Annapolis Aquatic Habitat Enhancement Project

Project Report: December 2009

By: Megan Tardif-Woolgar, Riparian Habitat Technician

Clean Annapolis River Project

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Funded by Nova Scotia Adopt-A-Stream

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Clean Annapolis River Project

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Acknowledgements

The Clean Annapolis River Project would like to thank all individuals and organizations that contributed to the success of the Annapolis Habitat Enhancement Project. These include: participating landowners for their contributions of time, materials, equipment, and labour, Nova Scotia Salmon Association's Adopt-A-Stream Community Funding Program for their contribution of funds, expertise, and time. We would also like to thank Environment Canada's Eco-Action Program, and Social Development Canada's Career Focus Program for their contribution of funds, the Town of Middleton, and J.D. Irving for their donation of spruce trees. We would also like to thank all of the volunteers who contributed their time and labour.

Executive Summary

The Riparian Habitat Restoration Project was created by the Clean Annapolis River Project (CARP) as a means of improving aquatic and riparian habitat quality within the Annapolis River watershed, with a focus on agricultural sites. Habitat enhancement endeavours for the 2009 season included:

- Repairing and revegetating impacted riparian buffer areas using remediation techniques such as planting native vegetation
- Restricting livestock access to waterways by fencing and providing alternate watering systems
-Partnering with local agricultural landowners, identifying new sites, and developing restoration plans;
-Creating stewardship agreements between CARP and participants to ensure longevity of project initiatives
-Communicating and promoting knowledge and awareness about riparian restoration to the general public

Several methods were used to achieve the Annapolis Habitat Enhancement Project's goals. These methods included: planting live willow stakes; and planting a diverse selection of native riparian trees and shrubs in areas from which livestock have been restricted to restore and enhance the riparian habitat. This is accomplished by installing electric fencing along watercourses located in livestock grazing areas to creating a vegetated buffer zone, and providing alternative watering systems for livestock. Communicating with farmers was also an important factor in creating relationships and promoting awareness of healthy riparian habitat stewardship practices.

As a result of the implementation of the Annapolis Habitat Enhancement Project, the following results were achieved:

- 6 participants involved in the Habitat Enhancement Project
- 2,585m of fencing installed along waterways
- 106,866 m^2 of riparian habitat protected
- One alternative watering system installed
- 840 native trees and shrubs planted
- 1,630 live willow stakes planted
- One public promotion day held
- 6 stewardship agreements signed

Introduction

The following report summarizes the Annapolis Aquatic Habitat Restoration Project implemented by Clean Annapolis Project in 2009. It provides detail on the project's reasoning and development, delivery, and the results achieved through its implementation.

Background

The Clean Annapolis River Project (CARP), founded in March 1990, is a charitable organization whose goal is *to restore and protect the Annapolis River watershed through science, leadership and community engagement*. CARP's activities cover a wide range including environmental assessment, education, and action endeavors. These activities include volunteer air and water quality monitoring, private stewardship and conservation planning, and fish habitat restoration projects. CARP has been a participant of the Atlantic Coastal Action Program (ACAP) since 1991, and has been honored with several regional, national, and international awards for its efforts.

The Annapolis River watershed is a highly agricultural area through which many streams and rivers flow, making their way from the bordering North and South Mountains to the Annapolis River on the Valley floor. At locations where watercourses run through agricultural land, there is potential for serious environmental degradation by decreasing the function of the riparian zone and negatively impacting the water quality. The adoption of agricultural land use practices that minimize or eliminate negative impacts on waterways is essential to the health of the Annapolis watershed. One such practice is riparian habitat stewardship. By protecting and enhancing riparian buffer zones between agricultural lands and watercourses, farmers can greatly reduce the impacts of their operations on the aquatic environment, help to control the flooding and erosion of their land, and provide healthy habitat for many wildlife and aquatic species.

The Annapolis Aquatic Habitat Restoration Project was created in order to improve aquatic habitat and water quality in the Annapolis watershed through partnering with local farmers to improve riparian habitat stewardship practices for their operations. This involves fencing livestock grazing areas along waterways, installing alternative watering systems, and revegetating riparian buffer zones through native tree and shrub planting and live willow staking. Participating farmers commit themselves to sustaining the objectives of the project for at least 10 years by signing a riparian habitat stewardship agreement.

Funding for this project came from three sources: Nova Scotia Salmon Association's Adopt-A-Stream Community Funding Initiative, The Environment Canada's Eco-Action Program, and Human Resources and Social Development Canada's Career Focus Program. The capability to achieve the project's goals with the funding provided was enhanced through the in-kind contributions of labour, materials, and equipment used by the various project participants.

Goals and Methodology

The goals of the Annapolis Aquatic Habitat Restoration Project were to improve aquatic habitat, reduce stream contamination, create naturalized riparian buffer zones between agricultural lands and the aquatic environment, and further develop riparian and aquatic habitat stewardship practices within the Annapolis River watershed. In order to meet these goals, a variety of activities were undertaken. These activities included: installation of fencing along waterways in livestock grazing areas; provision of alternative sources of drinking water for livestock; riparian zone revegetation; and generation of public awareness through attendance at public events related to agriculture. The following provides further detail on the methods used for individual project activities.

Live Willow Staking and Tree Planting

A major goal of the Annapolis Habitat Enhancement Project was to establish native trees and shrubs within degraded buffer zones. This was accomplished using a variety of methods, including the planting of nursery stock trees and shrubs, as well as various forms of staking using live cuttings from willows and other suitable trees and shrubs (Refer to Figures 1 and 2).

Figure 1- Willow stakes providing bank stabilization at the Town of Middleton site.

Figure 2- Willow staking May 2009 at the Town of Middleton site.

Fence Installation

Fencing was installed to eliminate livestock access to waterways at project sites. The type of fencing consisted of two-strand electric fence supported with untreated eucalyptus fence posts spaced approximately 15 meters apart with additional steel step-in posts in between (Refer to Figures 3 and 4). These material choices were based on fence longevity, and the untreated posts do not leach chemicals into waterways, as pressurized wood is prone to do. These fences were installed at a minimum distance of 5 meters from the edge of the waterway in order to allow for an undisturbed, natural riparian buffer between the aquatic

environment and agricultural land. Generally, the farmers were responsible for providing the electricity to run the electric fence, however an exception was made on the Bruce property where a Paramak electric solar fencer was provided due to the secluded nature of the area.

Figure 3- Fence installed on the Morse property.

Figure 4- Fence installed on the MacMurtry property.

Alternative Watering Systems

At two different sites, alternative livestock watering systems were installed in conjunction with fencing, eliminating the need for livestock to enter the streams. One system, installed on the Morse property, was an all-season system where water is gravity fed from a pond through a pipeline. In addition, a system consisting of a nose pump was set up on the Bruce property. This system uses a lever that livestock can activate with their noses to pump water from a nearby stream (Refer to Figures 5 and 6).

Figure 5- Nose pump installed on Bruce property.

Figure 6- Nose pump hose foot placed in water and suspended by a buoy to compensate for tidal water level fluctuation, installed at the Bruce property.

Stewardship Agreements

After the work was completed on their property, each participating landowner signed a Stewardship Agreement 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 agreed to retain a forested buffer zone (See Appendix A).

Public Awareness

Public awareness of best management practices for riparian zones in agricultural areas is an important aspect of this project. In order to increase knowledge and awareness amongst the agricultural community and the general public, a display was placed at the Lawrencetown cattle auction, offering information on the riparian restoration work with which CARP is involved. Also, the importance of this type of initiative will be imprinted on communities through interaction with participating landowners and communications regarding the importance of riparian habitat and agricultural land-use practices.

Site Descriptions and Project Details

Bruce Farm

The Bruce farm hosts a medium-sized organic cattle and sheep operation. It is located on the 201 highway in Centrelea, and the cattle have full access along 300 meters of Messenger Brook (Refer to Figure 7). The entire Western side of the pasture borders the brook, and 300 meters of fencing was completed in the summer of 2009. A nose pump was provided to compensate for fencing the livestock away from their main water source, as was a solar fencer due to the remote location of the pasture and its distance from power sources. Trees were also planted on the north half of the fenced-out area to create a vegetated buffer zone (See Figure 8). The entire fenced out section was not planted as the farmer wanted to be able to maintain visibility from the road.

Figure 7- Topographical map of the Bruce Farm location.

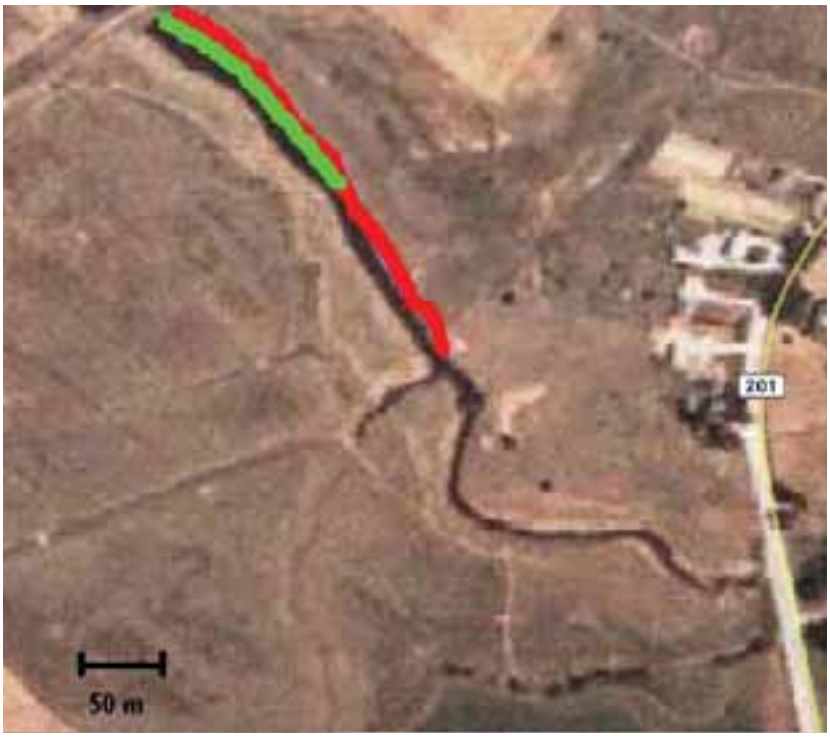

Figure 8- Aerial photograph of Bruce Farm. The red line represents the location of the fence, the green line represents the location of the planted container-stock spruce trees.

The following activities were completed at this site:

-128 Container-stock spruce trees planted
-300 meters of double stranded electric fence installed
-2,706 m^2 of riparian zone protected
-Nose pump installed
-Solar fencer installed
-Stewardship agreement signed (Refer to Appendix A)

MacMurtry Farm

The MacMurtry property, located in Brooklyn, is a medium-sized beef farm, bisected by Burbidge Brook along most of its length (Refer to Figure 9). Previous restoration work involving the installation of a culvert took place in 2006, however the property was never fenced. Fencing was performed on both sides of the brook, forcing the livestock to use the culvert provided. Willow staking was accomplished in the fall of 2009 to provide bank stabilization and decrease sedimentation (Refer to Figure 10).

Figure 9- Topographical map of the MacMurtey Farm location.

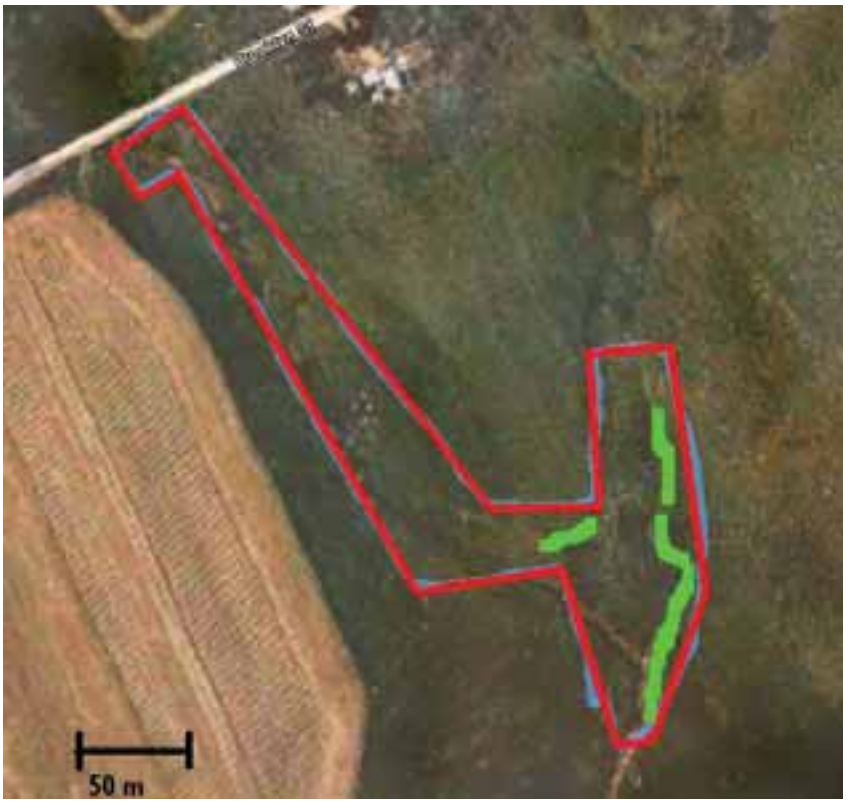

Figure 10- Aerial photograph of MacMurtry Farm. The red line represents the location of the fence, the green line represents the location of the live willow stakes.

The following activities were completed at this site:

-600 live willow stakes planted
-1,110 meters of double stranded electric fence installed
-21,718 m^2 of riparian zone protected
-Stewardship agreement signed (Refer to Appendix A)

Morse Farm

The Morse property is located on the Harmony road in Tremont, on the South Mountain behind Greenwood (Refer to Figure 11). It is a medium-sized organic farm, providing organically grown beef to a variety of local farmers markets. The Fales River, an Annapolis tributary, runs along the North Side of the property adjacent to where the cattle fields are located. Four hundred twenty five (425) meters of double stranded electric fencing was installed here, keeping the livestock out of the brook and creating a significant buffer zone (Refer to Figure 12). A gravity fed all-season watering system was installed to create an alternate watering source for the livestock.

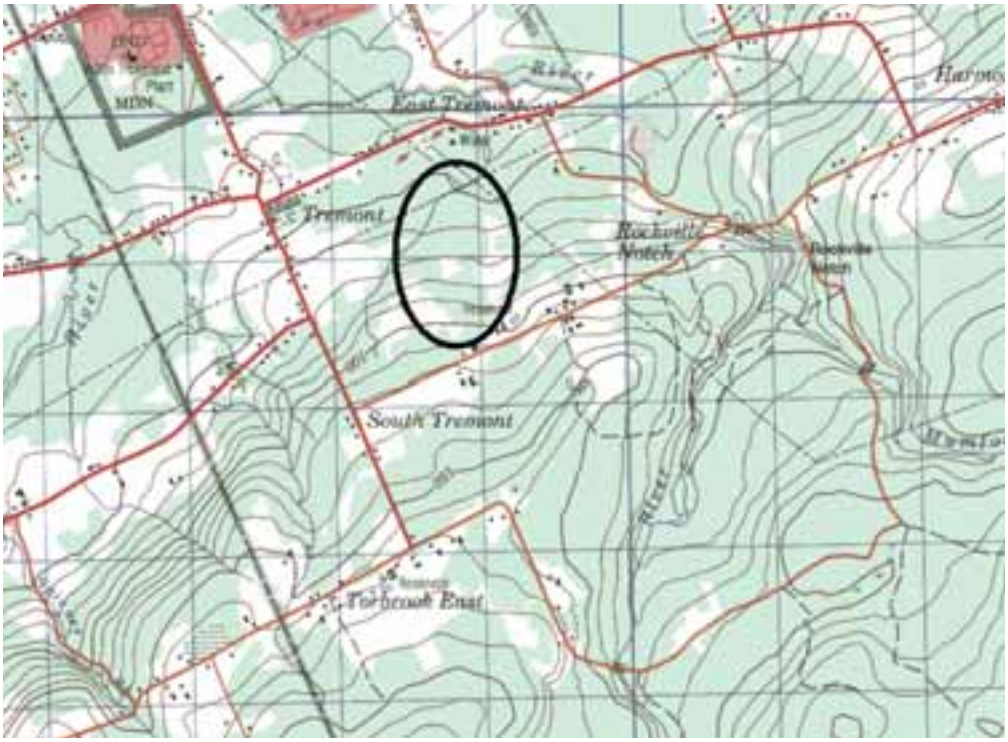

Figure 11- Topographical map of the Morse Farm location.

Figure 12- Aerial photograph of Morse Farm. The red line represents the location of the fence.

The following activities were completed at this site:

-425 meters of double stranded electric fence installed
-Approximately 51,663m^2 of riparian zone protected
-Gravity fed watering system installed
-Stewardship agreement signed (Refer to Appendix A)

Smith Farm

This property is located on highway #1 in Brickton. The riparian area fenced was along the Annapolis River, except the east side, which borders the McEwan brook (Refer to Figure 13). The area has been used as pastureland, and it is the landowners intention to board horses in the future. A 750 meter double stranded electric fence was installed on the property. Trees were planted in the fenced area to provide shade for fish populations (Refer to Figure 14).

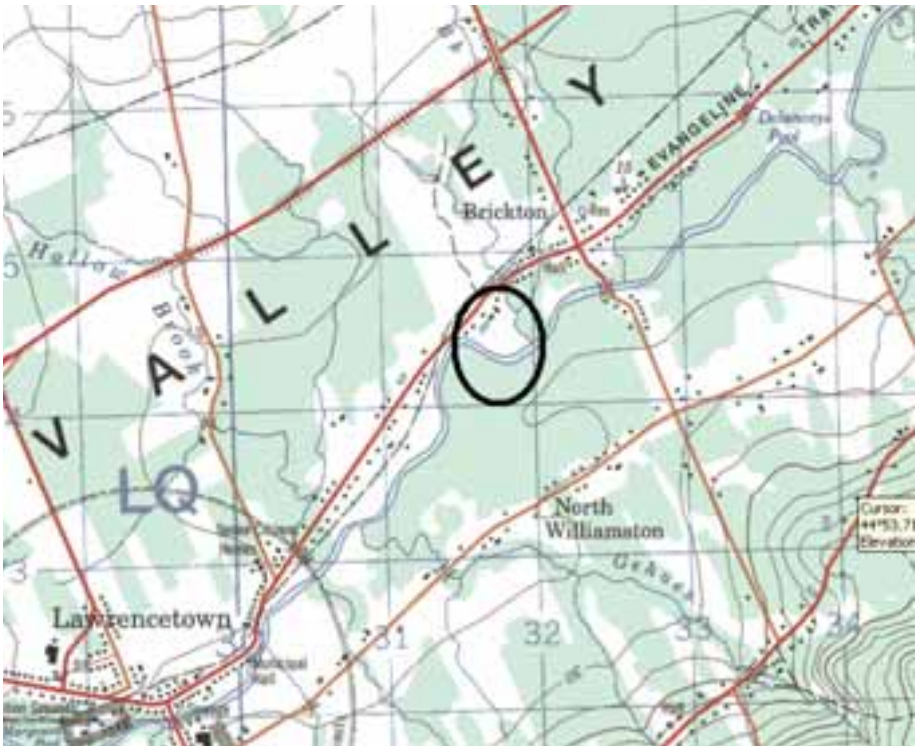

Figure 13- Topographical map of the Smith Farm location.

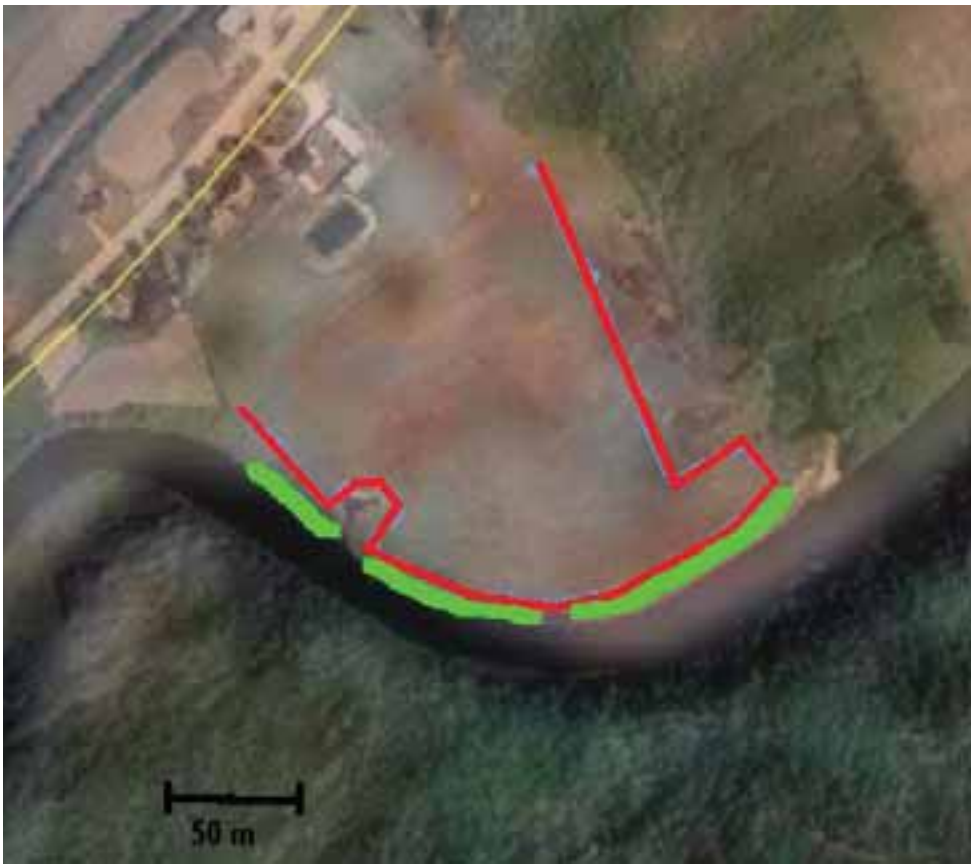

Figure 14- Aerial photograph of Smith Farm. The red line represents the location of the fence, the green line represents the location of the planted container-stock spruce trees.

The following activities were completed at this site:

-256 container stock spruce trees planted
-750 meters of double stranded electric fence installed
-7,500 m^2 of riparian zone protected
-Stewardship agreement signed (Refer to Appendix A)

Town of Middleton Site

The Town of Middleton site was an unrestricted cattle-grazing ground until an agreement was established in 2008. The site is located on the flood plain along the south bank of the Annapolis River in Middleton (Refer to Figure 15). While livestock were removed from the property in 2008, the many years of unrestricted access to waterways has caused severe stream bank erosion. Management actions were taken during the spring and summer of 2008 and 2009, including live willow staking and tree planting for bank stabilization (Refer to Figure 16).

Figure 15- Topographical map of the Town of Middleton property location.

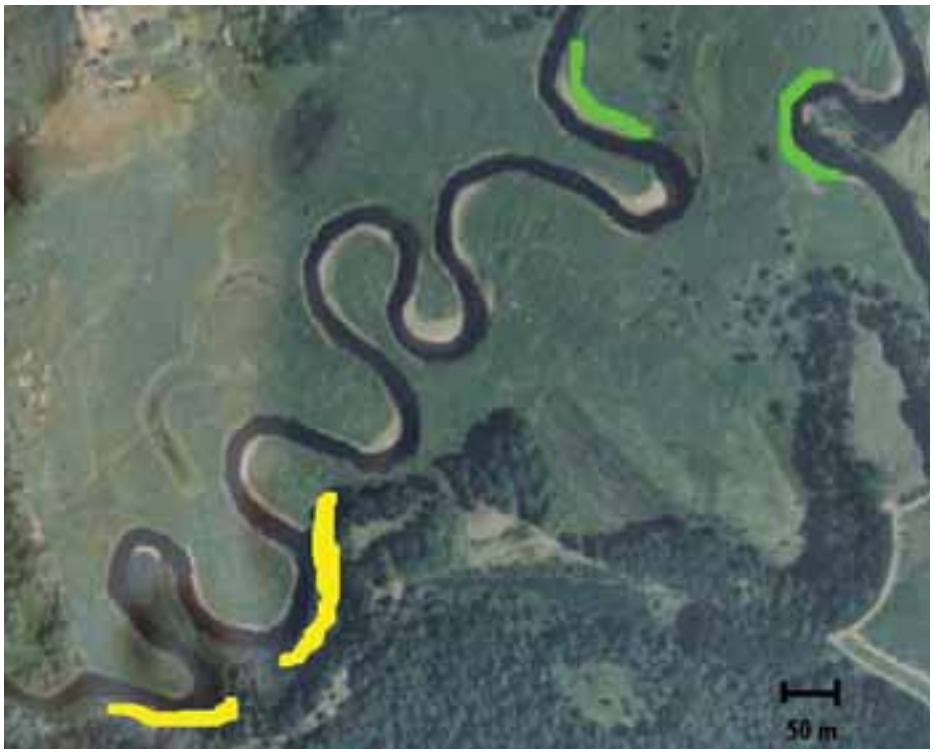

Figure 16- Aerial photograph of The Town of Middleton property. The yellow line represents the location of the container stock spruce trees, the green line represents the location of the live willow stakes.

The following activities were completed at this site:

-256 container stock spruce trees planted
-72 other native trees and shrubs planted
-8,750 m^2 of riparian zone protected in 2008
-7,329 m^2 of riparian zone protected in 2009
-Stewardship agreement signed (Refer to Appendix A)

Vidito Property

The Vidito property is located in Middleton, almost directly across the Annapolis River from the town of Middleton site. The property is used as a campground, but is lacking in riparian vegetation due to previous land uses (Refer to Figure 17). To provide an increase in riparian vegetation, CARP planted container stock spruce trees along the stream bank. A total of 128 trees were planted on at this site (Refer to Figure 18).

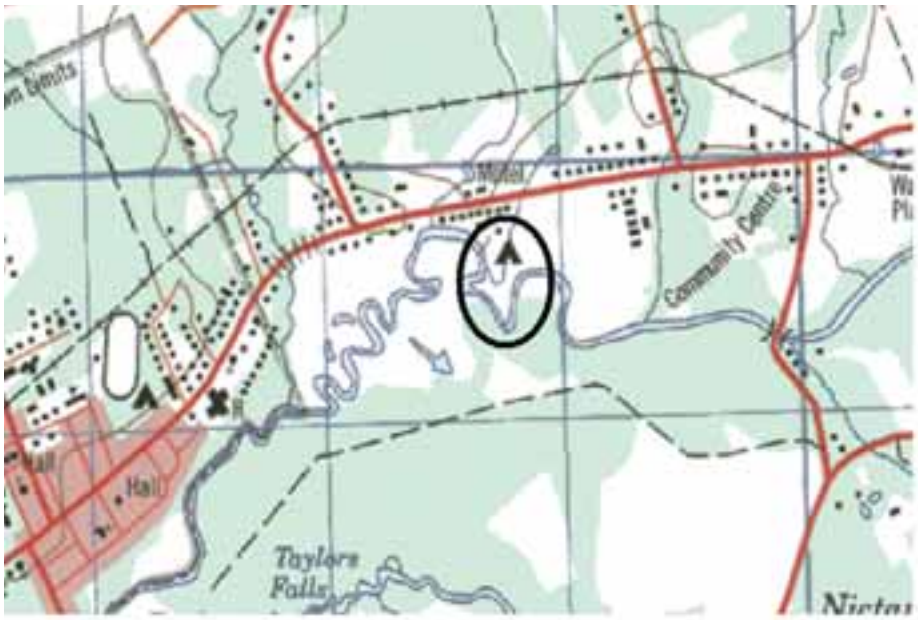

Figure 17- Topographical map of the Town of Middleton property location.

Figure 18- Aerial photograph of the Vidito property. The green line represents the location of the container stock spruce trees.

The following activities were completed at this site:

-128 container stock spruce trees planted
-1,200 m^2 of riparian zone protected
-Stewardship agreement signed (Refer to Appendix A)

Summary

The Riparian Habitat Restoration Project for the 2009-year was successful. Follow up of the work completed at the Middleton site showed that the willows and riparian vegetation within the newly protected area were thriving. **(DO YOU HAVE PHOTO??)** Although the riparian restoration work goals were met with success in 2009, there is great potential for future work throughout the Annapolis Watershed to improve water quality, enhance and protect biodiversity, and protect riverbanks from erosion. Stewardship agreements were successfully signed between the landowners and the Clean Annapolis River Project. Increased public awareness will likely follow from the actions and communications resulting from this project.

The following is a list of goals achieved by the Riparian Habitat Restoration Project in 2009:

- 6 participants involved in the Habitat Enhancement Project
- 2,585m of fencing installed along waterways
- 106,866 m^2 of riparian habitat protected
- One alternative watering system installed
- 840 native trees and shrubs planted
- 1,630 live willow stakes planted
- One public promotion day held
- 6 stewardship agreements signed

Appendix A- Stewardship Agreements

Clean Annapolis River Project

151 Victoria 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 ten 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: Danny Bruce
Name of Project Participant: Danny Bruce
Date: Sept 23/09

Stephen Hawboldt
Executive Director
Clean Annapolis River Project

corp@annapolisriver.ca

www.annapolisriver.ca

Clean Annapolis River Project

151 Victoria Street
P.O. Box 395 Annapolis Royal, NS
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Riparian Habitat Stewardship Agreement

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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: Clayton MacMurdy
Name of Project Participant: Clayton MacMurdy
Date: Sept 17/09

Stephen Hawboldt
Executive Director
Clean Annapolis River Project

Clean Annapolis River Project

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Riparian Habitat Stewardship Agreement

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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 ten 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: Janice Morse
Name of Project Participant: Janice Morse
Date: Sept. 17/09

Stephen Hawboldt
Executive Director
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Clean Annapolis River Project

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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 ten 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: Kim Smith
Name of Project Participant: Kim Smith
Date: Sept 17/09

Stephen Hawboldt
Executive Director
Clean Annapolis River Project

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07/30/2009 13:18 FAX 902 825 6369 TOWN MIDDLETON 001

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Toll Free: 1-888-547-4344
Phone: 902-532-7533
Fax: 902-532-3036

Riparian Habitat Stewardship Agreement

I hereby agree to support the riparian habitat enhancement and protection work undertaken on my properties: 05187836 and 05030531 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 ten 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:
Date: June/30/09

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Executive Director
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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.

- 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 ten 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: [signature]
Name of Project Participant: Edward Vidito
Date: Sept. 17/09

[signature]
Stephen Hawboldt
Executive Director
Clean Annapolis River Project

crp@annapolisriver.ca

www.annapolisriver.ca

Appendix B- Photos of Work and Progress

Bruce Property

1. Container-stock spruce tree planting inside fenced out riparian zone.

2. Fence.

Morse Property

3. Fence.

Town of Middleton Property

4. Steep bank after live willow staking in May 2009.

Vidito Property

15. Container stock spruce tree planted July 2009.

16. Container stock tree planting in July 2009.