



Annapolis Aquatic Habitat Enhancement Project Project Report: 2008

**Produced for the Clean Annapolis River Project
By Ria Neish, Riparian Habitat Restoration Technician
July 2008**





Annapolis Aquatic Habitat Enhancement Project

Project Report 2008

Funded in part by Nova Scotia Adopt-A-Stream



Clean Annapolis River Project
Ria Neish, Riparian Habitat Restoration
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Acknowledgements

Clean Annapolis River Project would like to thank all of the individuals and organizations who contributed to the success of the project. These include: Nova Scotia Salmon Association for the funding received through the Adopt-A-Stream Community Funding Program, Environment Canada's EcoAction Community Funding Project, the Town of Middleton, J.D. Irving for the donation of trees and all the volunteers and landowners who contributed their time, labour and resources.

Executive Summary

The Riparian Habitat Restoration Project was created by Clean Annapolis River Project (CARP) as a means of improving riparian habitat health and reducing the sources of land-based pollution throughout the Annapolis River Watershed. This was accomplished through partnerships with local agricultural landowners in order to identify areas for improvement, implement riparian habitat restoration and protection techniques, and develop stewardship and awareness of issues concerning the Annapolis River Watershed. The sites were chosen for this project due mainly to unrestricted livestock access to the waterways and associated disturbance and lack of vegetation in the riparian zone.

The measures taken at the sites included the construction of fences to exclude the livestock from the riparian area and waterway, willow staking, and planting of willow tree stock to provide soil stabilization of the eroding banks in addition to vegetative cover.

As a result of the implementation of the Riparian Habitat Restoration Project in 2008, the following results were achieved:

- 1020 live willow stakes planted
- 1000 willow trees planted
- 15 m three strand, barbed wire fence installed
- 2450 m electric fence installed
- 73 120 m² of riparian zone protected
- 5 stewardship agreements signed

Introduction

This report summarizes the Riparian Habitat Restoration Project implemented by the Clean Annapolis River Project in 2008. It provides the details of the reasoning of the project, the development and methodology, and the results that were achieved by its implementation.

Background

The Clean Annapolis River Project (CARP), founded in March of 1990, is a community-based environmental not-for-profit organization whose goal is to *work with communities and organizations to foster the conservation, restoration and sustainable use of freshwater and marine ecosystems of the Annapolis watershed*. CARP has been the initiator of a wide variety of projects including volunteer air and water quality monitoring, riparian habitat restoration, community action on invasive alien plants, and private stewardship and conservation planning. CARP currently has technicians providing assessments for the provincial government's Environmental Home Assessment Program and the provincial and federal government's EnerGuide for Houses program. CARP has been honoured with awards at the regional, national and international level for its efforts.

The Annapolis River Watershed constitutes the many streams and rivers flowing from the North and South Mountains, beginning between Berwick and Aylesford flowing west into the Bay of Fundy. The Annapolis River is an integral part area's history that spans 400 years to the beginning of settlement by Europeans, and thousands of years before that as part of the history of the Mi'kmaq peoples of the region. The Annapolis River Watershed is a resource used by many for various purposes from sport fishing to swimming to agriculture. Due to the arable land and favourable growing conditions found in the area, much of the land surrounding the Annapolis River has been used for various forms of agriculture.

Conventional agricultural practices, when used close to waterways, have the potential to be very damaging to the waterways and riparian areas. With unrestricted access to waterways, livestock trample and destroy riparian vegetation, stir up the bottom of the river increasing sedimentation, and deposit manure directly into the waterway. With little to no vegetative buffer zone in the riparian area, the banks of the river are left vulnerable to erosion due to the lack of roots holding the soil together. This in turn results in increased sedimentation in the river when parts of the bank break off, as well as considerable land loss in parts of the Annapolis Watershed. Manure in the waterway increases bacterial levels that are harmful to mammalian life, and contributes to the eutrophication and degradation of aquatic habitat. Vegetative buffer zones perform two other functions that are integral to the overall health of the river. They provide temperature-regulating shade over the river that is required for fish habitat, in addition to reducing over-land run-off and interception of land-based sediments and contaminants. Direct agricultural run-off threatens the health of waterways and can be directly and indirectly lethal to aquatic organisms through the degradation of water quality.

The adoption of agricultural land-use practises that reduce or eliminate negative impacts to waterways is fundamental to the restoration of the health of the Annapolis River Watershed. For this reason CARP has initiated the Riparian Habitat Restoration Project through partnerships with local landowners and fostering their stewardship with the aim of working towards the elimination of livestock access to waterways and creating vegetated riparian buffer zones. The

Background continued

desired outcome is to provide habitat for fish and wildlife, stabilize the banks from soil erosion, provide a buffer that filters and cleans surface water and agricultural run-off, and reduce the flooding of and erosion of soil from fields.

Through the implementation of the Riparian Habitat Restoration Project in 2008, 73 120 m² of riparian zone were protected by 2465 m of fence, 1020 live willow stakes and 1000 willow trees were planted enhancing riparian habitat and facilitating the stabilization of the riverbank, and 5 stewardship agreements were signed.

Funding for this project came from three sources including; Nova Scotia Salmon Association's Adopt-A-Stream community funding initiative, Environment Canada's EcoAction Community Funding Project, and the town of Middleton.

Goals and Methodology

The overall goals of the Riparian Habitat Restoration project were to reduce contamination of the Annapolis River, create or enhance riparian buffer zones and limit livestock access to the river. More specifically the goals included:

1. To help improve the water quality of the Annapolis Watershed, through riparian habitat restoration and restriction of livestock access to the waterways.
2. To establish a vegetative buffer to help control erosion, provide shade for fish habitat and reduce sedimentation in the river, regulate nutrient influx and limit contamination.
3. To help protect the biodiversity of the watershed.
4. To improve fish and wildlife habitat at the sites.
5. To assist the landowners in environmental stewardship.
6. To increase public awareness of the issues facing the Annapolis River.

The goals were achieved through four methods; live willow staking, willow tree planting, fencing and the establishment of stewardship agreements.

Live Willow Staking and Willow Tree Planting

Live willow stakes and willow trees were planted approximately 1 meter apart in two or three parallel rows along the banks of waterways within the Annapolis Watershed (see Appendix D, photos 11 - 13). The willows were planted to help stabilize eroding riverbanks, and to reduce sedimentation rates in the Annapolis River. These willows act as nutrient absorbers from surface waters flowing through the riparian area while contributing temperature regulating shade, sediment filtration and habitat for fish and wildlife.

Fence Installation

Fencing was installed to eliminate livestock access to waterways at four project sites. The type of fencing varied to meet the requirements of each site and consisted either of three-strand barbed-wire fence, two-strand electric fence, or single strand electric fence (see Appendix D, photos 14 & 15). Electric fences were constructed using untreated eucalyptus fence posts spaced at approximately 15 meters with steel step-in posts between them. The barbed wire fence was constructed with untreated spruce posts spaced at approximately 2 meters. These choices in materials were based on longevity of the fence, as well as the need to select materials that would not leach harmful substances into the

Goals and Methodology continued

waterways. These fences were installed at a distance of five to ten meters from the edge of the waterway in order to allow for an undisturbed, natural riparian buffer between the aquatic environment and the agricultural land.

Stewardship Agreements

Each participating landowner signed a Stewardship Agreement after the work was completed on their property whereby it was agreed that all the materials put in place by CARP would be used for the intended purpose and maintained for a minimum of 10 years. If trees or shrubs were planted, then the landowner agrees to retain a forested riparian buffer zone (see Appendix C).

Public Awareness

Through the interaction with the landowners and communications regarding the importance of riparian habitat and agricultural land-use practices, the importance of this type of initiative will be imprinted on the communities. It has been found, when undertaking similar projects in the past, that word-of-mouth quickly increases awareness and influences local attitudes.

Site Descriptions and Project Details

Town of Middleton Site

The Town of Middleton site is an alluvial floodplain along the Annapolis River (See Appendix A, photo 1) containing a significant number of rare plants, including a sizeable stand of Eastern White Cedar, which is classified as endangered in Nova Scotia. There are about 5000 m of riverbank in total where significant bank erosion can be seen. This site is made particularly vulnerable to erosion due to the hard-pack cattle paths that follow along the edge of the river, and the almost complete lack of vegetation at the river edge. About 30 cattle are currently pastured there. This site is partially within the area of concern for the protection of the Town of Middleton Aquifer.

Upon consultation, it was decided to fence off the piece of land that was bottlenecked by the meander in the river (see Appendix B, photo 1). This bottleneck was decided upon as a good place to install the fence, as it would permit a short fence to protect a proportionally larger piece of land. A three strand, barbed-wire fence was constructed and CARP staff carried out planting of live willow stakes.

The following is a list of activities completed at this site:

- 1020 live willow stakes planted
- 15 m triple strand, barbed wire fence installed
- 8570 m² of riparian zone protected

Horsnell

The Horsnell family farm is located off of Hwy 221 just outside of Aylesford (see Appendix A, photo 2). It is a large beef operation that extends up the side to the top of the North Mountain and has a number of small creeks running through the pastureland. CARP constructed a single strand electric fence of 450 meters last year, and another fence of 550 meters in total was added to either end of the previous years fence to exclude the cattle from a more extensive, forested

Site Descriptions and Project Details continued

riparian area along 2 separate waterways. In addition, two more sections of fence were added to one of the waterways to fence between crossings that had been put in many years before. Between the two crossings, one single strand electric fence of about 400 meters was installed to fence out a portion of the creek. On one side of the waterway, the landowner donated posts, and CARP installed the posts for the other side. Past the second crossing, a small section of the creek contained within a small hemlock stand running into a small pond was fenced out with 325 meters of single strand electric fence (see Appendix B, photo 2).

The following is a list of activities completed at this site:

- 1275 meters of single strand electric fence installed
- 43 500 m² of riparian zone protected
- Stewardship agreement signed

Mader

This site is a small farm with a few horses and about 10 cattle located off of Hwy 1 in Upper Granville (see Appendix A, photo 3). The landowner purchased some dyked pastureland adjacent to the Annapolis River and wished to fence out access to the Annapolis River and a small creek running along the west edge of his property before introducing his cattle. 300 meters of double strand electric fence was installed along the Annapolis River, connected to 375 meters of fence installed along the west edge of the property. Willow trees were planted along the Annapolis River (see Appendix B, photo 3).

The following is a list of activities completed at this site:

- 600 willow trees planted along 300 meters of the Annapolis River
- 675 meters of double strand electric fence installed
- 6750 m² of riparian zone protected
- Stewardship agreement signed

Milne

Located along Hwy 201 in West Paradise (see Appendix A, photo 4), this is a small property along the Annapolis River recently purchased and intended to hold about 10 horses. The owner had heard of CARP's Riparian Habitat Restoration Project and approached us for help fencing out the waterways that included about 150 meters along the Annapolis River and 350 meters adjacent to a brook that runs through the pasture on the east side of the property (see Appendix B, photo 4). The property is not currently being used as pastureland, but the owner's intent is to move the horses there for next summer. Because the site was not currently pastured, the riparian zones were intact with numerous wildlife sightings including beaver, fox, skunk and a multitude of birds. Willow trees were planted along the Annapolis River to provide shade and fish habitat.

The following is a list of activities completed at this site:

- 328 willow trees planted along 150 meters of the Annapolis River
- 500 meters of double strand electric fence installed

Milne continued

- 14 300 m² of riparian zone protected
- Stewardship agreement signed

Sharpe

A residential property located in Moschelle (see Appendix A, photo 5). The owners were building a house and small barn on the property and had some land that had been cleared to a small brook running through the north end of the property. The owners wished to restore the riparian vegetation along the banks of the brook. Willow trees were planted along the edge of the brook.

The following is a list of activities completed at this site:

- 45 willow trees planted along 45 meters of the brook
- Stewardship agreement signed

Smith

A residential property located in Port Wade, on the Annapolis Basin side of the Granville Rd (see Appendix A, photo 6). Over the winter, a significant chunk of land, averaging about 2 meter wide and 15 meters long, in two locations along their shoreline property eroded. The landowner had heard of CARP's Riparian Habitat Restoration Program and approached us for possible solutions. Hay was placed against the soil exposed from the erosion as a means of reducing surface water run-off erosion, and willows were planted.

- 27 willows planted along 30 meters of the Annapolis Basin
- 4 bales of hay placed on the exposed soil
- Stewardship agreement signed

Summary

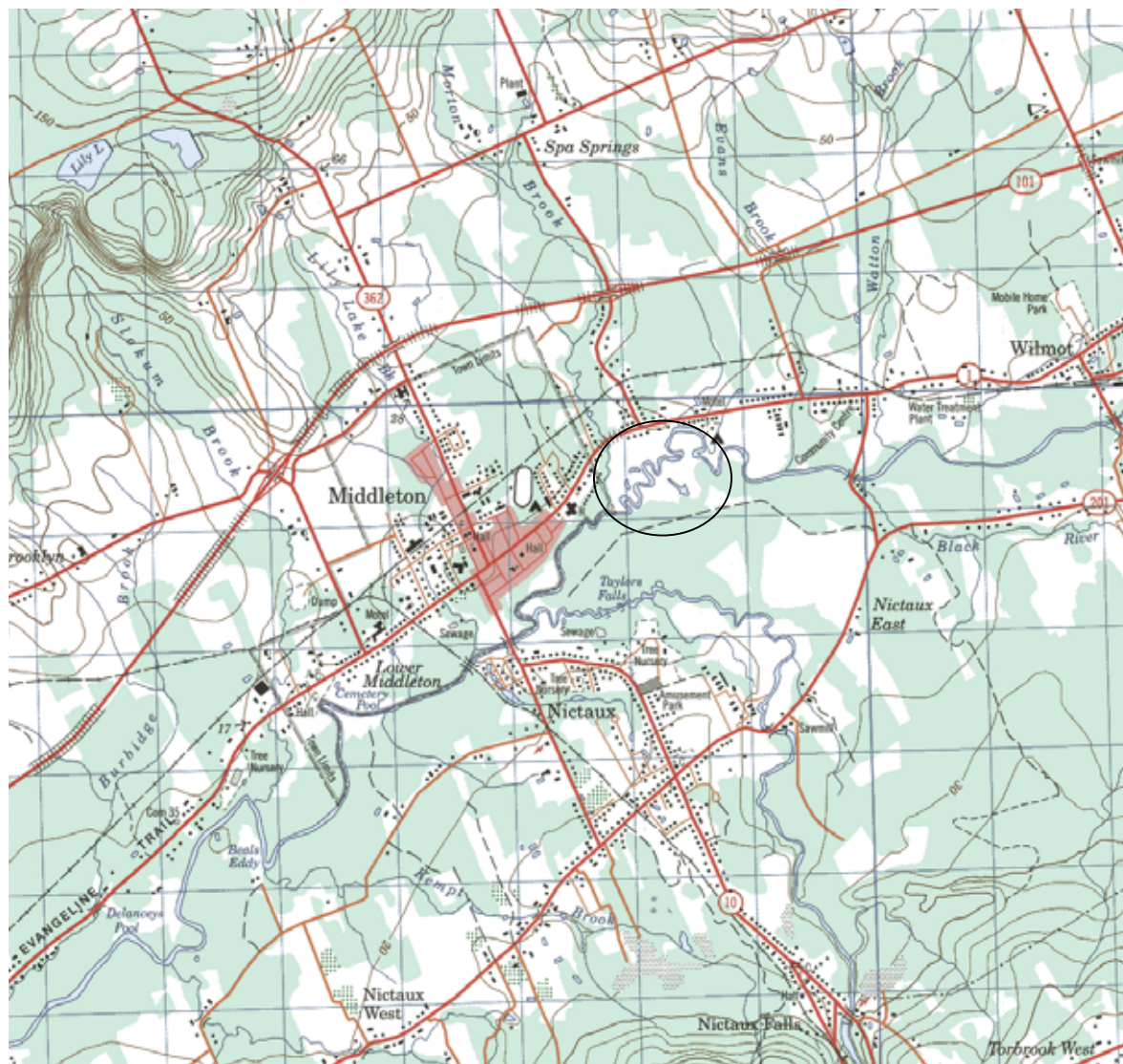
The Riparian Habitat Restoration Project for the year of 2008 was successful. Follow up of the work completed at the sites showed that the willows, and riparian vegetation within the newly protected riparian area were thriving (see Appendix D, photos 1 - 10). In terms of the overall goals of the project, they were met for the year 2008 and there is great potential for future work throughout the Annapolis Watershed to improve water quality in the area, protect the riverbanks from erosion, and enhance and protect biodiversity. Stewardship agreements were successfully signed with landowners. Increased public awareness will inevitably follow from the actions and communications resulting from this project.

The following are a list of accomplishments achieved:

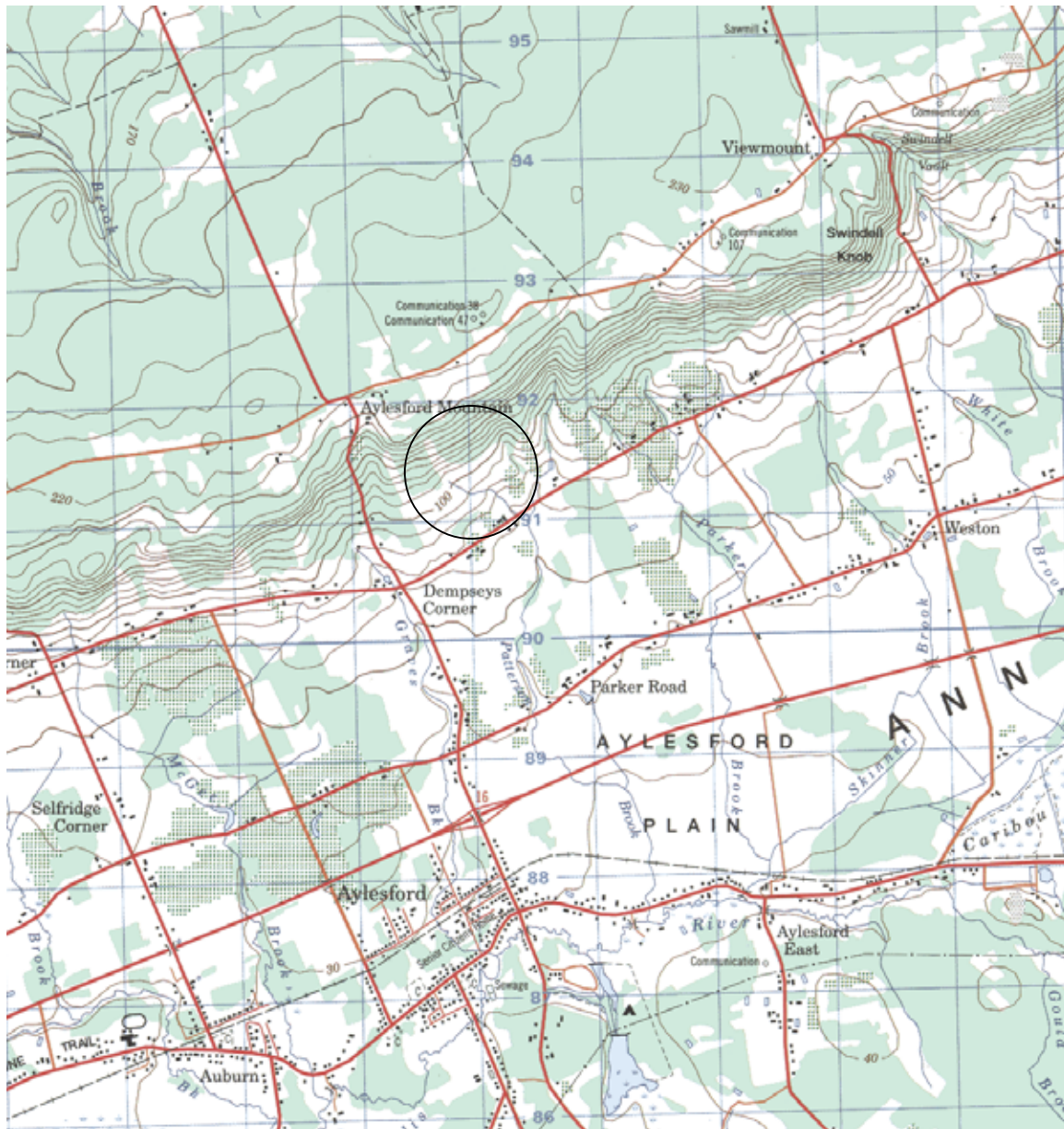
- 1020 live willow stakes planted
- 1000 willow trees planted
- 15 m triple stand, barbed wire fence installed
- 2450 m electric fence installed
- 73 120 m² of riparian zone protected
- 5 stewardship agreements signed

Appendices

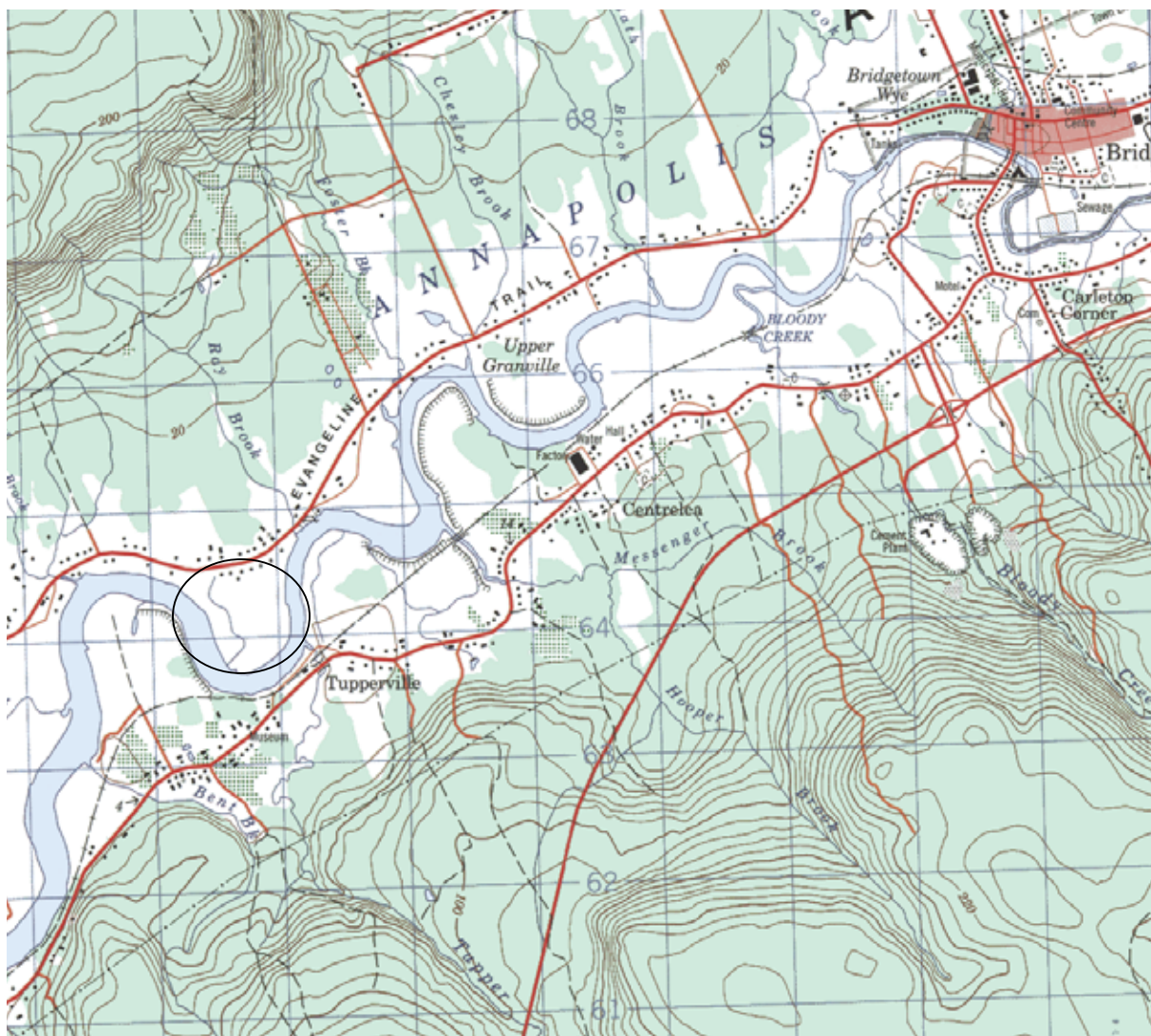
Appendix A — Topographic Maps Showing Site Locations



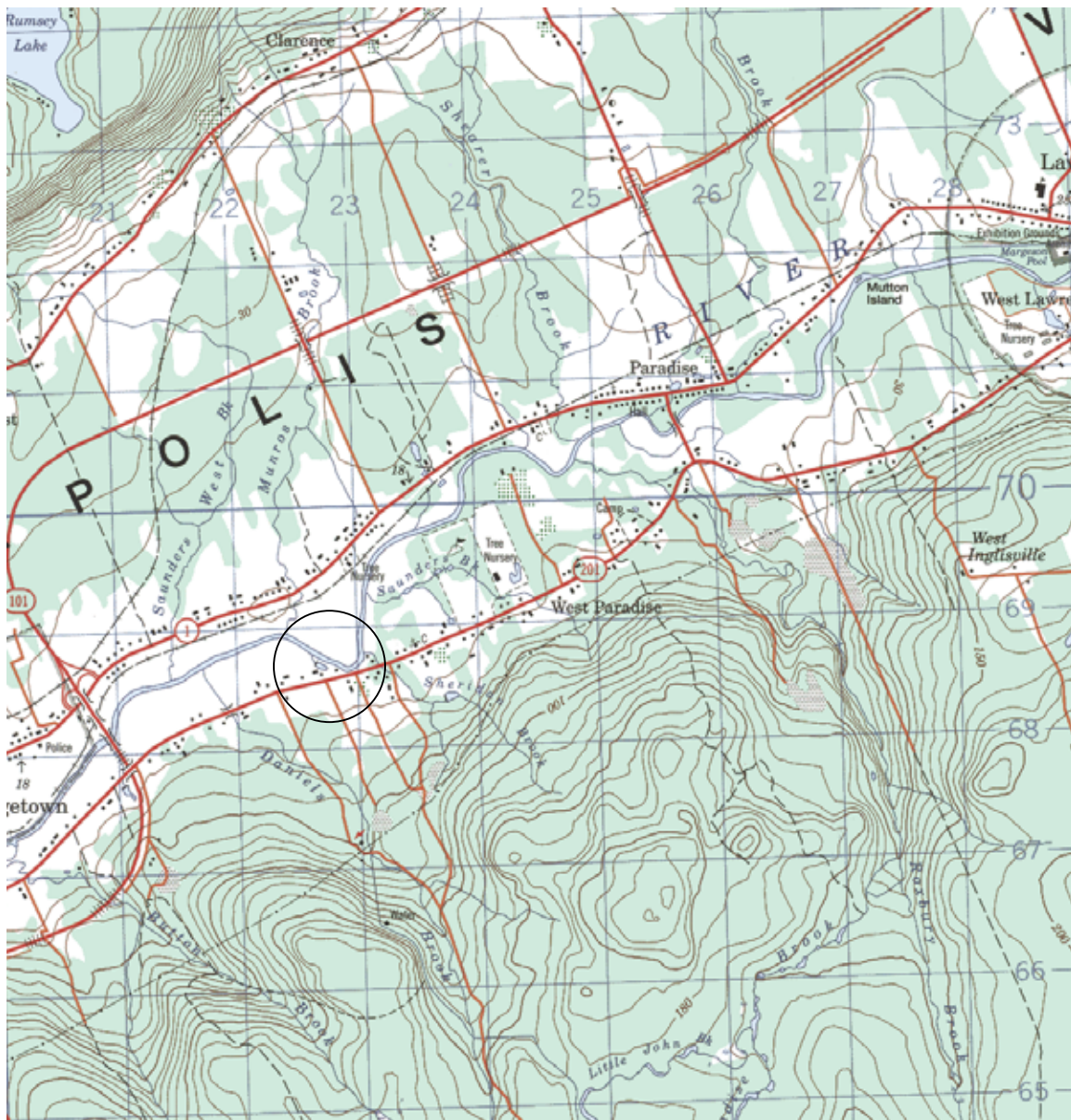
i. Location of the Town of Middleton Site



ii. Location of Horsnell Property



iii. Location of the Mader Property



iv. Location of the Milne Property



v. Location of the Sharpe property



vi. Location of the Smith Property

Appendix B — Aerial Photos of Agricultural Sites



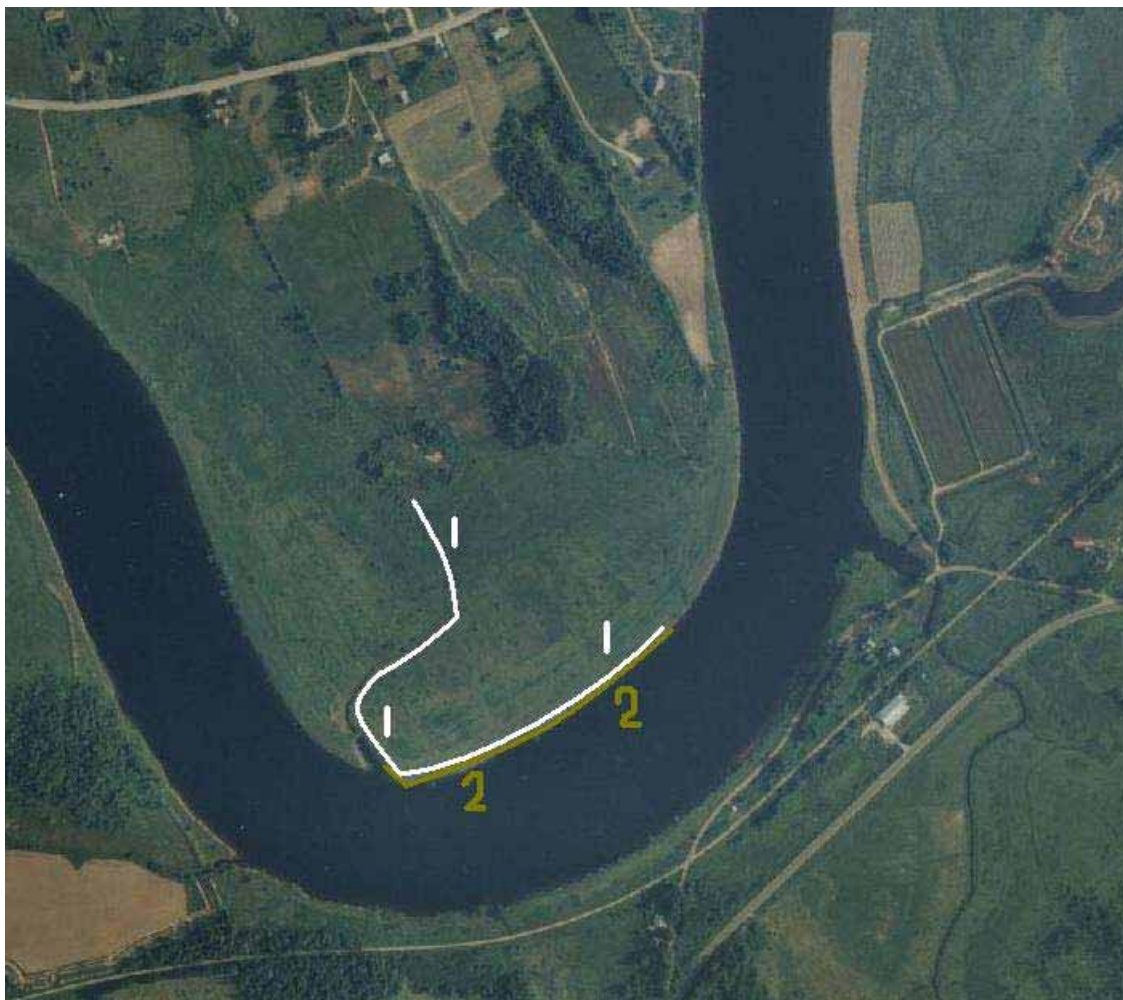
i. Town of Middleton Site

- 1 – Fence
- 2 – Willow staking



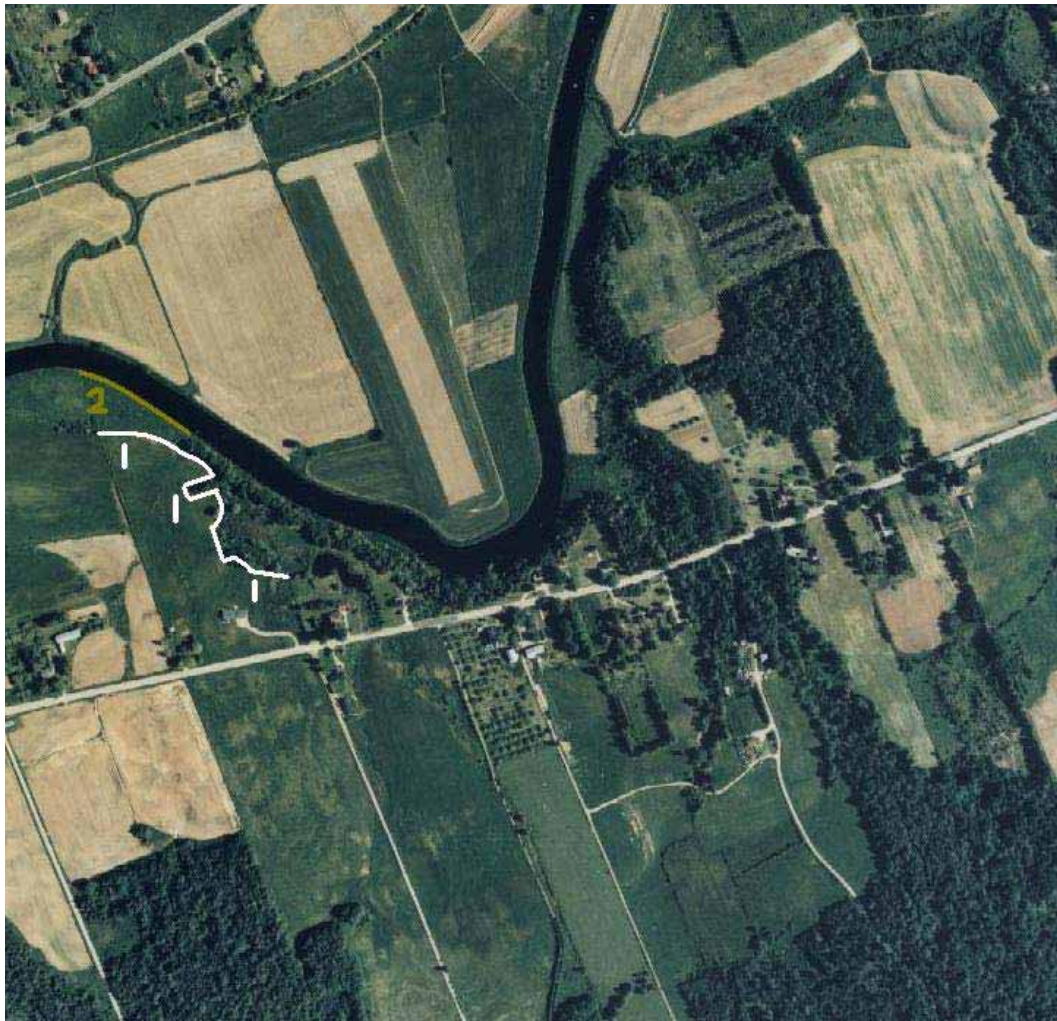
ii. Horsnell Property

- 1 – Fence from 2007
- 2 – Fence from this year



iii. Mader Property

- 1 – Fence
- 2 – Willow trees



iv. Milne Property

1 – Fence

2 – Willow trees

Appendix C — Stewardship Agreements



Clean Annapolis River Project

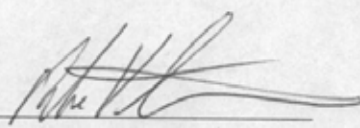
21 St. Anthony Street
P.O. Box 395 Annapolis Royal, NS
B0S 1A0

Toll Free: 1-888-547-4344
Phone: 902-532-7533
Fax: 902-532-3038

Riparian Habitat Stewardship Agreement

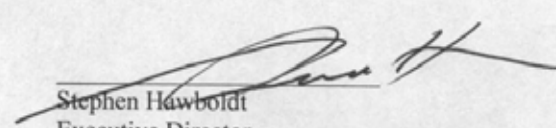
I hereby agree to support the riparian habitat enhancement and protection work undertaken on my property in partnership with Clean Annapolis River Project as follows:

- I agree to use all materials donated by Clean Annapolis River Project for use in the project for the purpose they were intended for, as agreed to with Clean Annapolis River Project.
- I agree to maintain all structures constructed on my property as part of the project for a period of at least 10 years, or until, due to land use changes, they are no longer needed to achieve the purpose they were intended for.
- Where reforestation has taken place on my property, I agree to retain a forested riparian buffer zone, and to refrain from removing any trees that were planted there by Clean Annapolis River Project.

Signature of Project Participant: 

Name of Project Participant: Mike Hornell

Date: Aug 13 08


Stephen Hawboldt
Executive Director
Clean Annapolis River Project



Clean Annapolis River Project

21 St. Anthony Street
P.O. Box 395 Annapolis Royal, NS
B0S 1A0

Toll Free: 1-888-547-4344
Phone: 902-532-7533
Fax: 902-532-3038

Riparian Habitat Stewardship Agreement

I hereby agree to support the riparian habitat enhancement and protection work undertaken on my property in partnership with Clean Annapolis River Project as follows:

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- I agree to maintain all structures constructed on my property as part of the project for a period of at least 10 years, or until, due to land use changes, they are no longer needed to achieve the purpose they were intended for.
- Where reforestation has taken place on my property, I agree to retain a forested riparian buffer zone, and to refrain from removing any trees that were planted there by Clean Annapolis River Project.

Signature of Project Participant: Susan Mader

Name of Project Participant: Susan Mader

Date: 14 August 2008

A handwritten signature in black ink, appearing to read "Stephen Hawboldt".

Stephen Hawboldt
Executive Director
Clean Annapolis River Project



Clean Annapolis River Project

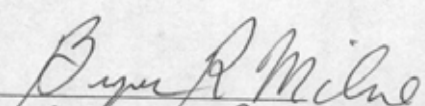
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Riparian Habitat Stewardship Agreement

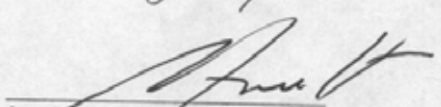
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Signature of Project Participant: 

Name of Project Participant: Bryce R. Milne

Date: Aug 14/2008


Stephen Hawboldt
Executive Director
Clean Annapolis River Project



Clean Annapolis River Project

21 St. Anthony Street
P.O. Box 395 Annapolis Royal, NS
B0S 1A0

Toll Free: 1-888-547-4344
Phone: 902-532-7533
Fax: 902-532-3038

Riparian Habitat Stewardship Agreement

I hereby agree to support the riparian habitat enhancement and protection work undertaken on my property in partnership with Clean Annapolis River Project as follows:

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- Where reforestation has taken place on my property, I agree to retain a forested riparian buffer zone, and to refrain from removing any trees that were planted there by Clean Annapolis River Project.

Signature of Project Participant: Andy Sharpe

Name of Project Participant: Andy Sharpe

Date: 18/8/08

Stephen Hawboldt
Executive Director
Clean Annapolis River Project



Clean Annapolis River Project

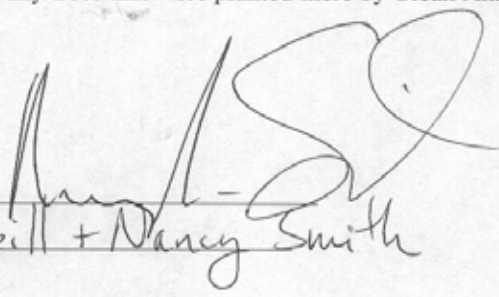
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Riparian Habitat Stewardship Agreement

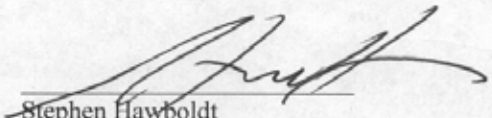
I hereby agree to support the riparian habitat enhancement and protection work undertaken on my property in partnership with Clean Annapolis River Project as follows:

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Signature of Project Participant: 

Name of Project Participant: Bill + Nancy Smith

Date: 9 July 2008


Stephen Hawboldt
Executive Director
Clean Annapolis River Project

Appendix D — Photos of Work and Progress



1. Town of Middleton Site, Mid May, facing north, depicts the fence and behind the site of riparian protection.



2. Town of Middleton Site, Mid July, facing east, on the site of riparian protection. Note how quickly the marsh grasses grow when protected.



3. Town of Middleton Site, Mid May, north beach on area of protection.



4. Town of Middleton Site, Mid July, north beach on area of protection, water level low. Note the vegetation growing.



5. Horsnell Property, mid June, pond before livestock access was restricted.



6. Horsnell Property, mid August, pond after livestock access was restricted. Note grasses filling in trampled areas.



7. Horsnell Property, mid June, brook before livestock access was restricted.



8. Horsnell Property, mid August, brook after livestock access was restricted. Note the restoration of marsh grasses.



9. Smith Property, site of erosion.



10. Smith Property, showing the placement of hay and willow trees.



11. Tree planting



12. Willow staking.



13. Willow stake sprouting after 10 weeks



14. Fencing.



15. 2-strand electric fence.