed crossing. A 1200mm diameter culvert is placed at the correct slope. The crossing is stabilized with a combination of different size rocks to create a solid structure. A 'Dissipation pool' is formed upstream of the crossing. The banks are now stable and 2m wide. A callout indicates the 'Combination of different size rock to create a solid stable crossing'.

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Appendix B – Before and After Pictures of DeLong Cattle Crossing Project



Figure 3: DeLong Farm before picture.



Figure 4: DeLong Farm after picture.

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Appendix C – Agricultural Biodiversity Conservation (ABC) Plan Example

Agricultural Biodiversity Conservation Plan

Newbury Hill Farm



2017











I. Riparian Areas

Riparian areas are located between the low and high-water marks of watercourses, as well as the adjacent lands whose vegetation and soils contain higher concentrations of water than are found in upland areas. Riparian areas are often a unique and biologically rich habitat because they possess a variety of physical, biological and chemical conditions not found elsewhere. In addition to increasing and supporting biodiversity/wildlife habitat (in fact, some plant and animal species can survive only in riparian habitats), these areas are important to the overall operation of the farm.



Riparian area along Ross brook adjacent to yard

In general, vegetated riparian areas hold soils in place, thereby reducing erosion. Riparian areas also reduce contamination of waterways from overland runoff, and provide shade which regulates water temperature. During times of flooding, water velocity can often be reduced by overflow into the riparian area.

A small stream referred to as Ross brook which averages 3m at bankfull width and averages approx. 2ft in depth runs through a section of the farm.

The riparian areas along the stream are adjacent to pasture, wooded area, and lawn. The banks are steep in some areas and gradual in others, and covered with a mixture of trees, shrubs and herbaceous non woody plant species. The riparian area along the yard contains mainly a mix of woody and non-woody plants with some trees and shrubs scattered throughout. The riparian area along the pasture contains a mix of shrubs and young trees including alders, apple trees, and cherry trees.



Riparian area in wooded section of the farm.

A riparian health assessment was conducted on the riparian area that encompassed the lawn, pasture, and wooded area on the farm. Riparian health assessments are designed to determine the health of the riparian area based on parameters such as,

- ◊ The amount of riparian area covered by vegetation.
- ◊ General species of flora present in the riparian area.
- ◊ Amount and type of human impact on the riparian area.
- ◊ The presence and effectiveness of the streams floodplain.

A. Ross brook Riparian Area

The gently sloped banks of Ross brook along the edge of the small back pasture were generally healthy in terms of riparian health with a buffer zone averaging around 8+ meters between the upper bank and stream.

Current Biodiversity Enhancement

The riparian areas along the brook were generally healthy and contain a mixture of trees, shrubs, grasses and other non-woody species. These areas provide habitat and corridors for a wide variety of animal species from turtles (possibly wood turtles - a species at risk), snakes, frogs to edge and grassland bird species (thrushes, robins, vireos, warblers, bob-o-links, sparrows, northern harriers, possibly short eared owls, pheasants and waterfowl). A variety of Nova Scotia's mammal species such as grassland mice and shrews, skunks, raccoons, deer, mink would use these areas for food, shelter and travel corridors. Many of the shrub species such as alder and

(Continued on page 5)

Agricultural Biodiversity Conservation Plan– Sample Farm

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Appendix D – Informational Pamphlet created for Public Outreach

What We Offer

Bluenose Coastal Action Foundation is always seeking new farmers to work with in attempts to improve watershed health across Lunenburg County. In the past there have been many projects completed on local farms such as livestock fencing, Agricultural Biodiversity Conservation Plans, riparian planting, and stream restoration. Coastal Action's main focus is to build relationships with farmers by working with them and not against them, seeing things from both the farmer's perspective and an environmental perspective.




Who We Are

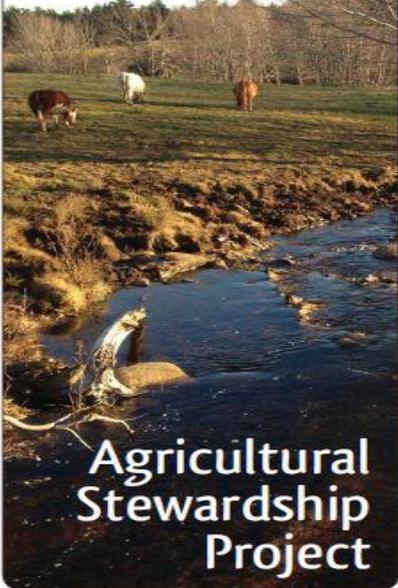
Bluenose Coastal Action Foundation is a charitable organization that addresses the environmental concerns along the South Shore region of Nova Scotia, and has been established since December 1993. Coastal Action's goal is to promote the restoration, enhancement, and conservation of our ecosystem through research, education, and action. Coastal Action is involved in a variety of projects including species at risk, climate change, watershed and marine-based, as well as environmental education. Coastal Action receives direction from a volunteer Board of Directors supported through a full-time Executive Director.

Our Vision
A healthy environment, supporting thriving South Shore communities.

Our Mission
We lead efforts to protect, enhance, and restore our ecosystem through research, education, and action.

Contact Us
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Agricultural Stewardship Project



About the Project

Bluenose Coastal Action Foundation began the Agricultural Stewardship Project in 2009. The main goal of the project is to improve the relationship between Agriculture and Watershed health throughout Lunenburg County.

Farming is a common practice throughout the County and often occurs near a stream, river, or lake. Interactions between farming and waterways can often result in degradation of freshwater resources and fish habitat. The LaHave River watershed is the main area of focus for the project as there are a number of farms located along its main branches and tributaries.

Common Issues Associated With Farms and Watershed Health

Farms can impact freshwater systems in a number of ways including loss of riparian area, bank erosion, sedimentation, and pollution. In most cases, farmers are not intentionally degrading nearby waterways as they are often unaware of the potential harmful impacts. For example, spreading fertilizers can result in algal blooms, this in turn decreases dissolved oxygen levels in water often killing fish and other aquatic life. Bank erosion, a common impact associated with livestock farming, can cause increased sediment levels in streams which can result in lower reproductive success and death for aquatic life.



What is a Riparian Area?

A riparian area is the land that runs adjacent to a stream, lake, river, brook, or wetland. These areas are often covered with trees, grasses, mosses, shrubs, and ferns and play an important role in keeping water systems healthy. Riparian areas should extend at least 10 meters on either side of a watercourse to provide proper shade, bank stabilization, as well as act as a filter removing contaminants from surface runoff.

