LaHave River Watershed Project

2014 Field Report

Bluenose
Coastal Action
Foundation

LaHave River Watershed Project

2014 Field Report

Prepared by: S. Fredericks

LaHave River Watershed Project funded by:

Nova Scotia Salmon Association NSLC Adopt-a-Stream Program

LaHave River Salmon Association

Environment Canada – Atlantic Ecosystem Initiative

Department of Fisheries and Oceans – Recreational Fisheries Conservation Partnerships Program

Atlantic Salmon Conservation Foundation

Town of Bridgewater

Municipality of the District of Lunenburg

Table of Contents

1.0 Introduction

1.1 Project Staff

Project Coordinator:	Shanna Fredericks
Field Coordinators:	Emma Kinley
	Zackery Zwicker
Field Technicians:	Ian Melanson
	Taylor Creaser
NS Youth Conservation Corps:	Blaire Slaunwhite
	Sam Reeves

1.2 Project Description

Bluenose Coastal Action Foundation initiated the LaHave River Watershed Project (LRWP) in 2007, in response to increasing public concern over the health of the river. The purpose of the project is to identify and reduce harmful environmental impacts within the LaHave River Watershed. Forestry, farming, recreation, and rural development are widespread throughout the watershed and can have a significant impact on the health of the system. Project goals include the development of a comprehensive watershed management plan and a long-term monitoring program to assess the river's health. Project activities include monthly water quality monitoring, habitat assessments, restoration projects, and community outreach and education. The LRWP is guided by an advisory committee representing various government departments, academia, industry, non-profit organizations, and community members.

1.3 LaHave River Watershed

The LaHave River Watershed is one of the largest watersheds in Southwestern Nova Scotia (1,700 km²), with its headwaters reaching into Annapolis and Kings Counties and the majority of the watershed stretching across Lunenburg County. The main stem of the river runs approximately 80 km from the headwaters to the mouth of the LaHave River Estuary in Riverport. This highly branched river system has several large sub-watersheds and some of the richest floodplain habitat in Western Nova Scotia. Most of the watershed is dominated by forestry, agriculture, and rural development; however, the lower portion of the watershed is heavily impacted by industrial, urban, and residential development. These lower reaches of the watershed, from Bridgewater to the mouth of the LaHave River Estuary, exhibit poor water quality and significant habitat degradation. Water quality in the estuary suffers not only from the cumulative impacts of the entire watershed, but also from urban storm-water drainage and the continued (and illegal) use of straight pipe septic systems, which discharge raw human sewage into the river every day.

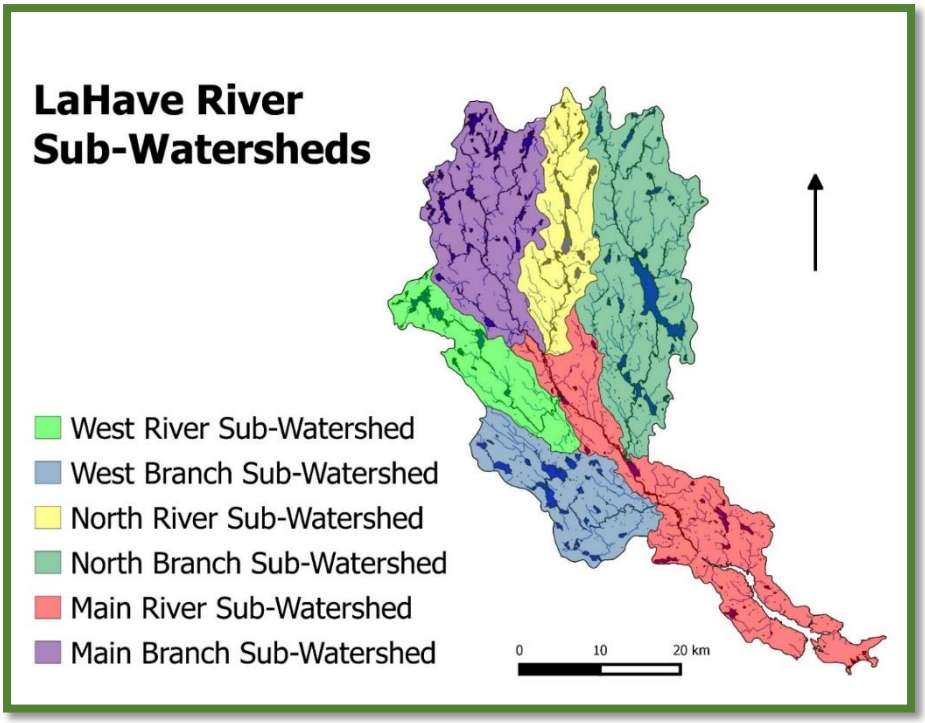

Figure 1.0 – Sub-watersheds of the LaHave River Watershed

The LaHave River historically supported a healthy run of Southern Upland Atlantic Salmon; however, following drastic declines in the 1980s and 1990s, the population now faces a high probability of extirpation from the LaHave and many other rivers in the Southern Upland region of Nova Scotia. Threats against the Southern Upland population include altered hydrology, acidification, invasive fish species, illegal fishing, and habitat fragmentation. The LRWP intends to address these threats at the watershed-scale in conjunction with small-scale restoration projects which address localized habitat conditions.

1.4 LaHave River Watershed Management Plan

One of the goals of the LaHave River Watershed Project is to develop a watershed management plan. An integrated watershed management plan, which addresses both land and water resources through collaborative efforts with government and stakeholders, will significantly improve our understanding of the system and provide recommendations for the sustainable management of the LaHave River Watershed. Due to the significant size of the watershed, monitoring and assessment activities are carried out at a more feasible sub-watershed scale. Sub-watershed Fish Habitat Restoration Plans have been developed for the North Branch, West River, and West Branch Sub-watersheds (see Figure 1.0), which involve assessments of riparian and in-stream habitats, water quality monitoring, land-use surveys, and recommendations for restoration activities to address harmful environmental impacts. This sub-watershed analysis improves our understanding of how water resources are being used, how land-use activities are influencing water quality, and how stream and riparian habitat conditions are influencing the quality and availability of fish habitat.

2.0 LaHave River Watershed Project 2014 Field Activities

2.1 Water Quality Monitoring

The LRWP began a water quality monitoring program in 2007 to create a long-term record of the river's health and to improve our understanding of both the natural variability within the system and the impacts of contamination on water quality. Fifteen sample site locations were identified in order to capture the water conditions throughout the entire watershed. Monitoring occurs from the headwaters to the estuary and includes all of the sub-watersheds, the main stem of the river, and downstream of the three waste water treatment plants in the watershed (see Figure 2.0). These sites are monitored on a monthly basis for physical, chemical, and biological water quality parameters.

Water quality parameters included in the LRWP monitoring program are as follows:

- Water Temperature (˚C)
- Dissolved Oxygen (mg/L and % SAT)
- pH
- Specific Conductivity (mS/cm)
- Total Dissolved Solids (mg/L)
- Salinity (ppt)
- Barometric Pressure (mm Hg)
- Dissolved Chloride (mg/L)

- Nitrate + Nitrite (mg/L)
- Total Phosphorus (mg/L)
- Total Suspended Solids (mg/L)
- Total Organic Carbon (mg/L)
- Fecal Coliform (CFU/100ml)
- Total Nitrogen (mg/L)

The monitoring program involves the use of a YSI Water Meter at each site and the collection of water samples, which are sent to a certified laboratory for analysis. In addition to the monthly monitoring program, water quality (YSI Water Meter only) is also assessed along the length of streams during habitat assessments.

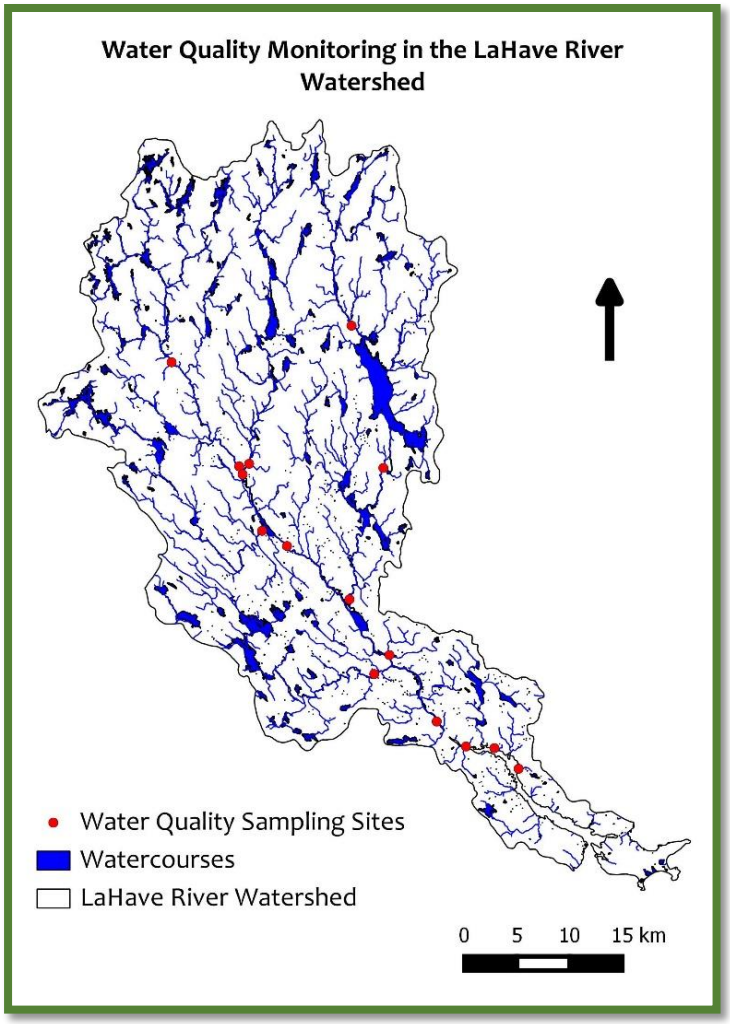

Figure 2.0 – Water Quality Sampling Sites in the LaHave River Watershed

2.2 Habitat Assessments

Riparian and aquatic habitats provide critical ecosystem services within a watershed, which can be severely degraded by a variety of land-use impacts. In order to gain a better understanding of the health of the system, the LRWP conducts various habitat assessments in streams throughout the watershed.

The LRWP follows the Nova Scotia Riparian Health Assessment User's Guide 2008 protocol for assessing the conditions of riparian habitat. A series of observations are made on vegetation coverage, exposed soils, bank stabilization, invasive species, and altered stream banks in order to assign a health score and identify areas in need of riparian restoration. In-stream habitat assessments provide

valuable information about water quality conditions and the quality and availability of fish habitat. These assessments are performed along the length of a stream when there is a significant change in stream conditions, a stream crossing, or any other anthropogenic alteration to the watercourse. Information collected includes stream channel measurements, substrate characteristics, shade coverage, pool/riffle/run habitat measurements, and water quality data. This information is used to determine the health of the stream and identify areas that would benefit from in-stream restoration activities.

During the 2014 field season, approximately 20 km of habitat assessments were completed within the North Branch and Main River Sub-watersheds on the following streams: Patten Brook, Mackays Brook, Penny Road unnamed tributary, Indian Brook, and Ross Brook.

2.3 Habitat Restoration Projects

The LRWP completed a variety of restoration projects in the North Branch and West River Sub-watersheds during the 2014 field season. Restoration activities are guided by the results of habitat assessments as well as consultation with landowners and community organizations. These projects are designed and implemented in partnership with staff from the Nova Scotia Salmon Association's Adopt-a-Stream Program.

Sheridan Brook Fish Habitat Restoration Project

Sheridan Brook is a 5 km tributary within the West River Sub-watershed. Habitat assessments performed in 2013 identified a straight, shallow, over-widened stream section in need of restoration. Shallow water with a lack of cold-water pools provides poor quality habitat for fish and can suffer from high water

temperatures and low dissolved oxygen. Five digger logs and 2 deflectors were installed along 240 m of this stream near its confluence with the West River LaHave, restoring 1,440 m² of fish habitat. Digger logs help to create deep pools through the scouring action of water as it flows over the logs, and over time they assist the stream in re-establishing a natural meander pattern. Deflectors also help to direct stream flow into a natural meander pattern, as well as encouraging sediment deposition along the over-widened stream banks.

Mackays Brook Aquatic Connectivity Restoration Project

Mackays Brook is a 4.5 km tributary within the North Branch Sub-watershed. During habitat assessments, an old timber bridge which had fallen into the stream was determined to be posing a significant barrier to fish migration. The fallen bridge had been collecting woody debris for several years and at the time of assessment only a small 1 ft² opening remained for fish to swim around the structure to access upstream habitat. The bridge was removed and the damaged stream banks were restored by planting 23 native riparian shrubs. Removal of this structure has restored fish passage to the 4 km of Mackays Brook upstream of the bridge location.

Patten Brook Riparian and Aquatic Connectivity Restoration Projects

Patten Brook is a 6.3 km tributary within the North Branch Sub-watershed. Habitat assessments highlighted several areas in need of restoration or improved land-use practices. A residential property near the confluence of Patten Brook and the North Branch LaHave was identified as a site in need of riparian restoration. Most of the natural riparian vegetation had been removed from the stream bank and was maintained as a manicured lawn, which resulted in erosion and sedimentation issues. Eighteen native riparian shrubs were planted along this 55 m section of the stream and the landowners have been encouraged to allow natural vegetation to grow along the shoreline.

Further upstream on Patten Brook, the LRWP crew found a privately owned stream crossing made of 2 small plastic culverts and rock. A culvert assessment determined that this crossing was posing a barrier to fish migration. The culverts were too small to handle the drainage area upstream of the crossing, which caused water to flow through the culverts at high speeds, making it difficult for fish to swim upstream. During low flow periods, water flowed under the culverts instead of through them, making fish passage nearly impossible. With permission and support from the landowner, this crossing was removed and replaced with a single-span bridge crossing. The bridge was designed and installed with the proper considerations for aquatic connectivity and catchment drainage, and has restored fish access to 3 km of Patten Brook upstream. In addition to this project, several small debris blockages were removed from this stream which posed potential barriers to fish migration during low flow.

Future efforts in this stream will be focused on improving land-use practices on both livestock and silviculture properties. Degraded riparian habitat has been identified in several locations, where Christmas tree production has encroached into the riparian zone. On several occasions, livestock were found to have full access to the stream, which has led to bank erosion and sedimentation of the watercourse. The LRWP hopes to engage these farmers in livestock fencing and riparian restoration projects in the future.

Wentzells Lake Riparian Restoration Project

The entire North Branch Sub-watershed drains into Wentzells Lake where it joins with the main stem of the LaHave River. The eastern edge of the lake is bordered by the LaHave River Trail and the Trunk 10 Hwy. Several sections of the eastern shoreline are suffering from riparian degradation, which is resulting in run-off and erosion problems. Much of this degradation stems from illegal clearing of vegetation on crown land and from landowners removing vegetation to maintain their lake views. These harmful activities needed to be addressed before any restorative efforts took place to ensure that the project would achieve its goals. The LRWP hosted an outreach event, led by Reg Newell from the Department of Natural Resources, to engage the local landowners in the project and inform them of the many benefits that a healthy riparian habitat provides. Following this event, a 100 m section of shoreline was planted with 24 native riparian trees and shrub species, which will help to stabilize the shoreline, slow and absorb run-off, and improve wildlife habitat.

3.0 Community Outreach and Education Activities

Watershed stewardship and education are critical to the management and protection of the LaHave River Watershed. The LRWP is actively engaged in community outreach and stakeholder partnerships. By providing presentations to local groups, and hosting information booths at various events, Coastal Action seeks to inform the public about our work while fostering a sense of environmental responsibility.

Coastal Action was involved in the following events in 2014:

- Nova Scotia Community College Sustainability Festival
- YMCA Healthy Kids Day
- Lunenburg Festival of Crafts
- Morton Centre Open House
- Mahone Bay Pirate Festival
- Bridgewater Growing Green Sustainability Festival
- Bridgewater Children's Fair
- NSLC River Day
- NSLC Adopt-a-Stream Eco Event
- Lunenburg and Bridgewater Farmers Markets
- Halifax International Boat Show
- Michelin Health & Safety Fair

Acknowledgements

The LaHave River Watershed Project crew would like to thank our project funders, in-kind partners, landowners, volunteers and the LaHave River Watershed Advisory Committee for their support and contributions to the project in 2014. The work of the LRWP would not be possible without the generous support of the community and our stakeholders. We look forward to continuing the efforts of the LRWP in 2015.