



# LaHave River Watershed Project

FIELD REPORT 2012 - 2013



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## Introduction

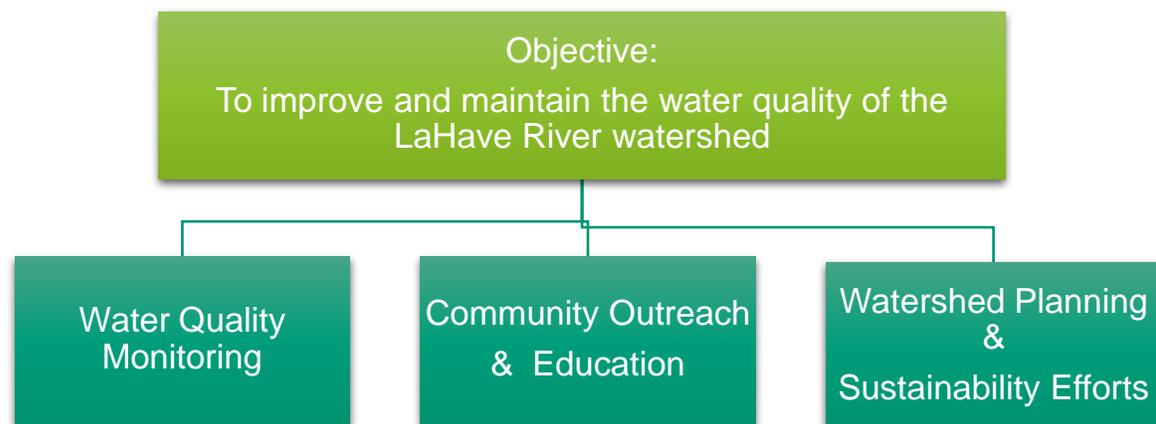
### *Project Background*

The LaHave River watershed encompasses an area of approximately 1700 square kilometers and provides a diversity of habitats for both freshwater and anadromous fish species. The watershed hosts a high level of residential, industrial, and recreational activity. Tourism, forestry, farming, and fishing (both recreational and commercial) are all common throughout the LaHave system. There are also avid boaters, cottagers, hunters, and anglers who use the watershed on a regular basis. These pressures have taken their toll on the watershed and the surrounding communities are starting to realize and recognize their own harmful impacts.

In response to these concerns, the Bluenose Coastal Action Foundation (BCAF), with help from their partners, initiated a long term water quality monitoring plan for the LaHave River to determine the health of the system and identify areas of concern. An advisory committee was formed with representatives from all levels of government, the private sector, academia, non-profit organizations, and local residents in an effort to create a project that would benefit all stakeholders.

### *Project Description*

The purpose of the LaHave River Watershed Project (LRWP) is to provide a long term record of the health of the LaHave River so BCAF and other project partners can act proactively to reduce stressors and harmful environmental impacts on the system by enhancing watershed education in the local community. The ultimate long term objective of the project is to improve and maintain the water quality of the LaHave River watershed through water quality monitoring and education to encourage the environmental sustainability and stewardship of the watershed and its inhabitants for the long term protection and sustainability of the native wildlife.



## *Project Staff (2012 – 2013)*

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## Project Activities

### *Water Quality Monitoring*

Water quality monitoring began on January 16<sup>th</sup>, 2012 and concluded on March 21<sup>st</sup>, 2013. Fifteen sample sites were monitored bi-weekly to document the natural variability along the LaHave system and track changes in general water quality. Sites are located at each major tributary entering the main branch, under each of the outflows from four sewage treatment facilities along the river, and in the headwaters where there is little human impact. Parameters monitored bi-weekly include: temperature, dissolved oxygen, pH, conductivity, total dissolved solids, and salinity. On a monthly basis, water samples are collected and taken to a certified laboratory (MAXXAM Analytics) to test levels of phosphorus, nitrogen, nitrates & nitrites, fecal coliforms, total suspended solids, and chloride. Two times a year, the certified lab will also provide a full metals test. After nearly 5 years of data collection, BCAF now has an excellent baseline dataset for the LaHave River.

Three students from the New Germany Rural High School assisted on the project this year. Neil Veinotte, Lucas Hiltz, and Rebecca Fancy volunteered with BCAF in order to complete 100 co-op hours in fulfillment of their O2 certificates. These students assisted staff members with water sampling and field measurements. As well, the students have had opportunities to expand their skills and participate on other BCAF projects. In addition, a first year student from the Nova Scotia Community College will be joining the project for a 5 week work co-op beginning in April, 2013.



Figure 1: Water quality monitoring and sample site Franey Corner, October 18<sup>th</sup>, 2012.

## *Community Outreach and Education*

Community outreach and education provides valuable information to the community with specific emphasis on living within the LaHave River watershed. Presentations are delivered to local groups, schools, and clubs; as well, educational booths and project displays are set up at local festivals and events. These outreach and educational events promote healthy watershed practices and equip community members with a respect for and better knowledge of their environment.

### Community Events

Throughout the year BCAF staff attended public events and activities where community members were spoken to and informed about the LRWP.

Several events that were attended included the following:

- MARC Youth Fishing Derby
- World Oceans Day
- Michelin Seniors Day
- Michelin Health and Safety Fair
- Tall Ships celebrations in Lunenburg
- Bridgewater, Lunenburg, and Mahone Bay Farmers Markets
- Mahone Bay Pirate Festival & Regatta
- Halifax International Boat Show
- White Point March Break Activities

### Fish Friends

One of the most popular programs that BCAF puts forth is the Fish Friends Program.

In 2012, Grade 4 classes from schools in Bridgewater, Mahone Bay, and Gold River participated in the Fish Friends Program. This program requires a commitment from BCAF of about 4 months. In early February, eyed Atlantic salmon eggs were collected from the Coldbrook fish hatchery and approximately 300 were delivered to each participating school. Once delivered, the Grade 4 classes become the guardians of the eggs. The students are responsible for the cleaning of the tank and filters, the removal of dead eggs, temperature regulation, and after hatching the feeding of the fry. During the spring semester, the Grade 4 students learn about the life history of the Atlantic salmon and other habitat based information associated with their curriculum outcomes. In previous years, all fish have been released into the Mushamush River during a single "Fish Release Day." However, this year due to a smaller number of participating schools, each class chose their own location and release date.

- Bayview Community School – Former NS Power dam site, Mushamush River
- Gold River/Western Shore Elementary School – Mushamush River near the Lutheran Church Camp, Big Mushamush
- Bridgewater Elementary School – Wiles Brook, LaHave River



Figure 2. Project Coordinator, Andy Breen, talking to local children about the fish release at Camp Mushamush.

## *Watershed Planning and Sustainability Efforts*

Throughout the year, the LRWP participated in a number of watershed planning and sustainability projects.

### Fish Habitat Restoration Project at Silver Mill Brook

Silver Mill Brook is a tributary of the LaHave River and runs through local property owner Kevin Veinotte's farm (Figure 3). Historically, this brook was straightened to maximize farm land and was accessible to cattle; however, nine years ago the brook became protected by the installation of an electric fence and cattle access was significantly limited. The goal of this summer's restoration project was to physically improve the in-stream structure of the brook in order to slowly improve fish habitat and help re-establish a natural meander pattern. This was accomplished through the installation of digger logs (Figure 4).

Digger logs create pools and gravel beds immediately downstream of the log, which serve as cover, resting areas, and spawning areas for fish travelling upstream. Digger logs also clean and oxygenate the water creating quality habitat for aquatic invertebrates.

Logs were cut to length to fit a 60 degree angle parallel to the bank of the brook. This angle helps direct the water into the bank to create the meander.



**Figure 3: Silver Mill Brook, a tributary of the LaHave River.**

The logs are also placed at a 3-5 degree angle, with the lower end upstream. Holes are drilled into the log for the 5/8" length of rebar that is used to secure the log into the substrate of the brook. A channel in the substrate is cleared for the log; pickaxes and shovels are normally used. Ideally, the channel is dug so the water cascades over the high portion of the log. Once installed, a pool is dug on the downstream side of the log. The rock and gravel removed from downstream can be used on the upstream side to create a ramp and a riffle. The ramp is important, with it the water will flow up to the peak of the log and then cascade down over it where it will begin to erode away parts of the streambed and create a larger pool (Figure 4). Weeks after installation, previously absent schools of fish were observed in the pools below the digger logs. During the summer of 2012, 24 digger logs were installed in Silver Mill Brook (Figure 5).



**Figure 4: BCAF installed digger logs at Silver Mill Brook.**



Figure 5: Measuring the gradient of a digger log during installation.

### Riparian Health Assessments

Using a portable Trimble Unit and Arc Pad software, LRWP staff mapped dozens of kilometers of riparian area along branches of the LaHave River and its tributaries (Chart 1). The riparian area is the land around a river or stream that is characterized by water-loving plants. Every time the riparian area appears to change, a series of 13 questions related to the riparian area are answered, determining an associated health with the traced region. After the questions are completed, the unit records the data along the line it just traced. A score above 80 is excellent health, from 60-80 is moderate, and below 60 is poor. By completing these assessments it can be determined which riparian areas are unhealthy and where future restoration efforts should be focused.



Figure 6 & 7: LRWP staff utilizing the Trimble unit for conducting Riparian Health Assessments.

<b>Riparian Area Health Assessments 2012</b>		
<b>Day</b>	<b>Stream Name</b>	<b>Kilometers Assessed (km)</b>
<b>1</b>	West Branch LaHave	3
<b>2</b>	Zwicker Brook	4.2
<b>3</b>	West Branch LaHave	3
<b>4</b>	West Branch LaHave - Unnamed Tributary #3	3.6
<b>5</b>	West Branch LaHave - Unnamed Tributary #4	4.9
<b>6</b>	West Branch LaHave	6.2
<b>7</b>	West Branch LaHave - Unnamed Tributary #5	1.3
	West Branch LaHave - Unnamed Tributary #6	1.2
<b>8</b>	West Branch LaHave	2
<b>9</b>	West Branch LaHave - Unnamed Tributary #8	4.1
<b>10</b>	West Branch LaHave	5
	Tributary leading to Cooks Lake	1
<b>11</b>	West Branch LaHave	5.1
<b>12</b>	West Branch LaHave	3.4
<b>13</b>	Ash Brook	4.8
<b>Total</b>		<b>52.8</b>

Chart 1: Kilometers of Riparian Area Health Assessments.

### West Branch Fish Habitat Restoration Plan

With funding from the NSLC Adopt-A-Stream (AAS) program, the Nova Scotia Salmon Association has created a Fish Habitat Restoration Plan template available on their website that can be downloaded and completed by community groups / organizations. It is designed so the user can fill out only the necessary sections that pertain to their specific watercourse with help from AAS staff if needed. It consists of five sections. The first is always the same and states the restoration plan objectives. The second part contains a table that is filled out by the user that contains introductory information about the watershed. Part three consists of many 1:10,000 topographical maps where site specific information about the watershed can be mapped. Part four is a table for problems and prescriptions. Here the user describes the problems they noted while walking the stream and identifies them with coordinates and descriptions and then offers a potential method for restoration that could be used. The final section consists of a restoration plan summary. It is an analysis of all the data collected and a plan pertaining to the restoration efforts suggested in section four.

BCAF has been working on developing a Fish Habitat Restoration Plan for the LaHave River Watershed; however, due to the large size of the watershed, BCAF has decided to break the area down into smaller sub-watersheds. In 2012, the focus of the fish habitat restoration plan was the West Branch of the LaHave River. LRWP staff began collecting data and information for the West Branch on days when they were not working on the other main components of the project. This work comprised the following activities:

- Riparian health assessments were conducted along approximately 53km of the West Branch of the LaHave River.
- Collection of local knowledge and professional expertise was initiated within the community and informational interviews with local residents, NS Department of Fisheries and Aquaculture – Inland Fisheries Division staff, as well as members of the LaHave River Salmon Association were conducted.
- Historic reports, documents, and data for this section of the watershed have been compiled and reviewed in order to obtain all pertinent information about the West Branch. This information includes water quality data, electrofishing surveys, as well as enhancement efforts regarding releases of salmon and trout.
- Creating the sub-watershed fish habitat restoration plan.

#### Agricultural Biodiversity Conservation Planning at LaHave Forestry

In November, LRWP staff and Reg Newell (NS Department of Natural Resources) completed an on-site ecological resource assessment at LaHave Forestry in Northfield, Lunenburg County. The goals of this assessment were:

- To identify and map existing wildlife habitats on the farm, including streams, wetlands, forest, etc.
- To identify areas of the farm that could benefit biodiversity through changes in management that could lower the risks to wildlife habitats.
- To document current and potential Beneficial Management Practices (BMP's) that enhance wildlife habitat to support biodiversity.



Figure 8: Constructed wetland at LaHave Forestry, Northfield.

Utilizing the information gathered during the on –site ecological resource assessment, Reg Newell completed an Agricultural Biodiversity Conservation Plan (ABC Plan) report.

The intent of the ABC Plan is to recognize current biodiversity conservation activities on the farm and to provide farmers with realistic and tailored land use options that support biodiversity and conservation planning. This is mutually beneficial for wildlife as well as the farm, as increased biodiversity will promote the complex interrelationships between species (predator/prey, seed dispersal, pollination, etc.) that are necessary to create highly stable and high-functioning ecosystems. This results in more productive croplands, fewer insect pests, improved forage for livestock, and better water quality.



**Figure 9: Land being converted to cropland at LaHave Forestry.**

## Acknowledgements

A special thanks to the dedicated members of the LaHave River Watershed Committee who help guide the project through their combined knowledge, expertise, and advise; as well as brainstorm new ideas for future project components and funding opportunities. Committee members include:

- LaHave River Salmon Association – Carroll Randall, Lowell Demond
- Nova Scotia Salmon Association – Amy Weston
- Lunenburg/Queens Federation of Agriculture – Peter Morine
- Municipality of the District of Lunenburg – Doug Reid
- Town of Bridgewater – Greg Ritcey, Michael Graves
- Environment Canada – Denis Parent, Todd Smith
- Fisheries and Oceans Canada – Mike Wambolt, Thomas Wheaton
- Nova Scotia Environment – Mike MacDonald
- Nova Scotia Fisheries and Aquaculture – Cathy Munro, Jason LeBlanc
- Nova Scotia Agriculture – Brian MacCulloch
- Nova Scotia Natural Resources – Reg Newell
- Dalhousie University – James Boxall
- Concerned Watershed Residents – David Maxwell, Barrie Clarke, Catherine Pross, Wayne Mulock
- South Shore Chapter, Council of Canadians – Marion Moore, Merydie Ross

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- LaHave River Salmon Association
- NS Adopt-A-Stream Program
- Municipality of the District of Lunenburg
- Town of Bridgewater
- EcoAction Community Funding Program
- Atlantic Salmon Conservation Foundation
- RBC Blue Water Program
- Environment Canada's Atlantic Ecosystem Initiative
- Nova Scotia Youth Conservation Corps
- Donations from residents/volunteers

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