# Annapolis Watershed Aquatic Habitat Restoration Project

## Final Project Report

Prepared for Clean Annapolis River Project

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September 2007

Clean Annapolis River Project

Environment Canada Environnement Canada

Ducks Unlimited Canada
CANADA'S CONSERVATION COMPANY

ISLAND NATURE TRUST

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# Acknowledgements

Clean Annapolis River Project would like to thank all individuals and organizations that contributed to the success of the Annapolis Watershed Aquatic Habitat Restoration Project. These include: participating landowners for their contributions of time, materials, equipment and labour, Environment Canada's EcoAction Community Funding Program for their contribution of funds, Nova Scotia Salmon Association's Adopt-A-Stream Community Funding Program for their contribution of funds, expertise and time, Ducks Unlimited for their contribution of expertise and the implementation of the constructed wetlands, Island Nature Trust for their contribution of outreach material to support the development of better riparian habitat stewardship practices, and JD Irving for their donation of willow seedlings.

# Executive Summary

The Annapolis Aquatic Habitat Restoration Project was created by 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. The project was divided into two separate phases, each to take place during separate field seasons (2006 and 2007). The first phase consisted primarily of the following: Partnering with local agricultural landowners in identifying sites and developing restoration plans, completion of work aimed at eliminating livestock access to waterways and riparian zones, identification and development of two sites demonstrating best management practices for riparian habitat in agricultural areas, hosting of informative demonstration days at these sites, and the creation of stewardship agreements between CARP and the project participants to ensure the longevity of project initiatives. The second phase of the project consisted of the revegetation of impacted riparian buffers using bioengineering techniques and planting native trees and shrubs in the areas fenced during the implementation of phase one, restricting livestock from waterways using fencing and alternate watering systems, and creating partnerships with additional landowners.

Phase one used several methods to achieve the goals set. Primary among these was the installation of fencing along watercourses located in livestock grazing areas. Depending on site requirements, one of three types was used. These were: five-strand barbed wire, two-strand electric fence, and single strand electric fence. Another method of limiting livestock access to waterways was the installation of alternative watering systems where cattle were drinking directly from a watercourse. This was done on its own or in conjunction with fencing of the waterway.

Phase two used a number of methods to meet the goals set including: planting live willow stakes, the construction of live sills in appropriate areas, planting bare-root trees, plug willows, and potted shrubs in riparian areas from which livestock had been restricted in phase one, as well as restricting livestock from additional waterways by fencing. Communication with farmers was a very important factor in creating relationships and awareness of the importance of riparian habitat stewardship practices.

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

- Eleven farms involved in project
- 5,295m of fence installed along waterways
- 34,475 $m^2$ of riparian habitat protected
- Five wetlands constructed
- Four alternative watering systems installed
- A total of 1,994 native trees and shrubs planted
- 484 live willow stakes planted
- 34 live sills constructed
- Two riparian habitat best management demonstration sites developed
- Three demonstration days held
- Nine stewardship agreements signed
- Five Stewardship agreements renewed

# Introduction

The following report summarizes phase one and two of the Annapolis Aquatic Habitat Restoration Project implemented by Clean Annapolis River Project in 2006 and 2007. It provides detail on the project's reasoning and development, its delivery, and the results achieved through its implementation.

# Background

The Clean Annapolis River Project (CARP), founded in March of 1990, is a charitable 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's activities cover a wide range of environmental assessment, education and action projects. Some of the projects that CARP has initiated include volunteer air and water quality monitoring, private stewardship and conservation planning, and fish habitat restoration. CARP has been a participant in the Atlantic Coastal Action Program (ACAP) since 1991, and has been honoured 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. Where waterways and agricultural land uses meet, there is potential for serious environmental degradation. 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 land and watercourses, farmers can greatly reduce the impacts of their operations on the aquatic environment, help 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 in improving riparian habitat stewardship practices for their operations. This involved fencing along waterways in livestock grazing areas, installation of alternative watering sources for livestock, and revegetation of riparian buffer zones through planting and willow staking. Participating farmers committed themselves to sustaining the objectives of the project over a long term through their signature of riparian habitat stewardship agreements.

Funding for this project came from three sources. These included: Environment Canada's EcoAction Community Funding Program, Nova Scotia Salmon Association's Adopt-A-Stream community funding initiative, and Island Nature Trust. The capability to achieve the project's goals with the funding provided was enhanced through the in-kind contributions of labour, materials and equipment use by the various project participants, as well as the in-kind contributions from Ducks Unlimited Canada to construct wetlands.

# Project Goals and Methodology

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

## Fencing

### 2006/2007

Fencing was installed to eliminate livestock access to waterways at project sites. The type of fencing varied to meet the requirements of each site and consisted of five-strand barbed-wire fence, two-strand electric fence, or single strand electric fence. Steel t-posts spaced at approximately 5-7 meters between large untreated support posts were used to support barbed wire fencing. Electric fences were supported using untreated eucalyptus fence posts spaced at approximately 15 meters with steel step-in posts between them, or untreated balsam fir posts spaced at approximately 10 meters. The choice in materials was based on longevity of the fence, as well as the need to select materials that would not leach harmful substances into the waterways. These fences were installed at an average distance of five 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.

## Alternative Watering Systems

### 2006

Two alternative sources of livestock drinking water were installed during this year. Each of these were installed in order to eliminate the need for livestock to access a watercourse in order to drink, though each site required its own solution to meet this goal. At one moderately remote site, a cattle operated nose-pump watering system drawing water from the watercourse at the site was used. At the other site, gravity fed spring water was available, and PVC water line was used to pipe fresh water to a float valve controlled watering tank.

### 2007

One alternate livestock watering system was installed during the second phase of this project, allowing for the elimination of cattle access to a watercourse at one of the project sites. The system consists of a reservoir that is gravity fed from the stream through a pipeline. The overflow runs through a pipe back into the stream.

## Riparian Zone Revegetation

### 2007

A major goal of the Annapolis Aquatic Habitat Restoration Project was to establish native trees and shrubs within degraded riparian 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. The nursery stock trees and shrubs were in the form of bare-root, plug, and potted stock. The nursery stock

willows and native trees and shrubs were divided between the Longley farm, Roosje farm, Beviss farm, and Mosher farm. There were 910 nursery stock plug willow seedlings, 35 native shrubs, 120 native trees, and 720 willow stakes planted in total. A variety of species were planted including willow (*Salix spp.*), white birch (*Betula papyrifera*), red maple (*Acer rubrum*), spruce (*Picea spp.*), Eastern white pine (*Pinus strobus*), balsam fir (*Abies balsamea*), red-osier dogwood (*Cornus sericea*), wild raisin (*Viburnum cassinoides*), hobblebush (*Viburnum lantanoides*), highbush cranberry (*Viburnum trilobum*), beaked hazelnut (*Corylus cornuta*), arrowwood (*Viburnum dentatum*), and common elder (*Sambucus nigra*). The nursery stock trees and shrubs in the potted and bare-root forms and the willow stakes had an excellent first-year success rate of approximately 85 percent. The nursery stock native trees in the plug form had approximately an 80 percent success rate. The nursery stock willow seedlings had an apparent success rate of approximately 40 percent, although some may rebound in the coming spring.

## Constructed Wetlands

### 2006

This project involved partnering with Ducks Unlimited on the construction of two wetlands. Ducks Unlimited delivered the design and implemented this initiative, with financial contributions from CARP. The construction of wetlands took place at two different sites identified by Ducks Unlimited Canada during the fall and winter of 2006. These sites are protected through signed stewardship agreements between Ducks Unlimited Canada and the owner of the land. The first site was located in Bear River East on the Peck property, and the second site was located in Morden on the Iannaccone property. A total of 3.84 hectares of wetlands were constructed.

### 2007

A total of three wetlands were restored at two different sites during this year. The first site was located just outside Berwick on the Vanoostrum property, a large beef farm. Two wetlands, approximately 0.24 hectares in size each, were restored on this property. The second site is located just outside Berwick on the Lamb property, a large dairy farm. One wetland, approximately 0.61 hectares in size, was restored at this site. There were approximately 4,050 square metres of riparian habitat protected at this site as well. A total of 1.09 hectares of wetland were restored during phase two of this project.

## 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 among the agricultural community and the general public, demonstration days and various presentations were held to exhibit the different fencing, alternate livestock watering systems, and bioengineering techniques used over the course of the project.

### 2006

CARP partnered with Island Nature Trust in the creation of two demonstration sites that exemplify appropriate riparian habitat stewardship practices. Island Nature Trust developed, as part of their initiative, a riparian habitat management manual for agricultural landowners in each of the Atlantic Provinces, as well as a companion brochure. These were sent to several organizations, including CARP, for distribution to the agricultural community. In addition, educational materials were displayed at two public events related to agriculture. These were the Annapolis Valley Exhibition in Lawrencetown, and a farm equipment and livestock auction held at the Lawrencetown Exhibition Grounds on October 28, 2006. In order to demonstrate riparian habitat stewardship practices to a targeted agricultural audience, an on site

demonstration session was held at the Roosje farm to highlight the work that had taken place there. This was held the morning of the farm equipment and livestock auction in nearby Lawrencetown in order to take advantage of the fact that agricultural operators would be concentrating in the area.

## 2007

A demonstration day was held at the Lilly farm in Lawrencetown during the Annapolis Valley exhibition. There was a display that outlined why livestock should be restricted from waterways, and showed the bioengineering techniques used to enhance riparian zones. The Lilly farm was chosen due to it being a well-established site, fenced and planted in 2003, that demonstrates the potential these techniques have to rehabilitate degraded riparian habitat. This site exemplified the benefits of fencing livestock out of the riparian zone. CARP attended the Upper Cornwallis Headwaters Watershed Open House and Town Hall Meeting sponsored by the Nova Scotia Federation of Agriculture that featured various presentations on riparian habitat restoration to local farmers. The event was an excellent chance to network with other organizations undertaking similar projects, and to promote the Annapolis Aquatic Habitat Restoration Project. CARP also attended the Atlantic Society of Fish and Wildlife Biologist Conference held at Acadia University to present a poster illustrating the success of the project, and highlighting live willow staking, live sills, and natural recovery of vegetative buffers achieved from restricting livestock access to waterways.

# Site Descriptions and Project Details

## Beviss

### 2006

This farm is located in Bridgetown. It is a relatively large beef operation. Fash Brook runs through a large section of pasture at this site. The owner had previously fenced a portion of this stream out. In a short period of time after the fence was installed, the riparian habitat and stream quickly recuperated from the extensive damage caused by the numerous cattle kept at that location. These encouraging results led to the owners desire to completely eliminate livestock access to the stream on his property. As a result, it was decided that an appropriate action at this site would be to eliminate livestock access to both banks of a 275 metre stretch of Fash Brook using single strand electric fencing. The implementation of this initiative eliminated a source of extensive habitat damage, and has allowed for the rehabilitation of a very promising area of riparian and aquatic habitat.

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

- Installation of 550m of electric fence along a watercourse
- 2,750m$^2$ of riparian habitat protected
- Stewardship agreement signed

### 2007

Due to the excellent results from the fence installation in 2006, the landowner decided to totally eliminate his cattle from the stream in 2007, extending the fence another 250 metres on both sides. It was decided to construct live sills along this stream to stabilize the eroded banks on the portion of the stream that had been fenced in 2006. Live stakes, shrubs and trees were planted in this area as well in order to provide shade to the stream, and to enhance bank stability. The shrubs selected were chosen based on value to wildlife and suitability to the site. Species included common elderberry, red-osier dogwood, highbush cranberry, and hobblebush. Many wildlife signs and sightings were observed while working at this location. Ducks, ruffed grouse, pheasant, great blue heron, and groundhogs were seen foraging in the riparian habitat created by the work completed in 2006. Bear, deer, raccoon, and otter tracks were noted along the stream in the same area.

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

- Installation of 500m of electric fence along a watercourse
- 2,000m$^2$ of riparian habitat protected
- 88 native trees and shrubs planted
- 484 live stakes planted
- 26 live sills constructed
- Stewardship agreement renewed

## Bridgetown Sewage Lagoons

### 2006

The sewage lagoons servicing the town of Bridgetown are in a fenced compound located along the north bank of the Annapolis River on the southern edge of the town. This fenced area is flanked on both the upstream and downstream sides by cattle grazing areas. Cattle were able to access the area between the fence and the river between the pastures. Because of this, the town of Bridgetown was concerned about accelerated erosion and riparian habitat damage caused by cattle access. CARP was approached, and a solution was devised. In order to remedy the situation, five-strand barbed wire fence was extended from both the upstream and downstream corners of the fence surrounding the lagoons. This effectively prevented livestock from accessing the area between.

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

- 50m barbed wire fence installed
- 2,500$m^2$ riparian habitat protected
- Stewardship agreement signed

## Brown

### 2006

This farm is located in Upper Clements. It is a relatively large beef operation. This site was chosen as a demonstration site due to the riparian habitat stewardship practices already in place. All watercourses running through pastureland on this farm are fenced to keep cattle out, and there are alternate sources of drinking water provided for the cattle. In order to bring attention to the practices at this farm, a new farm sign was designed to highlight the riparian habitat initiatives taken there. The signing of a riparian habitat stewardship agreement was not deemed an appropriate action for this particular site. The protection of riparian habitat was implemented, and is being maintained by the landowner as a private initiative.

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

- Creation of a riparian habitat best management practices demonstration site
- Creation of a farm sign to draw attention to riparian habitat stewardship practices

## Bruce

### 2006

This farm is located in Centerlea. It is a medium sized organic beef and sheep operation. There is a large section of pasture used for cattle on the farm through which Messenger Brook runs. They were accessing the brook as their source of drinking water, and had unrestricted access to the brook from both sides. The owner of this site had been approached about the possibility of fencing the cattle out of the stream, and was somewhat receptive to the idea. The primary

## Bruce Continued

concern about eliminating livestock access to Burbidge Brook was the issue of a drinking water source. Many options were discussed, and it was decided that a nose pump watering system could potentially provide the needed solution. The installation of the nose pump took place in the fall, providing the possibility of fencing the cattle out of the waterway in the near future.

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

- Alternative livestock watering system installed
- 75m electric fence installed around pond
- 450m$^2$ riparian habitat protected

### 2007

After having the alternative watering system on trial, it was decided that it was not going to be appropriate for the site, and the watering system was removed. Based on this experience, the landowner is exploring other options for a watering system in order to restrict his livestock from the waterway.

## Cook

### 2006

This farm is located in Clarence. It is a large dairy operation. Two pasture sites on this farm had sections of watercourse to which the cattle had access. In one of these pastures, access to a pond connected to the watercourse was necessary as a source of drinking water. There was some concern of damage to the banks and contamination of the watercourse. In order to address the issues outlined above, two-strand electric fencing was installed at a distance of five meters from the watercourses located in each pasture. Where the pond that acted as a water source for livestock was fenced out in one of the pastures, an alternative water source was required. There was a source of water in the form of a spring-fed well located at a higher elevation on the property. 185 meters of pipe was connected to this water source to supply a float valve controlled watering trough supplied by the landowner.

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

- Installation of 375m of electric fence along watercourses
- 1,875m$^2$ of riparian habitat protected
- Alternative livestock watering system installed
- Stewardship agreement signed

### 2007

Pasture expansion took place into an area bordered by two streams connecting to Shearer Brook; therefore double-stranded electric fencing was installed at an average distance of five meters from the watercourses, completely restricting livestock from waterways at this site.

## Cook Continued

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

- Installation of 540m of electric fence along watercourses
- Stewardship agreement renewed

## Horsnell

### 2007

This large beef farm is located in Dempsey's Corner at the base of the North Mountain. There are 3 streams running through pastureland from the North Mountain that connect to Patterson Brook, one of which is already fenced off. The two remaining streams require fencing and alternative watering systems. Graves Brook runs through another pasture on Hwy 221. Graves Brook requires fencing, and an alternative watering system. The landowner also keeps livestock in a pasture in Auburn on the Palmer Rd., north of the Annapolis River. This pasture requires fencing and an alternative watering system. There is one existing watering system installed in a pasture on the main property at this farm that consists of reservoir that is filled by gravity flow. As this system has worked very well for the landowner, it was decided that another such watering system would be installed in conjunction with single-strand electric fencing along a section of stream in the far west of the property.

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

- 550 m single-stranded electric fence installed
- Alternative livestock watering system installed
- 2600 $m^2$ riparian habitat protected

## Longley

### 2006

This farm is located in Bridgetown. It is a small mixed product farm. There is a watercourse running along the edge of a large pasture at this site. Approximately 650 metres of this watercourse had been fenced through a previous project, leaving approximately 475 metres open to livestock access. This was fenced this year using five-strand barbed wire fencing, completely eliminating livestock access to the watercourse at this site.

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

- 470m of barbed wire fence installed along a watercourse
- 2,350$m^2$ of riparian habitat protected
- Stewardship agreement signed

## Longley Continued

### 2007

There were a number of trees along the stream, but many long stretches were still exposed to full sunlight. It was decided the stream needed more shade and cover, so trees and shrubs were planted along the banks. These should also enhance bank stability as they grow. Shrub species were chosen based on value to wildlife and suitability to the site. Species included common elderberry, red-osier dogwood, beaked hazelnut, hobblebush, highbush cranberry, and wild raisin. There were many wildlife signs and sightings at this site including sightings of white-tailed deer, great blue heron, and ducks, as well as raccoon and otter tracks along the stream. It appeared as though a muskrat or similar species browsed the leaves from many of the plug willows planted at this site. It is possible the willows may survive, and put on new growth in the spring.

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

- 230 willow seedlings planted
- 80 native trees and shrubs planted
- Stewardship agreement renewed

## MacMurtry

### 2007

This farm is located in Brooklyn. It is a medium sized beef farm. The pasture at this site is quite large, and is bisected by Burbidge Brook along most of its length. Fencing was installed along a portion of the stream to eliminate livestock access. Live sills were constructed to enhance bank stability, and brush bundles were installed to increase shade and bank stability.

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

- 20m of fencing installed
- 6 live sills constructed
- 2 brush bundles installed
- Stewardship agreement renewed

## Mosher

### 2007

This farm is located at the base of the North Mountain in Clarence. It is a small hobby farm with one workhorse and three cows. The landowner contacted CARP for advice on fencing his livestock from a stream running through his property. The stream runs from a spring on the North Mountain and eventually connects to the Leonard Brook. The landowner donated double-stranded electric fence and 33 native trees. The landowner, with help from CARP staff and a volunteer, carried out the installation of the fence. CARP staff conducted the planting of trees.

## Mosher Continued

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

- 1000 m double-stranded electric fence installed
- 5000 $m^2$ of riparian habitat protected
- 290 willow seedlings planted
- 33 native trees planted
- Stewardship agreement signed

## Neily

### 2007

This small beef farm is located in West Inglisville, at the top of the South Mountain. Mud Lake Brook flows through the property down into the Lawrencetown water supply. This property borders a proposed water supply protected area for the community of Lawrencetown. The area surrounding the brook is very marshy, and it was decided most of the marshy area should be fenced out along with the brook. A double-stranded electric fence was installed. An existing pond, separate from the waterway, provides the cattle with drinking water.

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

- 350m double-stranded electric fence installed
- 3500 $m^2$ riparian habitat protected
- Stewardship agreement signed

## Phinney

### 2006

This is a medium sized dairy farm located in Clarence. There is a section of pasture on this farm through which the Leonard Brook runs. The cattle pastured at this site were accessing the brook for drinking water, and had full access to Leonard Brook from both banks. The owner of this property was approached about the possibility of eliminating livestock access to the waterway at this site, and expressed an interest in proceeding with the idea. Due to circumstances on the farm, fencing along the waterways this year did not prove to be possible. It was decided to install a nose pump watering system as an alternate source of drinking water, and complete the fencing when the opportunity arose. The installation of the nose pump took place in the fall, providing the possibility of fencing the cattle out of the waterway in the near future.

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

- Alternative livestock watering system installed
- Stewardship agreement signed

## Roosje

### 2006

This farm is located in at the base of the North Mountain, on the north side of the Clarence Road in Clarence. It is a small beef operation. There is pasture both behind the farmhouse at the base of the mountain, and on the south side of the Clarence Road. Burbidge Brook has headwaters in the north pasture, and makes its course across Clarence Road and through the south pasture. Livestock had access to the brook through the majority of both pastures with the exception of a small section of brook and headwater (spring fed wetland) at this site. The owner of this farm approached CARP with concerns of damage being caused to the watercourse by cattle pastured in both of the sections described above. Having recently acquired the land comprising the south, he was in a position to implement measures to prevent further damage to the watercourse. Due to the presence of remote watering systems in both pastures, livestock had no need to access the brook for drinking water. In order to address the issue of livestock access to the brook, two-strand electric fencing was extended from the existing fence. In the north pasture, the remainder of the spring fed wetland feeding Burbidge Brook was fenced out along with the remainder of the brook itself. In the south pasture where one side of the watercourse was already fenced out, fencing was extended along the opposite side of the brook to achieve complete protection of the watercourse and riparian zone. Because of the variety of riparian habitat management practices being implemented on this farm, it was chosen as the second demonstration site for Island Nature Trusts initiative. A demonstration day was held to highlight riparian habitat protection and improvement achieved through the use of alternative livestock watering systems and fencing along watercourses in the south pasture.

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

- 920m of electric fencing installed along a watercourse
- 4,600m$^2$ of riparian habitat protected
- Creation of a riparian habitat best management practices demonstration site
- Stewardship agreement signed

### 2007

Since the fencing in 2006, the vegetation in the riparian zone had grown well, but was still in need of improvement. The landowner did not want any large trees blocking the view of his back pastures because he needs to be able to see his livestock from the pasture beside the road. It was decided to plant plug willow seedlings and shrubs in order to enhance the vegetation in the riparian buffer zone without blocking the view. Additional shrub species were planted to increase the wildlife usage in the riparian zone including species such as red-osier dogwood, highbush cranberry, arrowwood, beaked hazelnut, and common elderberry.

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

- 320 willow seedlings planted
- 14 native trees and shrubs planted
- Stewardship agreement renewed

# Summary

The Annapolis Watershed Aquatic Habitat Restoration project was implemented successfully. The multiple goals of improving aquatic habitat, reducing contamination of streams, creating naturalized riparian buffer zones between agricultural land and the aquatic environment, and developing riparian and aquatic habitat stewardship practices in the Annapolis River watershed were met through the meshing of separate projects into a comprehensive initiative. Through the contributions of project partners, funding sources and project participants, it was possible to increase the area and quality of protected riparian and aquatic habitat in the Annapolis River watershed, and to further build the capacity of the local agricultural community to adopt best management practices for these habitat types within the agricultural landscape.

As a result of the implementation of phase one of the Annapolis Aquatic Habitat Restoration Project, the following results were achieved:

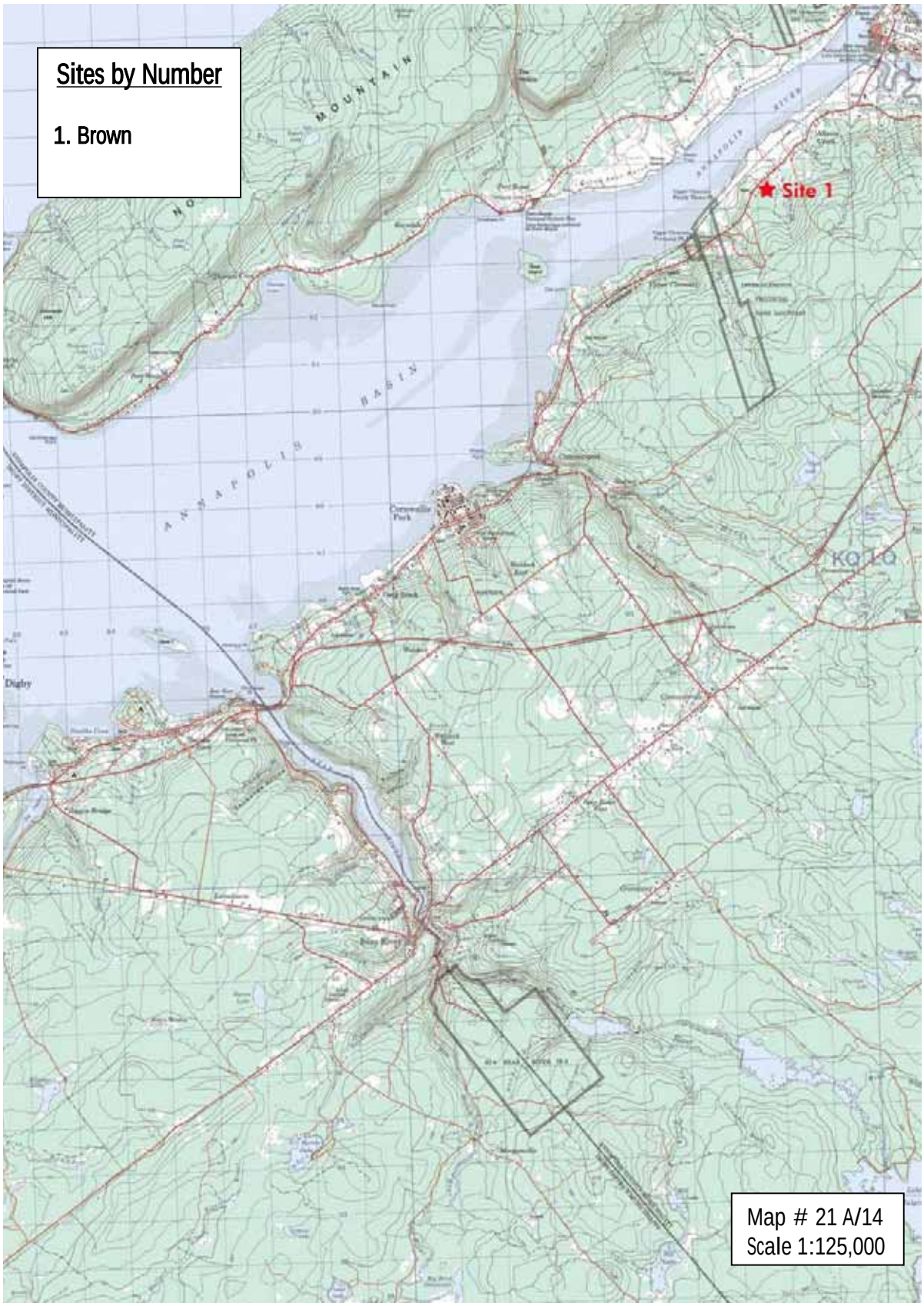
## 2006

- Eight farms involved in project
- 2,365m of fence installed along waterways
- 14,525m$^2$ of riparian habitat protected
- Two wetlands constructed
- Three alternative watering systems installed
- Two riparian habitat best management demonstration sites developed
- Two demonstration days held
- Seven stewardship agreements signed

## 2007

- Three additional farms involved in project
- 2,930m of fence installed along waterways
- 19,950m$^2$ of riparian habitat protected
- One alternative watering system installed
- Three wetlands restored
- A total of 1,994 native trees and shrubs planted
- 484 live willow stakes planted
- 32 live sills constructed
- One demonstration day held
- Two stewardship agreements signed
- Five stewardship agreement renewals signed

Appendix A- Site Location Maps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Site 1
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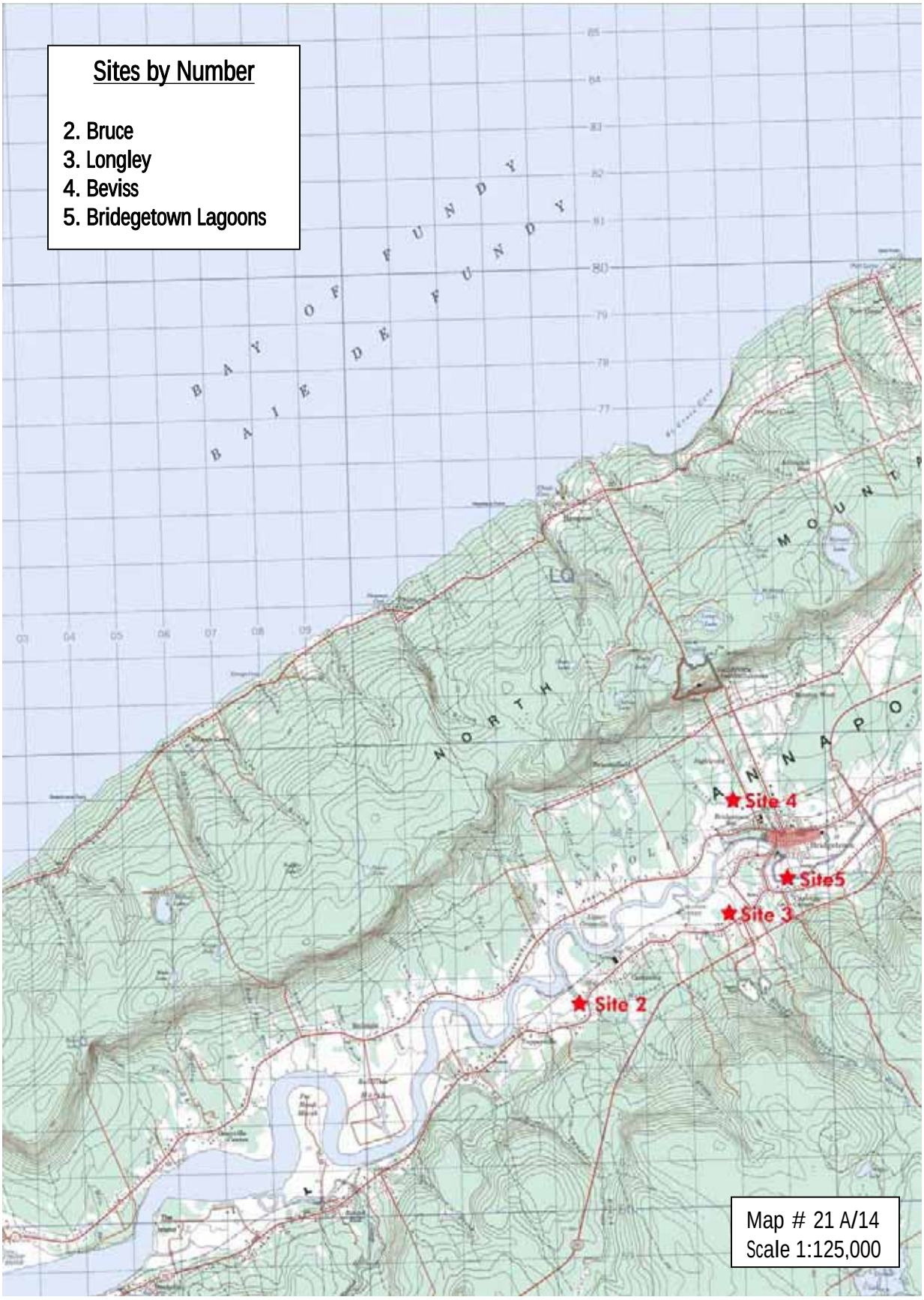
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2. Bruce
3. Longley
4. Beviss
5. Bridegetown Lagoons
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BAIE DE FUNDY
NORTH
MOUNT
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Site5
Site 3
Site 2
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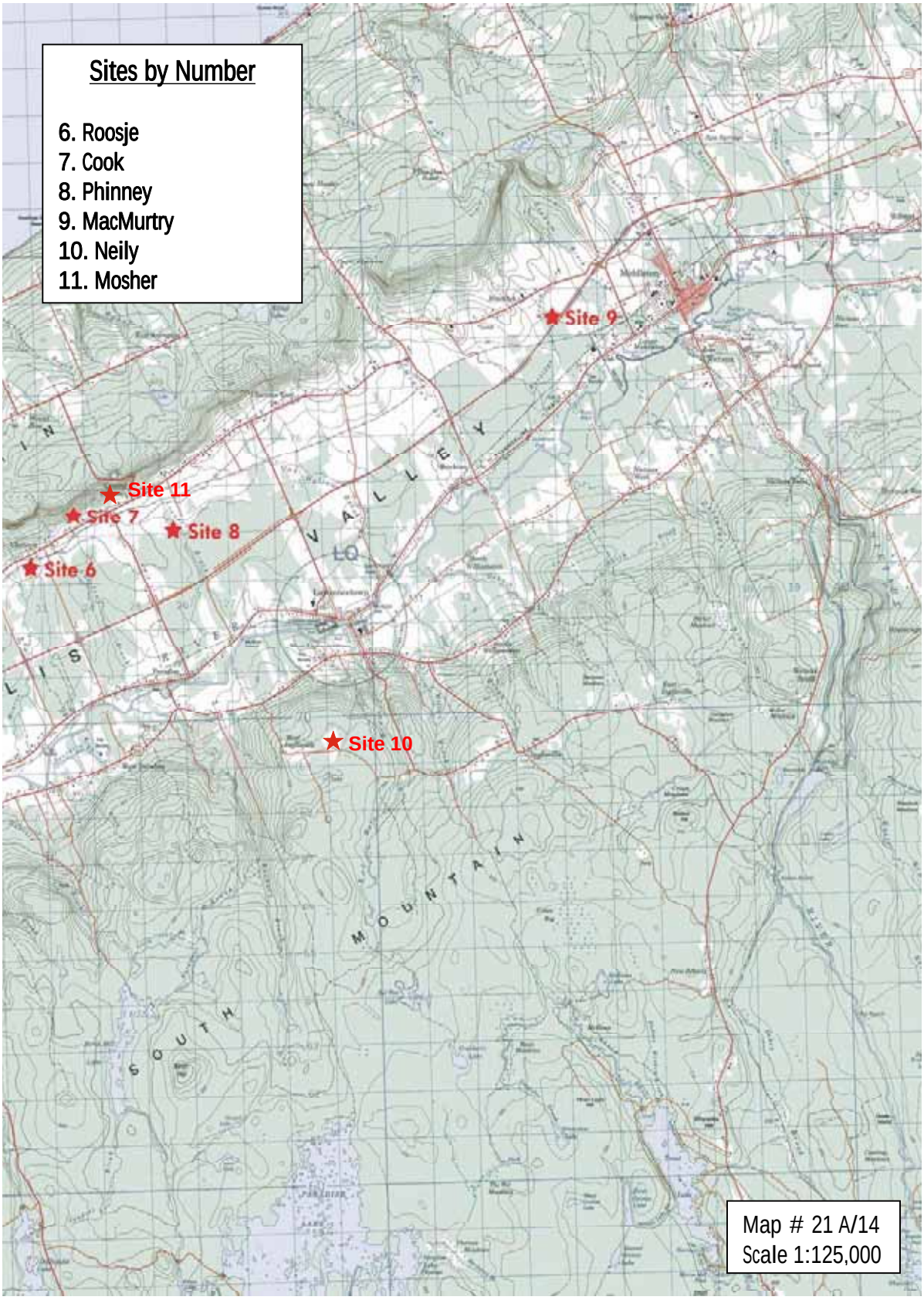
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7. Cook
8. Phinney
9. MacMurtry
10. Neily
11. Mosher
Site 9
Site 11
Site 7
Site 8
Site 6
Site 10
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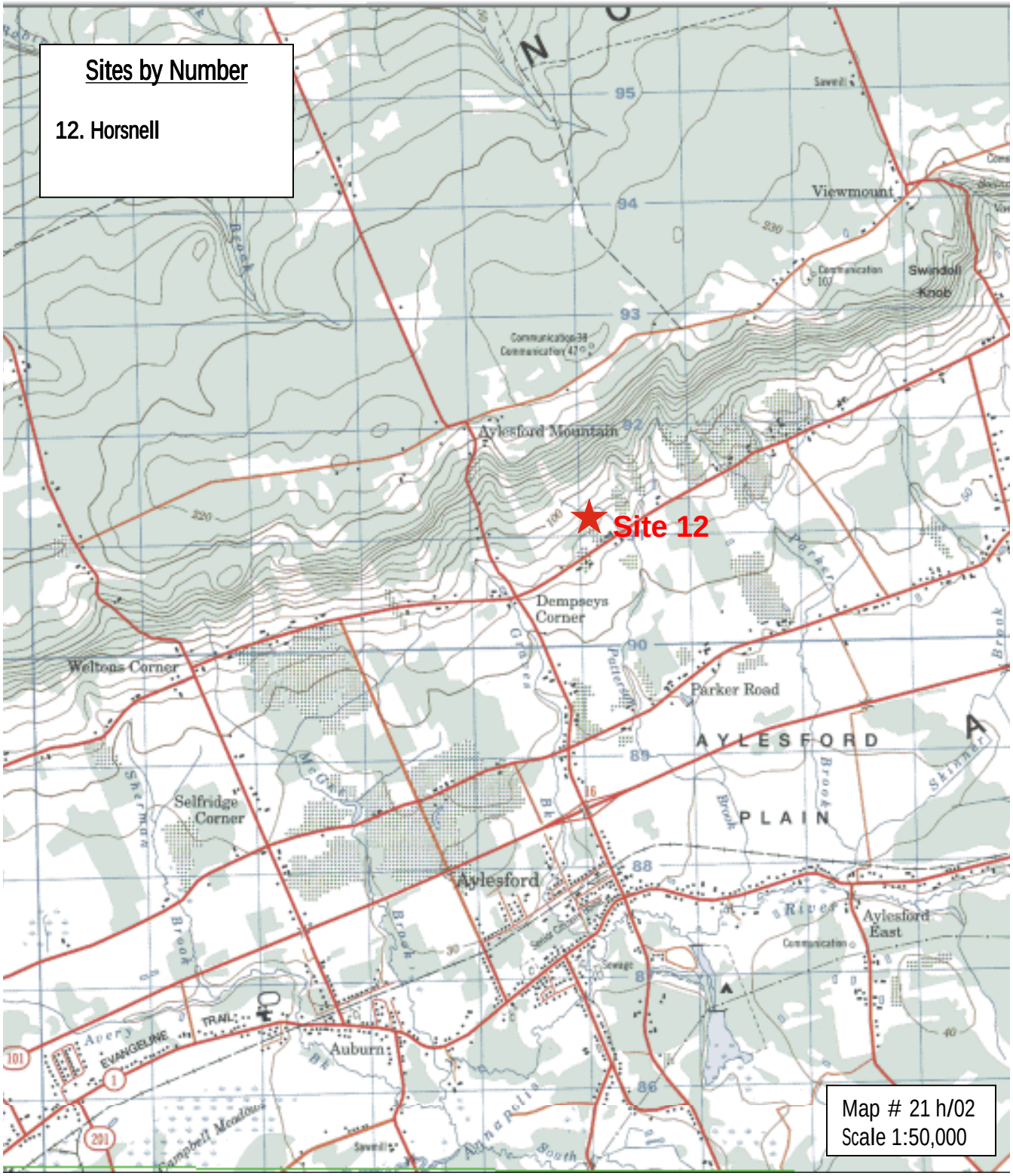
Sites by Number
12. Horsnell
Site 12
Viewmount
Swindoll Knob
Aylesford Mountain
Dempseys Corner
Weltons Corner
Parker Road
AYLESFORD PLAIN
Selfridge Corner
Aylesford
Aylesford East
Auburn
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Scale 1:50,000

Appenix B- Stewardship Agreements

Beviss Stewardship Agreement 2006

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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.
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Signature of Project Participant: Hardy Beviss
Name of Project Participant: Hardy Beviss
Date: Oct-30 2006

Stephen Hawboldt
Executive Director
Clean Annapolis River Project

Bridgetown Stewardship Agreement 2006

**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

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Signature of Project Participant:
Name of Project Participant: John Lohnes CAO Town of Bridgetown
Date: October 14, 2006

Stephen Hawboldt
Executive Director
Clean Annapolis River Project

Cook Stewardship Agreement 2006

**Clean Annapolis River Project**

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Signature of Project Participant: Alan Cook

Name of Project Participant: Alan Cook

Date: Oct 5/06

Stephen Hawboldt
Executive Director
Clean Annapolis River Project

carp@annapolisriver.ca

www.annapolisriver.ca

Longley Stewardship Agreement 2006

**Clean Annapolis River Project**

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Signature of Project Participant: Raymond Longley
Name of Project Participant: RAYMOND W LONGLEY
Date: Oct 13 06

Stephen Hawboldt
Executive Director
Clean Annapolis River Project

carp@annapolisriver.ca

www.annapolisriver.ca

MacMurtry Stewardship Agreement 2006

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Signature of Project Participant: Clayton MacMurtry
Name of Project Participant: Clayton MacMurtry
Date: Oct. 24, 2006

Stephen Hawboldt
Executive Director
Clean Annapolis River Project

corp@annapolisriver.ca

www.annapolisriver.ca

Phinney Stewardship Agreement 2006

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Signature of Project Participant: Danny Phinney

Name of Project Participant: Danny Phinney per Phinneyville Farms

Date: Oct 23/06

Stephen Hawboldt
Executive Director
Clean Annapolis River Project

Roosje Stewardship Agreement 2006

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Signature of Project Participant: Peter Roosje Sr.
Name of Project Participant: Peter Roosje Sr.
Date: 12 oct. 06

Stephen Hawboldt
Executive Director
Clean Annapolis River Project

carp@annapolisriver.ca

www.annapolisriver.ca

Beviss Stewardship Agreement 2007

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Signature of Project Participant: Hardy Beviss
Name of Project Participant: Hardy Beviss
Date: Sept. 26/07

Stephen Hawboldt
Executive Director
Clean Annapolis River Project

carp@annapolisriver.ca

Cook Stewardship Agreement 2007

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Signature of Project Participant: Alan Cook

Name of Project Participant: Alan Cook

Date: Sept 26/07

Stephen Hawboldt
Executive Director
Clean Annapolis River Project

carp@annapolisriver.ca

Longley Stewardship Agreement 2007

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Signature of Project Participant: Raymond Longley
Name of Project Participant: Raymond Longley
Date: Sept.26/07

Stephen Hawboldt
Executive Director
Clean Annapolis River Project

carp@annapolisriver.ca

MacMurtry Stewardship Agreement 2007

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Signature of Project Participant: Clayton MacMurtry

Name of Project Participant: Clayton MacMurtry

Date: Oct. 24/07

Stephen Hawboldt
Executive Director
Clean Annapolis River Project

carp@annapolisriver.ca

Mosher Stewardship Agreement 2007

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Signature of Project Participant: R T Mosher

Name of Project Participant: Rick Mosher

Date: 20/09/07

Stephen Hawboldt
Executive Director
Clean Annapolis River Project

carp@annapolisriver.ca

Neily Stewardship Agreement 2007

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- If and when funding is available for a crossing, CARP agrees to make this site a priority for the installation of a crossing.

Signature of Project Participant: R. Neily
Name of Project Participant: Randall J Neily
Date: Oct 24/07

Stephen Hawboldt
Executive Director
Clean Annapolis River Project

carp@annapolisriver.ca

Roosje Stewardship Agreement 2007

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Signature of Project Participant: Peter Roosje

Name of Project Participant: Peter Roosje

Date: 20 sept '07

Stephen Hawboldt
Executive Director
Clean Annapolis River Project

carp@annapolisriver.ca

Appenix C- Project Publicity

Press Release: Annapolis County Spectator: October 9, 2006

# Farmer protecting streamside habitat

Peter Roosje will be hosting a demonstration of the measures he has implemented to protect aquatic and streamside (riparian) habitat on his farm, located at 2131 Clarence Road, Central Clarence.

The demonstration will be held on October 28, from 10 a.m. to 12 noon.

This demonstration will highlight initiatives undertaken by Roosje on his own, and in partnership with Clean Annapolis River Project to protect and enhance aquatic and riparian habitat in his pastureland. These include the use of alternative sources of drinking water, fencing along waterways, and the use of appropriate livestock and equipment crossings.

Levi Cliche, environmental technologist for CARP, will be on site to answer questions and provide information on aquatic and riparian habitat stewardship.

This demonstration is being held as part of CARP's Annapolis Watershed Aquatic Habitat Restoration Project. This project was made possible through funding provided by the following sources: Environment Canada's EcoAction Community Funding Initiative, Nova Scotia Salmon Association's Adopt-A-Stream Community Funding Program, Island Nature Trust, and Sage Environmental Program.

The Clean Annapolis River Project, founded in March of 1990, is a charitable organization whose goal is to work with communities and organizations to foster the conservation, restoration and sustainable use of freshwater and marine ecosystems in the Annapolis watershed.

For more information, please contact: Cliche at 902-532-7533 or toll free at 1-888-547-4344. Email: carp@annapolisriver.ca

Press Release: Annapolis County Spectator: June 7, 2007

# CARP may have fencing funding for farmers

The Clean Annapolis River Project (CARP) may have funding for farmers to construct fences along waterways in the Annapolis River watershed.

This summer CARP is continuing the Habitat Restoration in Riparian Zones project with funding from public and private sector partners.

This project is intended to help farmers with the costs of fencing livestock out of waterways in grazing lands, and to enhance the functions of riparian buffer zones through the planting of trees and shrubs.

Funding for the purchase of fencing materials will be available to a limited number of farms within the Annapolis River watershed. Planting of trees and shrubs along the waterway will be may take place as well.

Individuals interested in participating in the Habitat Restoration in Riparian Zones project are invited to contact CARP by phone at, (902) 532-7533, toll free: 1-888-547-4344, or by email at carp@annapolisriver.ca.

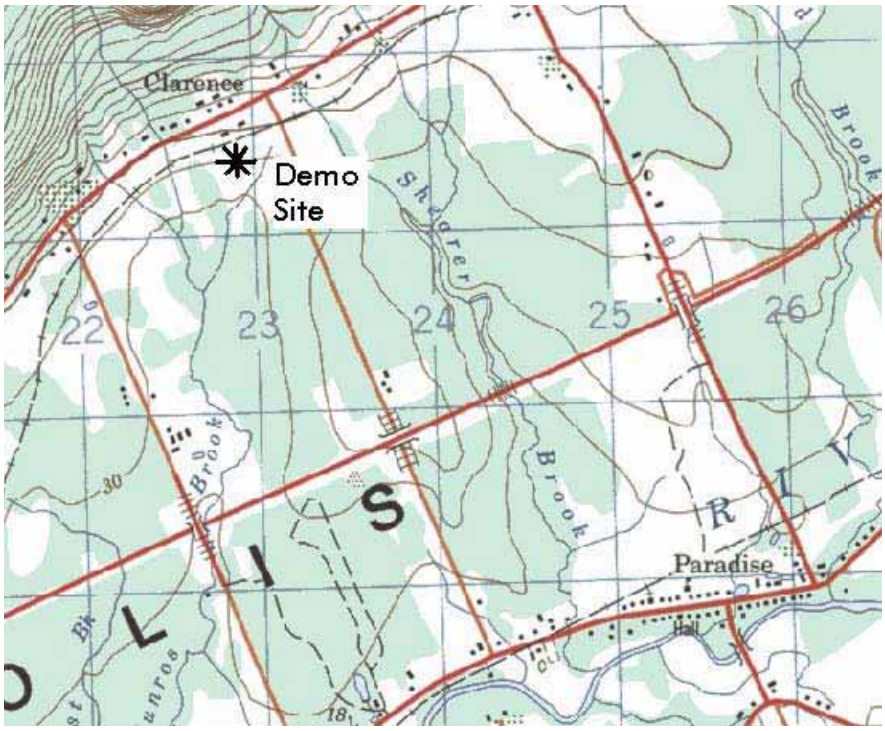
Demonstration Day Flyer, 2006

# River Friendly Farming Demonstration Day

Saturday, October 28
10 am – 12 pm

Peter Roosje's Farm
2131 Clarence Road
Central Clarence

Demonstration being held by **Peter Roosje** in cooperation with **Clean Annapolis River Project** to highlight environmentally sound livestock management practices.



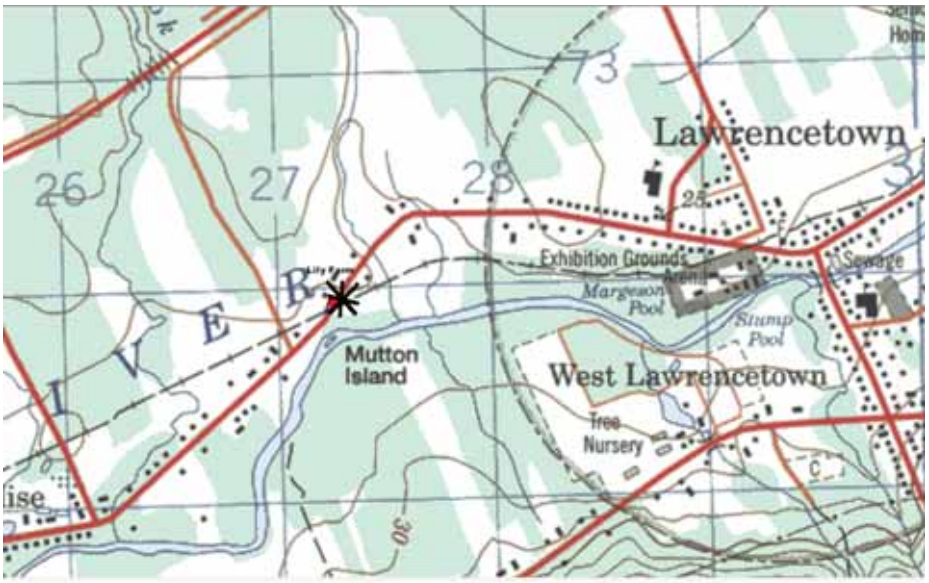
Demonstration Day Flyer, 2006

# STREAMBANK RESTORATION DEMONSTRATION DAY

## Wednesday August 15
## 1 pm to 3 pm

## George Lilly's Farm
## Hwy 1, Lawrencetown, NS

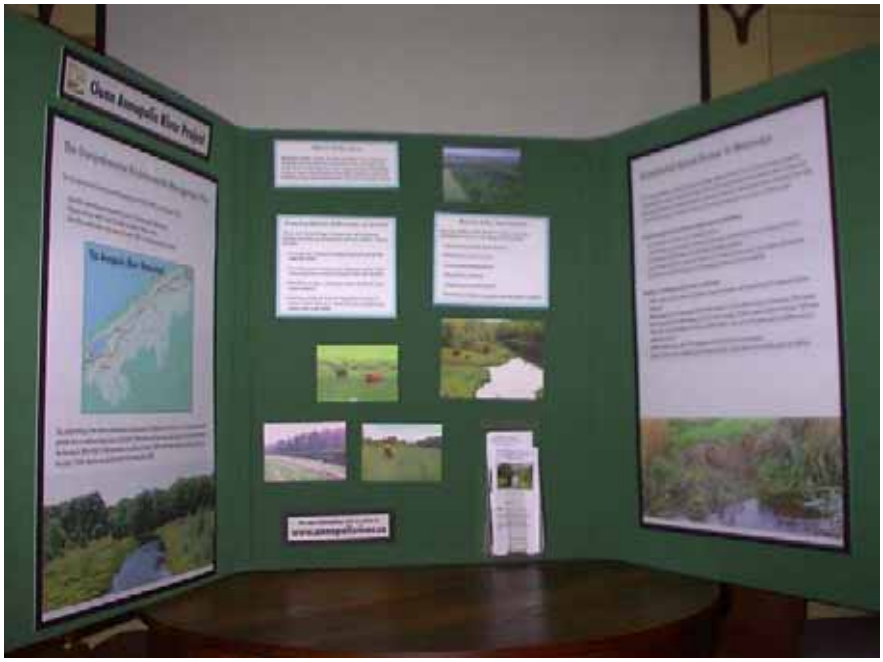
A demonstration being held by George Lily in cooperation with the Clean Annapolis River Project to highlight innovative streamside and aquatic habitat protection and restoration measures.



Appendix D- Project Photos

Fence at Longley Site, 2006


Farm Sign for Brown Demonstration Site, 2006



Public Display Materials

Cows restricted from stream at Beviss site

Damage from cattle at Beviss Site, October 2006

Same area as above after fencing and willow staking, September 2007

Live willow sills constructed at Beviss site, May 2007

Same live willow sills as above after one summers growth, September 2007