

# Aucoin Brook Watershed-Based Fish Habitat Restoration Plan

Prepared for:  
Cheticamp River Salmon Association



Prepared by:  
Jillian Baker

Completion Date

---

Revised

---



## Contact Information

Contact Name: Jillian Baker  
Position: Project Manager  
Group Name: Cheticamp River Salmon  
Association

Address:  
P.O. Box 1099  
Cheticamp, NS  
B0E 1H0

Phone: 902-224-0002  
Email: [jillian.baker@dal.ca](mailto:jillian.baker@dal.ca)

Contact Name: René Aucoin  
Position: President  
Group Name: Cheticamp River  
Salmon Association

Address:  
P.O. Box 1022  
Cheticamp, Nova Scotia  
B03 1H0

Phone: 902-224-5854  
Email: [rene.aucoin@usaintanne.ca](mailto:rene.aucoin@usaintanne.ca)

# Table of Contents

<b>Part 1.</b> Restoration Plan Objectives.....	4
<b>Part 2.</b> Introductory Information – Aucoin Brook Subwatershed.....	5
Aucoin Brook Subwatershed Boundary Map.....	8
<b>Part 3.</b> Labeled 1:10 000 Maps – Aucoin Brook Subwatershed.....	9
Aucoin Brook Subwatershed, Sections 1 & 2.....	9
Aucoin Brook Subwatershed, Sections 3 & 4.....	9
Aucoin Brook Subwatershed, Sections 5, 6, & 7.....	10
Aucoin Brook Subwatershed, Sections 8, 9, & 10.....	10
Aucoin Brook Subwatershed, Sections 11 & 12.....	11
<b>Part 4.</b> Problems and Prescriptions Table – Aucoin Brook Subwatershed.....	12
<b>Part 5.</b> Restoration Plan Summary.....	30
<b>Part 6.</b> Supporting Photographs.....	34
Reference Material.....	43

# 1. Restoration Plan Objectives

The intent of this Aucoin Brook subwatershed-based fish habitat restoration plan is to provide a comprehensive document that will assist in efforts to improve fish habitat conditions and ultimately help improve fish populations and resources within Aucoin Brook and the larger Cheticamp River system. The plan focuses on how to improve watershed conditions for fish habitat while also taking into consideration productivity of the aquatic habitats and water uses by other resident plants and wildlife. By taking a watershed-based approach to restoration planning, the Cheticamp River Salmon Association will gain a comprehensive look at restoration needs and will help to determine what specific activities can be undertaken to improve habitat and environmental conditions generally.

The plan focuses on, but is not limited to, how to improve salmonid habitat and the habitat of other native fish species in the Aucoin Brook subwatershed. Using salmonid species as a biological indicator will help improve fishery resources, improve stream functionality, and improve aesthetic value of the natural watershed environment.

<p>Objectives</p>	<p>The main objectives of this plan are to assess the existing condition of fish habitat within the Aucoin Brook watershed and to identify actions to take to restore and improve fish habitat where problems have been identified.</p> <p>This plan is intended as a resource to help guide efforts to accomplish the following:</p> <ol style="list-style-type: none"> <li>1. To promote recruitment of Atlantic salmon and native trout species through an increase of fish habitat and an increased ability of fishes to successfully migrate and spawn, and</li> <li>2. To restore/improve the natural conditions of Aucoin Brook, including natural hydraulic processes and riparian habitat</li> </ol>
<p>Specific Goals</p>	<ul style="list-style-type: none"> <li>• Assess the existing degree of habitat connectivity within the watershed, to identify specific fish passage problem areas, and to prescribe solutions at applicable sites</li> <li>• Identify required maintenance of existing restoration structures installed in previous years; i.e., to assess existing in-stream structures to determine where upgrades, alterations, removals, and/or repairs may be beneficial</li> <li>• Develop strategies for restoring sections of the brook in which siltation/sedimentation is negatively impacting fish species and other aquatic life</li> <li>• Produce baseline information (including water parameters, channel measurements, riparian vegetation) on the Aucoin Brook watershed that can be used to track changes, assess effectiveness of restoration efforts, identify potential problems within the watershed, etc.</li> <li>• Identify specific habitat deficiencies and restore spawning areas, pools, and hiding areas for salmonoids</li> <li>• Improve overall health of the riparian zone by identifying area of thin or absent riparian vegetation that could benefit from planting</li> </ul>

- Identify eroding and/or vulnerable banks and recommend actions to reinforce/stabilize banks and reduce erosion

## 2. Introductory Information – Aucoin Brook Subwatershed

1	Location in province (town[s], county, and region)	Located in Cheticamp, Nova Scotia Inverness county; west coast of Cape Breton Island Originates in the Montagne Noire area of the Cape Breton Highlands
2	Watershed area (square km)	Aucoin Brook: 16.97 km <sup>2</sup>
3	Watershed drains into (include coordinates of confluence)	Cheticamp River (near Petit Étang at 20T 0655731 UTM 5168503)
4	Distance of watercourse mouth from ocean (km)	Approx. 2.5 km
5	Average watercourse width at mouth (m)	Approx. 5.5 m
6	Length of watercourse (km)	Approx. 11 km
7	Elevation at headwaters (m)	Approx. 400 m
8	Elevation at mouth (m)	Approx. 20 m
9	Most common substrate type and size	Variable, but primarily cobble with high volume of gravel in mid-reaches, and rock and boulder becoming more common at higher elevations
10	Lake(s) within watershed (provide name[s], appr. size [square km])	3 lakes: Lac à Méderic 0.03km <sup>2</sup> (20T 0655790 5167951); Lac à Dominique 0.03 km <sup>2</sup> (20T 0655926 5167052), and an unnamed lake (20T 0657432 5164760 – origin of Gypsum Mine Brook) 0.02 km <sup>2</sup>
11	Significant tributaries within watershed (name[s] and length[s])	Approx. 3.2 km tributary (Gypsum Mine Brook) flows into east side of Aucoin Brook (20T 0655166 5166296)

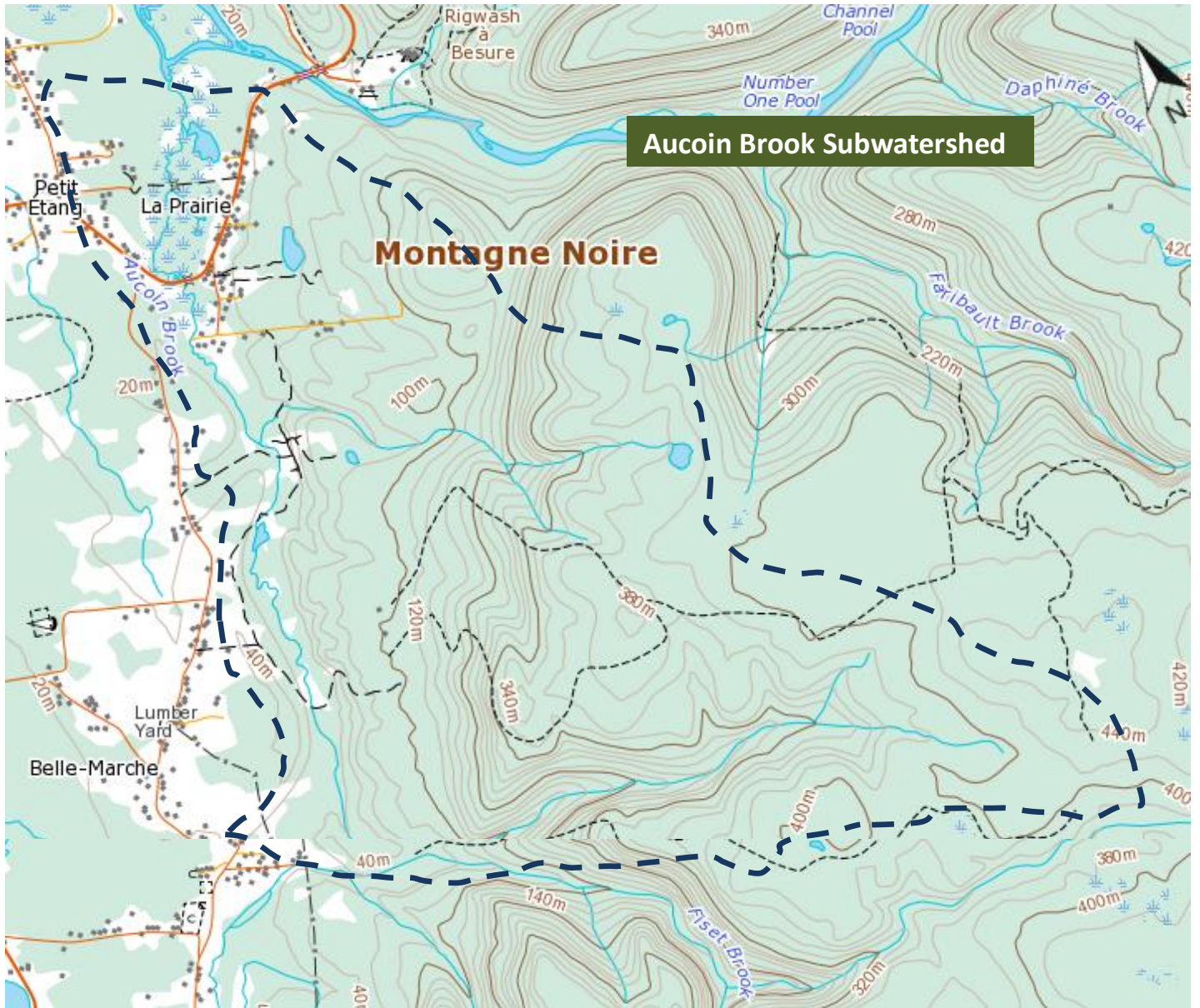


12	Soil type(s) and geological characteristics	Soils in the Cape Breton Highlands are generally well-drained and strongly acidic, with a thin coarse till of variable permeability over bedrock
13	Average water temperature in summer (July-August)	15.72°C 2013; 13.35°C in 2006
14	Peak water temperature	22.67°C July 15, 2013 24.93°C August 8, 2012
15	Average pH	pH 7.31 (measured 2013)
16	Native fish species present	Atlantic salmon, brook (or speckled) trout, with possibility of American eel, sticklebacks, gaspereau, and banded killifish
17	Non-native fish species present	Possibility of brown trout and rainbow trout
18	Endangered / threatened / at risk species present (aquatic or non-aquatic)	Atlantic salmon (special concern), American eel (threatened)
19	Fish stocking (if applic. note species and avg. number per year)	Aucoin's Brook has been stocked annually with trout since 2006; the Cheticamp River Salmon Association helps facilitate spring and fall stocking on Aucoin Brook, releasing between 1000-2000 sea-run brook trout each year (e.g., in 2013, ~1800 brook trout were released in the combined fall and spring stocking)
20	Forestry activities and impacts (explain)	Some forestry activities occurred in the past (log removal, etc.) with possible impacts, however no known forestry activities impact Aucoin Brook today
21	Urban/residential development impacts (explain)	Trail and road development along Aucoin Brook is largely motivated by ATV users; increase of vehicular traffic and poorly designed/placed crossings or trails contributes to unwanted sediment entering the brook, increased pollution, etc.
22	Agricultural development and impacts (explain)	Agriculture was historically important in the watershed, but little agriculture continues today. Land use for agriculture resulted in a variety of impacts on Aucoin Brook, including thinning of riparian vegetation in places and the construction of rock fords to serve as water crossings. Fencing (largely post & barbed wire)

		was used in places to keep livestock from entering the brook. Remnants of both the rock fords and fencing are still present along the brook
23	Other industry impacts (explain if applicable)	There is an old gypsum mine located on the eastern side of the watershed that has not been in operation for decades
24	Historical conditions, impacts and considerations	
25	Condition of main river stem between ocean and watercourse (barriers present, etc)	A set of four culverts in the Belle-Marche area (at 20T 654632 UTM 5164502) was a partial barrier to fish passage until its removal in 2013
26	Other information	

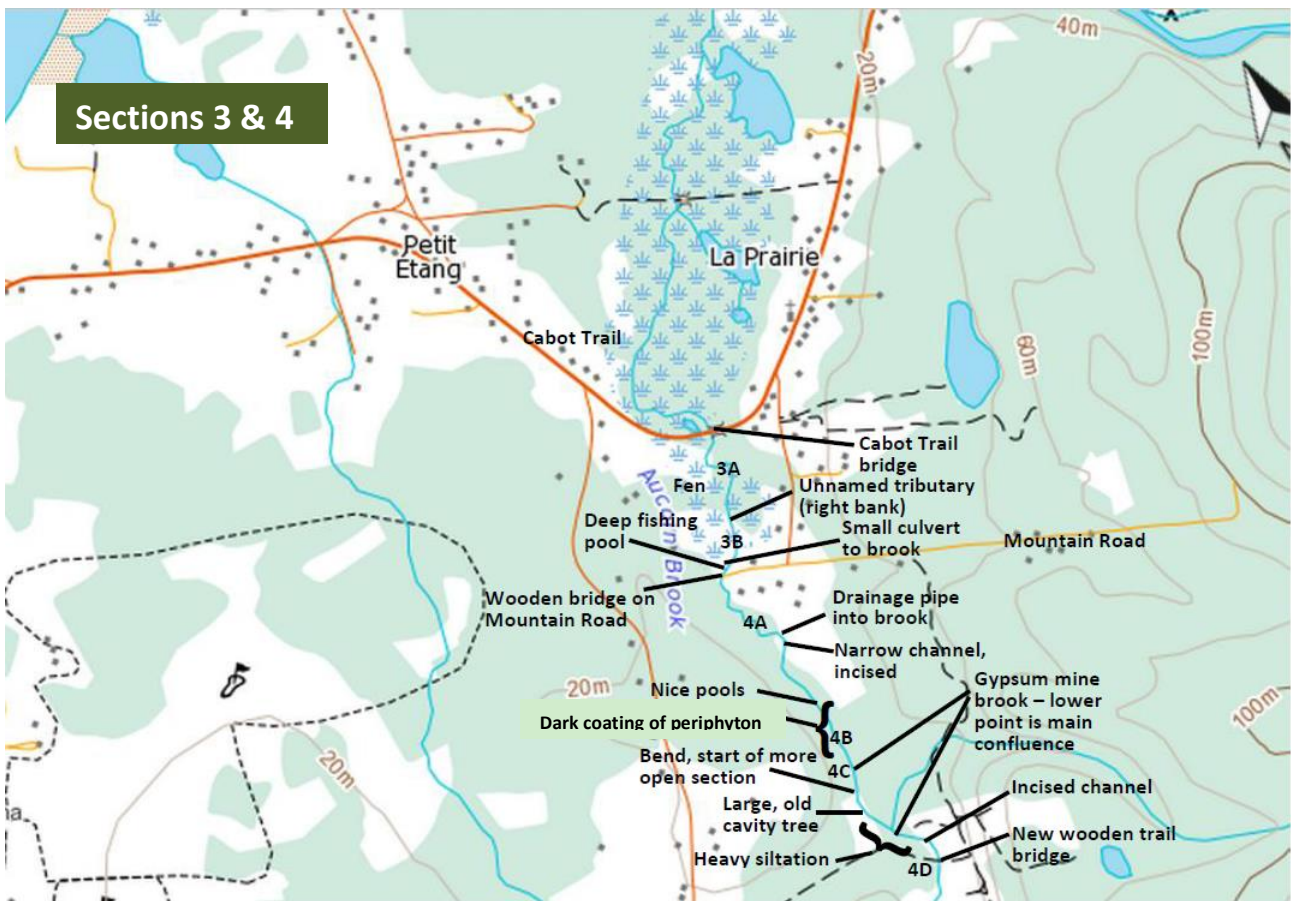
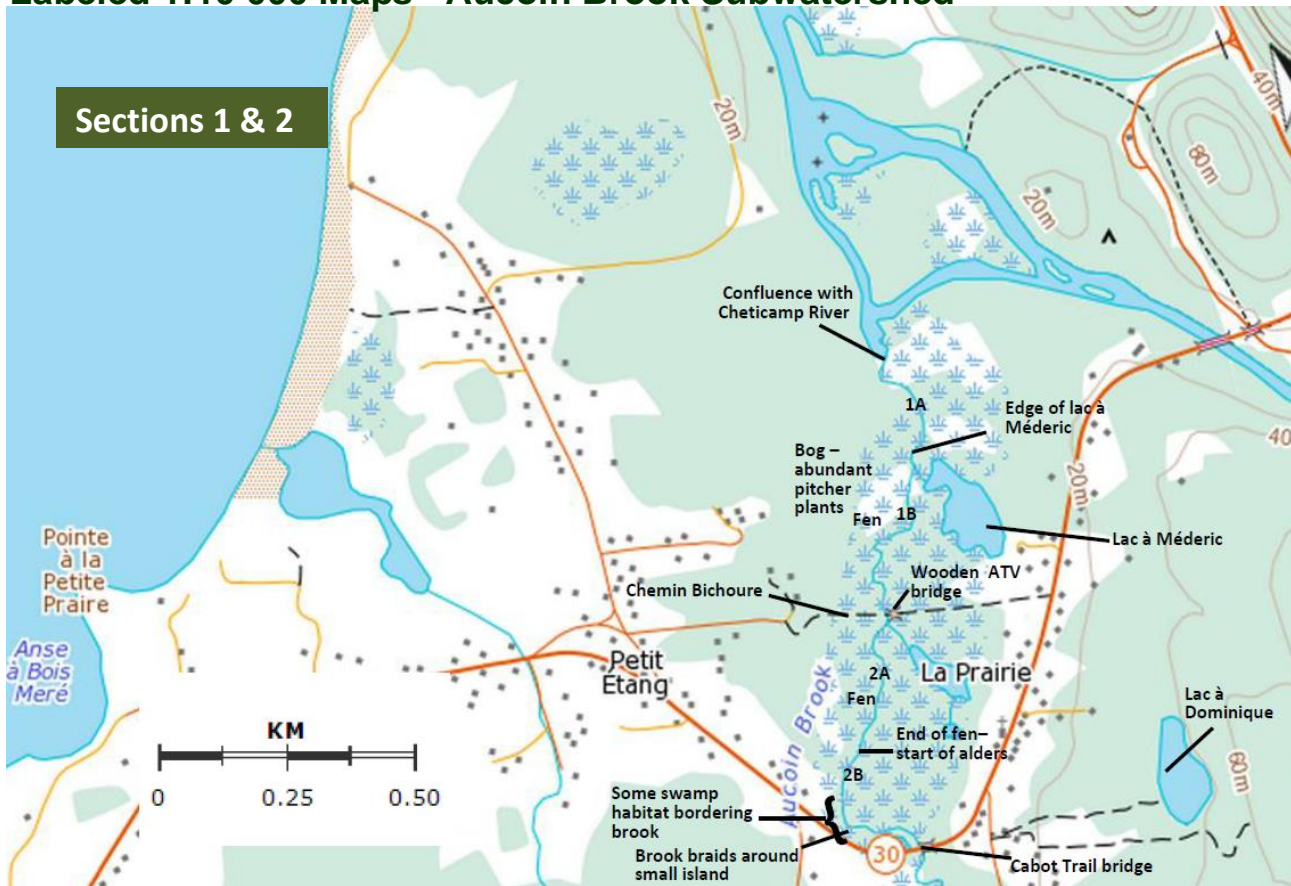
# Subwatershed Boundary Map

Figure 1. Boundary map for Aucoin Brook subwatershed. Subwatershed area is 16.97km<sup>2</sup>

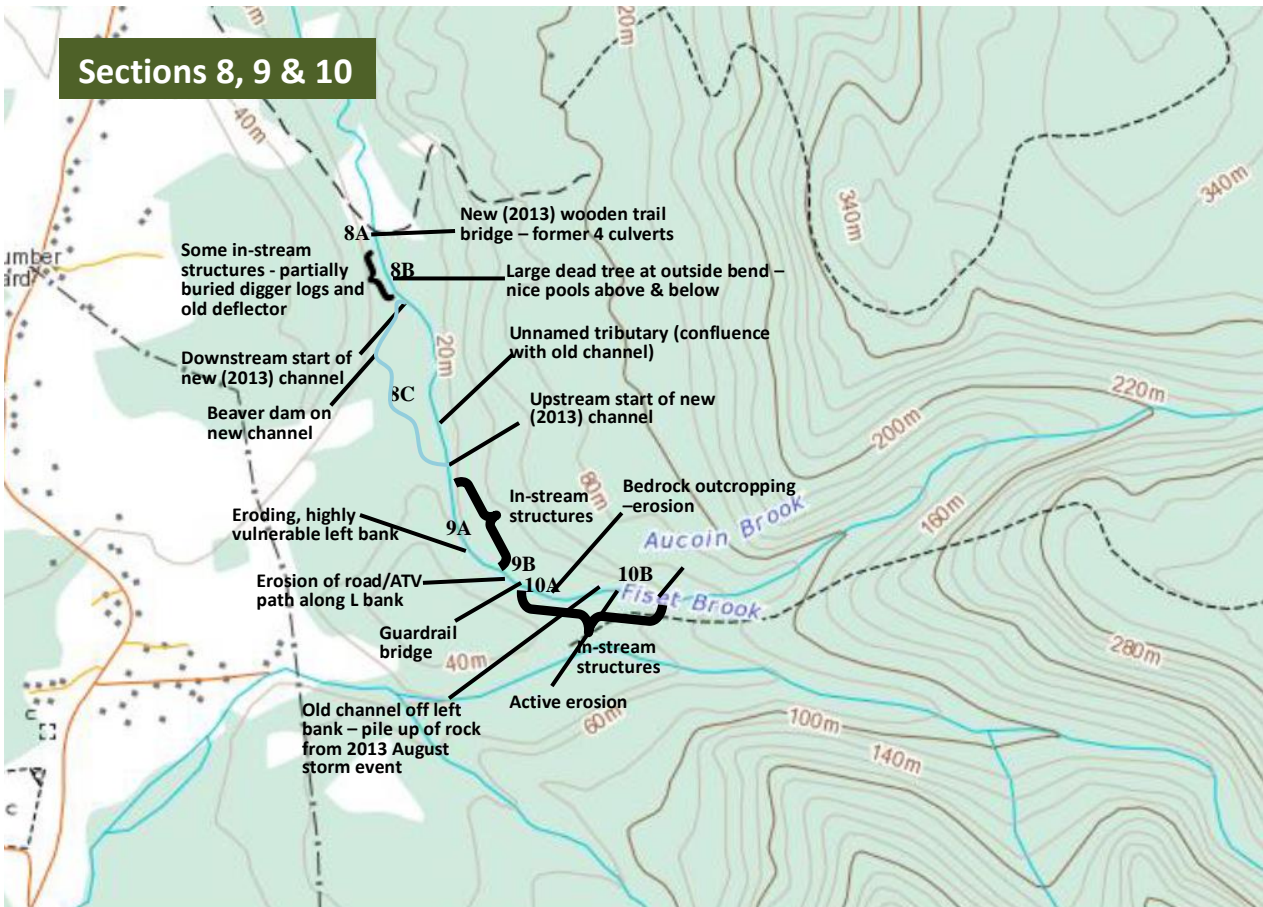
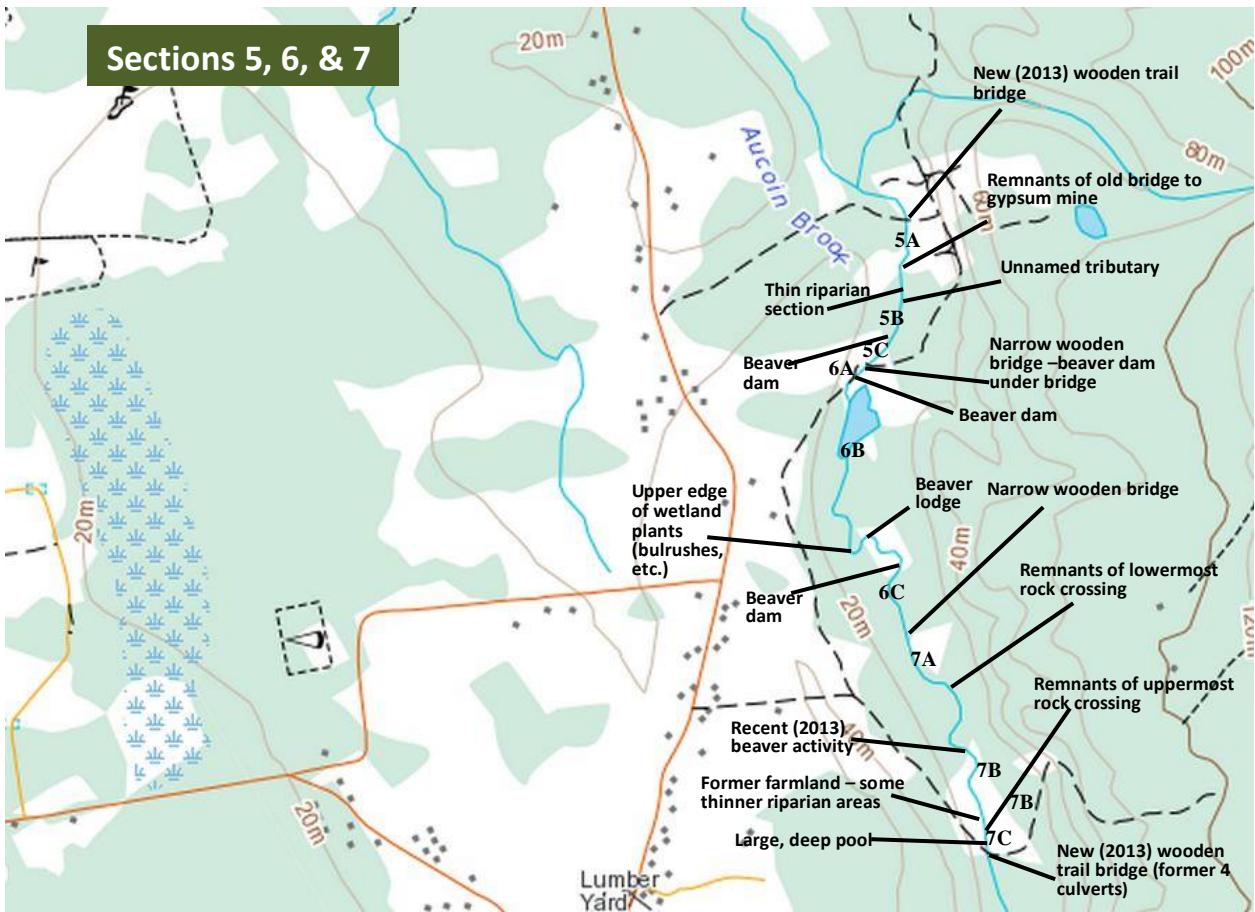




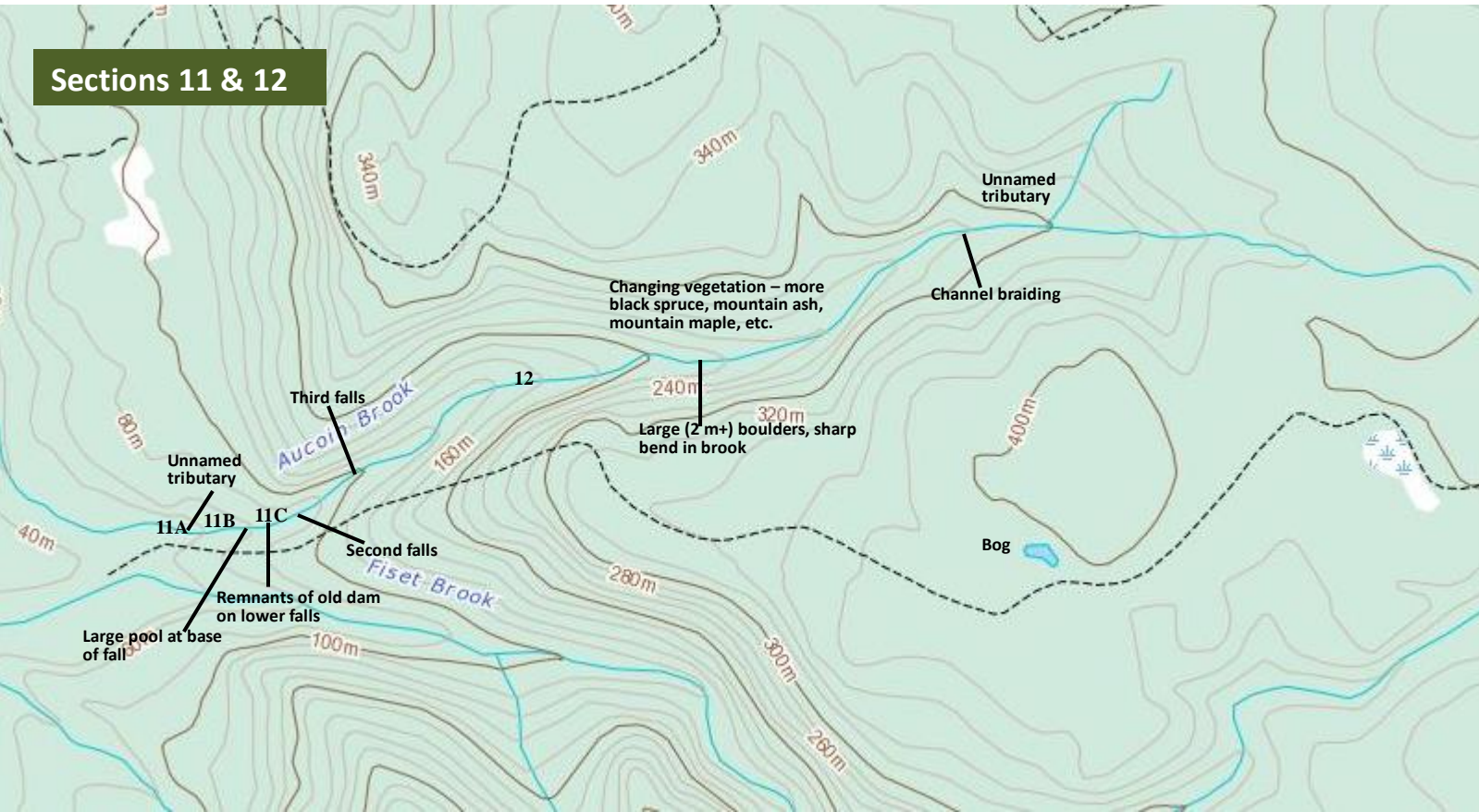
### 3. Labeled 1:10 000 Maps - Aucoin Brook Subwatershed







**Sections 11 & 12**



## 4. Problems and Prescriptions Table - Aucoin Brook Subwatershed

Section Number and Site	Stream Feature	Lower Limit (coordinates and landmarks)	Upper Limit (coordinates and landmarks)	Site Details	Adjacent Land Use Considerations	Prescription for Restoration	Project Priority Ranking	Project Status
Section 1	<p>Confluence with Cheticamp River to narrow wooden ATV bridge on Chemin Bichoure. This section is approximately 840 m long. Brook averages 6.5 m in lower to mid reaches of this section then widens with riparian area more waterlogged in the area around lac à Méderic before narrowing to approximately 2.5 m in the upper reaches of this section. The brook is bordered by fen and, to a lesser extent, bog throughout this section. Riparian wetland appears healthy. Sedges dominant vegetation, with rushes and reeds also present, as well as sparse low shrubs. Cranberry and pitcher plants are abundant in the areas of bog. The brook contains abundant aquatic vegetation: both submerged and floating vegetation (particularly in deeper sections) are present. There is ATV traffic on Chemin Bichoure and also signs of ATV tracks along the brook below lac à Méderic. Fish are present and beavers have been spotted in this area.</p> <p>Date Sampled: June 25, 2013            Water Quality Sampled: 19.90°C; pH: 7.55; Conductivity: 470 us/cm; DO: 117.6%, 10.46 mg/L; Salinity 0.25; TDS: 0.338g/L</p>							
1a	Confluence, bordering bog	Confluence of Aucoin Brook and Cheticamp River 20T 0655731 UTM 5168503	Edge of lac à Méderic 20T 0655733 UTM 5168157	The section is approximately 350 m long. Brook is approximately 6.5 m wide in this section with an average depth of about 0.9 m in the lower reaches. Upstream, toward lac à Méderic, the brook deepens to over 2m. There is mud and silt throughout this section, as well as embedded gravel and pebble. There is submerged vegetation and abundant floating lilies. There is relatively little in-stream woody debris. Riparian habitat consists of wetland grasses and sedges, rushes, and reeds. There is a bog with cranberry and abundant pitcher plants off the left bank. A path used by beavers runs along the left side of the brook through much of this section and a beaver was spotted in the water. Fish are present.	The confluence can be accessed via an ATV path that runs along parts of the Cheticamp River. Adjacent land is wetland, marsh and bog. There are ATV tracks in the grass off the left bank and small amounts of oil visible in the water along the edge of the brook.	N/A	N/A	Restoration work is not required in this section. Continue to monitor and keep a record of water parameters.
1b	Fen and lac à Méderic	Edge of lac à Méderic 20T 0655733 UTM 5168157	Narrow wooden bridge 20T 0655481 UTM 5167806	Section is approximately 490 m long. Brook widens before narrowing to an average of 2.5 m above lac à Méderic. Brook deepens to over a metre and surrounding area is more noticeably waterlogged with standing water making this area difficult to navigate on foot. Wetland bordering brook is fen habitat. Riparian area is healthy and is primarily sedges, with some rushes, reeds, and small shrubs. Brook contains both submerged and floating vegetation. Fish are present and beavers have been seen in this section.	This section can be accessed via the bridge on Chemin Bichoure. ATV traffic is common on Chemin Bichoure and the bridge is a local fishing spot.	N/A	N/A	Restoration work is not required in this section. Continue to monitor and keep a record of water parameters.



Section Number and Site	Stream Feature	Lower Limit (coordinates and landmarks)	Upper Limit (coordinates and landmarks)	Site Details	Adjacent Land Use Considerations	Prescription for Restoration	Project Priority Ranking	Project Status
Section 2	<p>Narrow wooden ATV bridge on Chemin Bichoure to Cabot Trail bridge. This section is approximately 830 m long. Brook averages between 2.5 and 4.5 m wide. The brook is deep and slow moving through much of this section. There is a small, unnamed lake approximately 75 metres upstream from the bridge on Chemin Bichoure. The majority of the riparian area is fen, although there is a small stretch of tall shrub swamp near the top of this section (downstream from the Cabot Trail bridge). Sedges and rushes with some low shrubs transition to more alders and taller shrubs, with some hardwood along the section of swamp. Coverage over the brook is variable in this section; little to no coverage over the brook in fen, but transitions to dense coverage from alders in upper reaches of this section. There is relatively heavy beaver activity in this section, with beaver sightings and lots of old and recent cuttings. Fish are present throughout this section.</p> <p>Date Sampled: June 25, 2013  Water Quality Sampled: 15.92°C; pH: 7.34; Conductivity: 359 us/cm; DO: 106.1%, 10.46 mg/L; Salinity 0.21; TDS: 0.283g/L</p>							
2a	Fen	Narrow wooden bridge 20T 0655481 UTM 5167806	End of open fen – transition into alders 20T 0655207 UTM 5167546	The section is approximately 400 m long. There is a small lake approximately 75 metres upstream from the bridge on Chemin Bichoure. Brook is narrow (>2.5 m wide) in the stretch upstream from the bridge and below the lake. Brook is over 0.5 m deep and riparian habitat is waterlogged and difficult to navigate on foot. Vegetation along the brook is primarily sedges, as well as rushes, reeds, grasses, and some shrubs (e.g., serviceberry). Water movement is slow. Substrate is deep, soft mud and silt. There is considerable in-stream woody debris and both floating and submerged vegetation in the brook.	This section can be accessed via the bridge on Chemin Bichoure. ATV traffic is common on Chemin Bichoure and the bridge is a local fishing spot.	N/A	N/A	Restoration work is not required in this section. Continue to monitor and keep a record of water parameters.
2b	Alders and shrub swamp	End of open fen – transition into alders 20T 0655207 UTM 5167546	Cabot Trail bridge 20T 0655267 UTM 5167231	Section is approximately 430 m long. Brook is approximately 4.5 m wide and is relatively deep, although variable (average of approximately 0.5 m). Fen transitions into shrub-dominated swamp. Riparian area is healthy and is primarily alders and other shrubs (e.g., dogwoods, serviceberry, striped maple, etc.) and sedges, ferns, and grasses. The alders provide considerable coverage over the brook. There is some nice hardwood (elm, oak, etc.) off the right bank in the upper half of the section. There is submerged in-stream vegetation and lots of woody debris in the brook. Banks are muddy and incised and there is gravel and pebble mid-channel that is partially embedded in mud and silt. There is lots of beaver	This section can be accessed via the bridge on the Cabot Trail. The Cabot Trail highway also runs roughly parallel to the brook for the upper half of the section. There is some garbage in this section (e.g. old road sign, occasional can or piece of plastic), likely due to close proximity to busy highway.	N/A	N/A	N/A

Section Number and Site	Stream Feature	Lower Limit (coordinates and landmarks)	Upper Limit (coordinates and landmarks)	Site Details	Adjacent Land Use Considerations	Prescription for Restoration	Project Priority Ranking	Project Status
				activity and fish are present throughout this section.				
Section 3	<p>Cabot Trail bridge to wooden bridge on Mountain Road. This section is approximately 460 m long and the brook averages between 3.7 - 4.3 m wide. Stretches of narrow channel and incised banks can be found mid-section. Water depth is variable with low sections of less than 10 cm and 1m+ pools, but an average depth of approximately 0.3 – 0.4 m. Water movement is also variable: water tends to be deep and slow in the lower reaches of this section and becomes shallower and faster in the mid-upper reaches. An unnamed tributary enters the brook on the left bank. There is a series of deep (1m+) pools upstream from the tributary and there is some nice riffle habitat toward the top of this section. Substrate is variable through this section: mud and silt transitions to partially embedded gravel and pebble in the lower reaches and cobble and rock become more common in the mid-upper section. Embedment of pebbles and cobbles decreases up-section. In-stream woody debris is abundant in this section and there is a healthy amount of submerged in-stream vegetation. Fish are present throughout this section. Grasses and tall shrubs (alders, serviceberry, etc.) are common in the riparian areas of this section.</p> <p>Date Sampled: June 21, 2013  Water Quality Sampled: 15.86°C; pH: 7.48; Conductivity: 377 us/cm; DO: 115.7%, 11.43mg/L; Salinity 0.22; TDS: 0.297g/L</p>							
3a	Human impacts (garbage and fishing pools)	Cabot Trail Road bridge 20T 0655267 UTM 5167231	Unnamed tributary 20T 0655206 UTM 5167027	<p>This section is approximately 280 m long. The brook is deep (average of 0.4m) and slow moving at the bottom of this section. The bottom of the channel is soft just upstream from the bridge and the substrate is a combination of mud, silt, and embedded gravel and pebble. There is some submerged in-stream vegetation and lots of woody debris in the channel. The riparian area is largely populated by alders, shrubs (dogwood, serviceberry, chokecherry, etc.), and sedges and grasses, with the occasional hardwood or softwood. There is some fen habitat bordering the brook in this section. Alders provide some coverage over the brook in places, and there are some short stretches where the channel narrows and is incised. There are some nice, deep (1m+) pools in the mid to upper reaches of this section. A small, unnamed tributary enters the right bank of the brook at the upper limit of this section. At the point of confluence, the tributary has a bankfull width of 2.4 m and is less than 10 cm deep. According to NRCAN topographical maps, the tributary is approximately 3.5 km long. The tributary has slightly incised banks and good water flow. Water parameters of the tributary:  Date Sampled: June 21, 2013  Water Quality Sampled: 15.29°C; pH:</p>	The site can be accessed by the bridge on the Cabot Trail (upper limit). There is heavy vehicular traffic on the Cabot Trail and this section of the brook is relatively easy to access. There is evidence that people fish at some of the pools in this section.	Alders can be thinned and cut back where overhang is particularly dense as they can weaken banks and contribute to siltation.  This section's proximity to the heavily traveled Cabot Trail and a residential area result in noticeable increase in volume of garbage. This section should be walked annually to remove accumulated litter. Also monitor for accumulations of woody debris and thin as necessary (e.g., pile-up at 655196 5167210).	Low.	No work has been carried out here to date.

Section Number and Site	Stream Feature	Lower Limit (coordinates and landmarks)	Upper Limit (coordinates and landmarks)	Site Details	Adjacent Land Use Considerations	Prescription for Restoration	Project Priority Ranking	Project Status
				7.59; Conductivity: 274 us/cm; DO: 110.0%, 11.11mg/L; Salinity 0.16; TDS: 0.219g/L.				
3b	Riffle habitat & large, open pool	Unnamed tributary 20T 0655206 UTM 5167027	Wooden bridge on Mountain Rd. 20T 0655125 UTM 5166751	Section is approximately 180 m long. Brook widens in this section and water movement is generally shallow and fast. There is a series of nice riffles in this section. The riparian habitat is healthy and consists mostly of grasses, alders and other shrubs, and some hardwood (particularly on left side). Pebble and cobble dominate the substrate, with more rocks in the mid-upper reaches of this section. Substrate is partially embedded. A thin layer of brown algae can be found on much of the substrate. There is a large, deep (1m+) pool just downstream from the bridge at the upper limit. There is little cover in or over the pool. Locals report fishing here. There is a culvert that passes under Mountain Road and drains toward the brook, at the lower edge of the pool. There are fish of different age classes present throughout this section.	This section can be accessed by the bridge on Mountain Road. There are houses near the right bank at the upper limit, and evidence that people fish in this section. There is some garbage in and around the brook.	This section should be walked annually to remove accumulated litter	N/A	No work has been done in this section to date. Continue to monitor and consider possible restoration work in future years.
Section 4	Wooden bridge at Mountain Road to new wooden trail bridge on road to old gypsum mine. This section is approximately 1050 m long. The brook averages approximately 5 m wide in this section (reaches over 6 m wide in places). The confluence of Aucoin's Brook and the main channel of the Gypsum Mine Brook occurs in this section (655166 5166296), with a smaller, secondary channel of the Gypsum Mine Brook trickling into Aucoin's approximately 200 m upstream. Channel is very incised in stretch at top of this section. There are steep, mud banks in this section and heavy siltation: substrate is deeply-fully embedded. This section is thick with alders which provide good coverage over the brook.  Date Sampled: June 21, 2013 Water Quality Sampled: 13.52°C; pH: 7.30; Conductivity: 361 us/cm; DO: 113.8%, 11.84mg/L; Salinity 0.22; TDS: 0.300g/L							
4a	Residential	Wooden bridge on Mountain Rd. 20T 0655125 UTM 5166751	Narrow channel, deeply incised bank 20T 0655168 5166673	This section is approximately 320 m long. The brook is deep, slow moving, and the channel bottom is muddy immediately upstream from bridge. More sand appears in substrate upstream in this section, and larger material – small cobble and pebbles – becomes more common upstream. There are a few houses with lawns that border the right bank of the brook at the lower part of this section. Brook	The site can be accessed by the bridge at the lower limit (Mountain Road). There are several homes that border the right bank of the brook, and there is evidence of human activity along the brook (e.g., paths to brook, fishing spots,	Alders can be thinned and cut back where overhang is particularly dense as they can weaken banks and contribute to siltation. Investigate the	Medium	Look into the drainage pipe issue in 2014. Follow-up as necessary.

Section Number and Site	Stream Feature	Lower Limit (coordinates and landmarks)	Upper Limit (coordinates and landmarks)	Site Details	Adjacent Land Use Considerations	Prescription for Restoration	Project Priority Ranking	Project Status
				meanders nicely through much of this section. There is adequate riparian area, however, consisting mostly of alders and shrubs and grasses with some mixed hardwood and softwood along the left bank (there is one short section of thin riparian area on right bank at upper limit in section of narrow and deeply incised channel). In-stream vegetation (mostly submerged) is abundant in this section, and there is a fair amount of small and medium-sized woody debris. Lots of fish are present. There is a drainage pipe that enters in the brook on the right bank near the upper limit of this section that may be sewer. Just upstream from the pipe is an inlet with brownish algae growth and oil residue. Water parameters just upstream from the bridge: Date Sampled: June 21, 2013 Water Quality Sampled: 13.21°C; pH: 7.51; Conductivity: 371 us/cm; DO: 113.5%, 11.89mg/L; Salinity 0.23; TDS: 0.321g/L .	hunting platform). Locals report that the lawns of the bordering homes are frequently affected by flooding.	drainage pipe to determine what it is introducing into the brook. Determine the source of the inlet upstream. Follow-up if necessary, depending on findings.  Seedlings could be planted in the short stretch of thin riparian area at upper limit.		
4b	Thin dark film of periphyton on substrate	Narrow channel, deeply incised bank 20T 0655168 5166673	Confluence of gypsum mine tributary and Aucoin Brook 20T 0655166 UTM 5166296	Section is approximately 400 m long. Riparian habitat is healthy and largely mixed mature hardwood (ash, birch, etc.) and softwood. Mid-section there is a considerable number of dead standing spruce off the left bank. There is adequate coverage over the brook and abundant in-stream woody debris. Brook is mostly straight in this section. Water is relatively shallow with periodic deep pools. There is good flow through the section. The substrate is primarily pebble and gravel with sand and scattered cobble. Substrate is mostly covered with thin dark film of periphyton, likely consisting in part of blue green algae and diatoms, through much of this section. There are fish of different age classes present throughout this section.	There is evidence that there was farmland adjacent to the right bank at one point (old page wire fence), and there are indications that the land is used for fishing, trapping, etc. (e.g., old rope crossing). Small and large mammal tracks along banks are abundant in this section.	This section should be monitored for accumulations of woody debris that may eventually create blockages and barriers – thinning may be required as a preventative measure (e.g., thin debris pile at 655136 5166611).	Low	No work has been done in this section to date. Continue to monitor and re-evaluate in future to determine if restoration work may eventually be beneficial.



Section Number and Site	Stream Feature	Lower Limit (coordinates and landmarks)	Upper Limit (coordinates and landmarks)	Site Details	Adjacent Land Use Considerations	Prescription for Restoration	Project Priority Ranking	Project Status
4c	Gypsum mine tributary	Confluence of gypsum mine tributary and Aucoin Brook 20T 0655166 UTM 5166296	N/A	The gypsum mine tributary is approximately 3.2 km long and originates at ~ 20T 0657433 5164840. At the confluence with Aucoin's Brook, the gypsum mine tributary is approximately 3.6 m wide and 10 cm deep. Gypsum mine brook splits and main stem meets Aucoin's Brook at 655166 5166292, however, a smaller channel meets the brook approximately 200 m upstream at 655172 5166065. There is considerable growth of bright green algae in the gypsum mine brook (growing off of rocks and woody debris). Water parameters for gypsum mine brook: Date Sampled: June 21, 2013 Water Quality Sampled: 11.32°C; pH: 7.49; Conductivity: 571 us/cm; DO: 117.2%, 12.80 mg/L; Salinity 0.38; TDS: 0.502 g/L .	The gypsum mine brook passes through the old gypsum mine area.	Gypsum mine brook should be surveyed and nutrient source for algae determined. Dead spruce that are falling into or adjacent to the brook should be removed as much as possible.	Low	Preliminary surveying in 2012 identified large volume of dead spruce in gypsum mine brook upstream from guardrail bridge (654923 5166902). Surveying was not continued upstream of the dead trees to determine whether there were additional sources of nutrients. Many good sized trout present in brook above dead spruce.
4d	Incised channel and heavy siltation	Confluence of gypsum mine tributary and Aucoin Brook 20T 0655166 UTM 5166296	New (2013) wooden trail bridge 20T 0655273 UTM 5165975	Section is approximately 330 m long. The channel is very incised in this section – banks are thick mud, soft in places. Channel bottom is mostly soft – cobble and smaller material are deeply embedded in mud and silt, especially in the mid-upper reaches of this section. The riparian habitat is healthy and consists mostly of grasses and alders along with other shrubs (e.g., serviceberry, hawthorne, dogwood). There is some softwood in this section as well, in particular, a stand of spruce off right bank in area of old crossing. Alders provide good coverage over the brook in most of this section. There is considerable in-stream vegetation and woody debris. There are remnants of an old crossing that would have been used for the gypsum mine (655146 5166115) – timber from this crossing is scattered and deposited from the old crossing downstream.	This site can be accessed by the road to the old gypsum mine that crosses the brook at the upper limit (wooden trail bridge). A gypsum mine used to operate near this section of the brook, but production at the mine stopped decades ago. The old gypsum mine area is being developed into a destination for tourists and locals by improving road access and installing some structures (e.g., grills and picnic areas).	A series of brush mats were installed in this section in 2013 as a way to potentially reduce the siltation and clear up the channel. These should be and monitored for effectiveness and expansion should be considered depending on the results of work in 2013.	Medium	A few sites were chosen in 2013 to act as case studies – these were photographed to help document site conditions before installation and monitor changes. Continue installing brush mats in future if results of case studies indicate improvements.
Section 5	New (2013) wooden trail bridge (on road to gypsum mine) to narrow wooden bridge on ATV path. This section is approximately 400 m long. Brook averages approximately 4.25 m in the section below the dam. The channel is over-widened above the dam, with a width of over 4.5 metres in places. The riparian habitat appears mostly healthy in this section and							

Section Number and Site	Stream Feature	Lower Limit (coordinates and landmarks)	Upper Limit (coordinates and landmarks)	Site Details	Adjacent Land Use Considerations	Prescription for Restoration	Project Priority Ranking	Project Status
<p>is variable, consisting of alders and other shrubs (serviceberry, hawthorne, dogwood, etc.), some mixed hardwood and softwood, and typical wetland vegetation (e.g., sedges and rushes) in the marsh and swamp habitats around the dam. Water is slow moving and relatively deep through much of this section, although there is some nice riffle habitat downstream from the dam.</p> <p>Date Sampled: June 17, 2013 Water Quality Sampled: 11.97°C; pH: 7.09; Conductivity: 140 us/cm; DO: 109.1%, 12.03mg/L; Salinity 0.09; TDS: 0.124g/L</p>								
5a	Slow section, no riffles & small, unnamed tributary	New wooden trail bridge 20T 0655273 UTM 5165975	Bend just upstream from small, unnamed tributary 20T 0655105 UTM 5165802	The section is approximately 200 m long. Water movement is slow in this section. Brook has considerable amount of in-stream woody debris and coverage over the brook (mostly alders), although the riparian area is thin on the right bank at the top of this section (0655130 5165816). Water is generally deep throughout this section and there are a couple of nice pools. Brook averages 4.5 m in lower to mid-section, however, brook narrows beyond the thin riparian section and becomes shallower. The substrate is largely silt and sand in the lower reaches of this section; more gravel and pebble show up as you move upstream. There are signs of beaver activity toward the upper limit of this section.	Site can be accessed at the wooden trail bridge (lower limit) by the road to the old gypsum mine. There are the remnants of an old bridge in this section (0655147 5165863) – likely built and used when the gypsum mine was operational.	Seedlings could be planted to improve the thin riparian area. Brush mats installed on some of the bends in this mid-lower reaches of this section may help with siltation.	Low	No work has been done in this section to date. Continue to monitor and consider possible restoration work in future years.
5b	Potential blockages (woody debris and beaver)	Bend just upstream from small, unnamed tributary 20T 0655105 UTM 5165802	Beaver dam 20T 0655022 UTM 5165737	Section is approximately 120 m long. Brook is approximately 4 m wide in this section but widens to approximately 5.5 m at upstream limit (just downstream of beaver dam). Riparian habitat is mostly healthy – alders and grasses in some sections of former farmland, with some mixed hardwood and softwood. Some thinner riparian areas, presumably areas that were formerly fields. There are a number of piles of woody debris in this section, as well as trees that have fallen across the brook. There is evidence of both old and recent beaver activity in this section.	Much of the land adjacent to the brook in this section was formerly farmland. There is some old wire fencing in places along the brook, as well as the remnants of fairly regular crossings made from rock.	Beaver dam(s) should be considered for removal or, preferably, need for creating openings to improve fish passage during critical periods. This section should be monitored for accumulations of woody debris that may eventually create blockages and barriers – thinning may be required as a preventative measure (e.g., thin	Low	Remove dam(s) and monitor to determine whether it is reconstructed. Trapping beavers may be necessary. Consider planting some seedlings in any thinner riparian areas and installing brush mats in areas of high siltation.

Section Number and Site	Stream Feature	Lower Limit (coordinates and landmarks)	Upper Limit (coordinates and landmarks)	Site Details	Adjacent Land Use Considerations	Prescription for Restoration	Project Priority Ranking	Project Status
						debris at 654733 5164879). Although most of the riparian area is adequate, it is thin in some of the areas that were formerly farmland and seedlings could be planted to provide more cover. Installing brush mats on some of the bends could help with some of the areas of higher siltation.		
5c	Overwidened section	Beaver dam 20T 0655022 UTM 5165737	Narrow wooden bridge 20T 0654968 UTM 5165702	Section is short: approximately 80 m long. Brook is overwidened upstream of the beaver dam, with an average width of approximately 10.5 m. Depth in this section is variable, ranging from less than 20 cm to more than 0.5 m. Brook narrows further upstream, toward bridge, and water is shallower and slow moving. Riparian habitat appears healthy and consists of wetland vegetation (reeds, sedges, etc.), grasses, and alders, with some overhang over the brook. There is submerged and the occasional floating in-stream vegetation (>20% coverage). Substrate is small material – mostly gravel and pebble, with some cobble – embedded in silt and mud.	Much of the land adjacent to the brook in this section was formerly farmland. There is some old wire fencing along right bank. Road over bridge is used by ATVs, horses, and pedestrians.	N/A	N/A	Monitor for blockages, especially beaver activity.
Section 6	First narrow wooden rail bridge to second narrow wooden rail bridge. This section is approximately 875 m long. The brook is overwidened in this section as a result of heavy beaver activity. There are three beaver dams in this section (including the one under the bridge at the lower limit) and one beaver lodge. The riparian area at the upper and lower reaches of this section consists of mostly alders and grasses. The mid-section is wetland (marsh and swamp) and is not easily navigable on foot. Water movement is very slow and almost still in places. Date Sampled: June 19, 2013 Water Quality Sampled: 11.0°C; pH: 7.54; Conductivity: 140 us/cm; DO: 109.1%, 12.03mg/L; Salinity 0.09; TDS: 0.124g/L							
6a	Beaver activity at wooden bridge	Narrow wooden bridge 20T 0654968 UTM 5165702	Beaver dam 20T 0654961 UTM 5165674	There is beaver activity at the bridge. Beavers have created a dam at the upstream side of the bridge. Another dam is located approximately 30 m upstream. Brook has become	Site can be accessed by an ATV trail that crosses the wooden bridge. There is old farmland on the right	Dam under the bridge is causing fish passage issues and should be removed if possible	Medium	Dams were removed summer 2013, but rebuilt by beavers May need to resort to additional trapping

Section Number and Site	Stream Feature	Lower Limit (coordinates and landmarks)	Upper Limit (coordinates and landmarks)	Site Details	Adjacent Land Use Considerations	Prescription for Restoration	Project Priority Ranking	Project Status
				overwidened (~40 feet wide) upstream of the bridge and is flowing onto the ATV path. The water is deep in this section and fish sightings have been made, including salmon parr. There is some vegetation and woody debris in the water and alders providing some cover over the brook. In addition to alders, riparian area is mostly grasses and old farmland. Water parameters in this section: 14.59 °C; pH: 7.01; Conductivity: 263 us/cm; DO: 100.5%, 10.21 mg/L; Salinity 0.16; TDS: 0.213g/L	bank.	(attempt to unplug from upstream side of bridge). Upper dam should also be considered for removal. Bridge is narrow and is creating a pinch point. It should be assessed and considered for eventual replacement.		efforts (some beavers trapped fall of 2013) if dams continue to be rebuilt due to the fish passage issues created by the dams. Will need to consult with landowner to discuss bridge options. Replacing bridge will also be dependent on future funding.
6b	Beaver pond/marsh	Beaver dam 20T 0654961 UTM 5165674	Upper transition out of marsh 20T 0654795 UTM 5165361	Section is approximately 470 m long. Riparian habitat is mostly healthy – alders and grasses in some sections of former farmland, with some mixed hardwood and softwood. Some thinner riparian areas, presumably areas that were formerly fields. There are a number of piles of woody debris in this section, as well as trees that have fallen across the brook. There is evidence of both old and recent beaver activity in this section.	Much of the land adjacent to the brook in this section was formerly farmland. There is some old wire fencing in places along the brook, as well as the remnants of fairly regular crossings made from rock.	This section should be monitored for accumulations of woody debris that may eventually create blockages and barriers – thinning may be required as a preventative measure (e.g., thin debris at 654733 5164879). Although most of the riparian area is adequate, it is thin in some of the areas that were formerly farmland and seedlings could be planted to provide more cover (e.g., 654661 5164590). Installing brush mats on some of the bends could help with some of the areas of higher siltation.	Low	Consider planting some seedlings in any thinner riparian areas and installing brush mats in areas of high siltation.
6c	Beaver pond/marsh	Upper transition out of marshland 20T 0654795 UTM 5165361	Narrow wooden bridge 20T 0654730 UTM 5165077	Section is approximately 375 m long. There is heavy beaver activity in this area, including a beaver lodge (654763 5163324) and dam (654756 516521).	Much of the land adjacent to the brook in this section was formerly farmland.	Beaver activity should be monitored in this section and dams	Low	No work undertaken on this section in recent years.



Section Number and Site	Stream Feature	Lower Limit (coordinates and landmarks)	Upper Limit (coordinates and landmarks)	Site Details	Adjacent Land Use Considerations	Prescription for Restoration	Project Priority Ranking	Project Status
				Riparian habitat is healthy. There is wetland vegetation along the lower reaches of this section which transitions into predominantly grasses and alders. The alders hang over the brook, with heavy coverage in the upper reaches of the section. Water is deep with a heavy silt and sand downstream from the bridge. Water movement is very slow. alders and grasses in some sections of former farmland, with some mixed hardwood and softwood. Some thinner riparian areas, presumably areas that were formerly fields. There are a number of piles of woody debris in this section, as well as trees that have fallen across the brook. There is evidence of both old and recent beaver activity in this section.	There is some old wire fencing in places along the brook, as well as the remnants of fairly regular crossings made from rock.	considered for removal if they create barriers to fish passage, or for thinning in order to improve fish passage during critical periods. This section should also be monitored for accumulations of woody debris that may eventually create blockages and barriers – thinning may be required as a preventative measure.		
Section 7	Wooden rail tie bridge to four culverts. This section is approximately 700 m long. Brook is approximately 4 m wide, with an average depth of approximately 0.25 m. There are no boulders or large rocks in this section. The substrate consists of a small amount of cobble, with larger amounts of pebble and gravel. There is a lot of silt and sand in this section, with about 50% (75% or higher in some areas) embedment of pebbles and cobble. The channel is fairly incised in much of this section; the banks are mostly mud, but appear stable. The riparian habitat is healthy throughout this section and consists of alders and other shrubs, some softwood, and the occasional hardwood. There are also grasses and ferns, as well as old farmland in the lower to mid reaches of this section. There is evidence of older as well as recent beaver activity in this section.  Date Sampled: June 19, 2013 Water Quality Sampled: 9.87 °C; pH: 7.17; Conductivity: 76 us/cm; DO: 104.6 %, 11.84mg/L; Salinity 0.05; TDS: 0.069g/L							
7a	Narrow wooden bridge	Narrow wooden bridge 20T 0654730 UTM 5165077	First remnants of old rock farm crossings 20T 0654749 UTM 5164901	Section is approximately 200 m long. The water is slow moving/almost still immediately upstream of the bridge. The brook is overwidened above the bridge and deep (1m+) with mud/silt substrate. Alders are present with some overhanging the brook. Water parameters in this section: 10.05 °C; pH: 7.07; Conductivity: 111 us/cm; DO: 105.8%, 11.93mg/L; Salinity 0.07; TDS: 0.101g/L	Site can be accessed by an ATV trail that crosses the wooden bridge.	Bridge is narrow be assessed and considered for eventual replacement.  Alders should be periodically thinned as they tend to weaken banks and cause siltation.	Low	Will need to consult with landowner to discuss bridge options. Replacing bridge will also be dependent on future funding.
7b	Former farmland	First remnants of old rock farm crossings 20T 0654749 UTM 5164901	Uppermost remnants of rock crossings 20T 0654652 UTM 5164532	Section is approximately 450 m long. Riparian habitat is mostly healthy – alders and grasses in some sections of former farmland, with some mixed hardwood and softwood. Some thinner riparian areas, presumably areas that were formerly fields. There are a	Much of the land adjacent to the brook in this section was formerly farmland. There is some old wire fencing in places along the brook, as well as	Although most of the riparian area is adequate, it is thin in some of the areas that were formerly farmland and seedlings	Low-Medium	No work has been carried out in this section to date. Condition of banks will be assessed in 2014.

Section Number and Site	Stream Feature	Lower Limit (coordinates and landmarks)	Upper Limit (coordinates and landmarks)	Site Details	Adjacent Land Use Considerations	Prescription for Restoration	Project Priority Ranking	Project Status
				number of piles of woody debris in this section, as well as trees that have fallen across the brook. There is evidence of both old and recent beaver activity in this section.	the remnants of fairly regular crossings made from rock.	could be planted to provide more cover.  Assess condition of banks in areas of old farm crossings. If needed, consider installing bank structures to help restore function.		
7c	Large, deep pool	Uppermost remnants of rock crossings 20T 0654652 UTM 5164532	New wooden trail bridge (2013) – former 4 culverts 20T 654632 UTM 5164502	Section short, approximately 50 m long. Average width of the brook in section 7 is approximately 4 m, but wider (add measurement) at this pool just downstream of the second new (2013) wooden trail bridge (formerly four culverts). The Association has reinforced the banks in this section with large rock and have successfully used rocks to help create the large pool (rocks act similarly to digger log here), although this section is in the process of changing due to the removal of the stacked culverts (e.g., some infilling of pool already occurring). There is adequate vegetative cover over the brook, mostly from alders. There is also in-stream woody debris, including a spot of some accumulation downstream of the pool – there are no barriers or blockages present. Fish are often seen jumping in the pool.	Site can be accessed from the road crossing at the upper limit of this section (wooden trail bridge). There is evidence of trapping activity in this section (e.g., old weasel traps have been seen).	Removal of the culverts is altering this section and so it should be monitored and changes recorded.	N/A	Monitor changes to this section after the culverts are removed and replaced.
Section 8	<p>New (2013) wooden trail bridge (former 4 culverts) to upstream start of new (2013) channel. Channel infilling due to a large blockage of fallen trees and other woody debris caused a stretch of Aucoin Brook to change course in 2013. Substrate deposition had already been a problem in this section of Aucoin Brook in recent years, with heavy deposition of gravel and cobble resulting in partial channel infilling and stream braiding. Raised water table, habitat loss, and potential fish passage issues had also been identified in this area, however, the brook had been starting to carve a new main channel and vegetation had been starting to recolonize the left bank (including willow and maple seedlings) prior to the events of summer, 2013. Only a small amount of water continued to flow in the old channel through this section after August, 2013. A variety of in-stream structures were installed in the lower stretch of this section and along the old channel (in and above the area where heavy substrate deposition has been a problem in recent years). Most of the in-stream structures are partially or fully buried by gravel, damaged and/or washed out or otherwise no longer effective due to changes in the brook.</p> <p>Average brook width is 4.5 m, although there are also narrow sections where the brook is less than 3 m wide. Depth is shallow (typically between 10-20 cm) in upper and lower section, but there are some deeper spots mid-section. There is a considerable amount of woody debris in this section, particularly in the lower section of the new channel and the stretch above the bridge. Substrate in lower section is dominated by pebble and gravel, with sand and silt present, as well as some cobble (&gt;10%). Brook is still in the process of digging a channel in the upper stretch of the new channel; more cobble and larger substrate show up in the new channel where it rejoins a former channel. Riparian habitat is relatively healthy, although there is a considerable volume of dead trees (standing and fallen) along the new channel. The riparian vegetation on the lower section of the new channel and through the remainder of the lower stretch of this section consists primarily of alders and shrubs (dogwood, etc.) with considerable overhang in places.</p>							

Section Number and Site	Stream Feature	Lower Limit (coordinates and landmarks)	Upper Limit (coordinates and landmarks)	Site Details	Adjacent Land Use Considerations	Prescription for Restoration	Project Priority Ranking	Project Status
Water Quality Sampled: June 14, 2013 Water Parameters: Temp: 8.97 °C; pH: 7.19; Conductivity: 72 us/cm; DO: 105.2 %, 12.14 mg/L; Salinity 0.05; TDS: 0.068g/L								
8a	New wooden trail bridge	New (2013) wooden trail bridge 20T 654632 UTM 5164502	N/A	An approximately 3.7 m (~12') wide wooden trail bridge was constructed at this site in 2013. This bridge replaces a set of four undersized, stacked and poorly placed culverts. The culverts had been assessed on a couple of occasions, and it was confirmed that they were contributing to a variety of problems, including restricted fish passage, sedimentation above the culverts, and accumulations of woody debris (periodically leading to flooding over the road). With the culverts removed, this section of the brook should be monitored for changes as the brook readjusts.	Road access at the bridge.	Culverts had been previously accessed and identified as partial barriers to fish passage. Funding for culvert replacement project was secured for 2013 – culverts were removed and a large wooden trail bridge was installed in their place during fall of 2013. The brook should be monitored here as it adjusts to the change.	Low	Culverts were replaced with a wooden trail bridge during fall of 2013.
8b	Small structures (3 diggers logs, 2 deflectors)	New (2013) wooden trail bridge 20T 654632 UTM 5164502	Upstream start of in-stream structures leading up to bridge 20T 653853 UTM 5164766	Section is short, approximately 125 m long and brook width averages 4.5 m. The substrate is primarily gravel and some of the digger logs have been largely (> 75%) buried in gravel. Structures: Bridge to 1st DL: ~22.5 m 1 <sup>st</sup> DL - 2 <sup>nd</sup> DL: ~26 m 2 <sup>nd</sup> DL – 1 <sup>st</sup> deflector : ~22.5 m 1 <sup>st</sup> deflector – 3rd DL: ~23 m 3rd DL – 2 <sup>nd</sup> deflector: ~ 24.5 m	Road access at the lower limit (wooden trail bridge). There is also an ATV path that runs roughly parallel to the left bank at the lower section; however, it does not appear to experience much traffic.	Maintenance required on some of the structures (e.g., dig out buried digger logs). However, with the culverts removed downstream the brook should be given time to readjust. Structures should eventually be reassessed for effectiveness.	Low	Digger logs were dug out in 2012, but almost fully buried again in 2013.
8c	New channel	Upstream start of in-stream structures leading up to bridge 20T 653853 UTM 5164766	Upstream start of new (2013) channel 20T 654523 UTM 5163816	The main channel changed course in 2013 as the result of a major storm/flooding event in early August. A large pile up of fallen trees and large woody material (including washed out in-stream structures) blocked the main channel and resulted in a serious pile up of substrate (rocks, cobble, etc.). As the main channel filled in, the river	Section is most easily accessed at the upper limit. An ATV path that runs roughly parallel to Aucoin Brook ends just upstream from the upper limit of the new channel.	New channel should be closely monitored, and new blockages or barriers identified and removed (high volume of dead trees along channel pose risk of ending	Medium-High	Preliminary measures were taken in 2013 to improve conditions on the new channel. A combination of hand digging, placing large rocks along the banks, and

Section Number and Site	Stream Feature	Lower Limit (coordinates and landmarks)	Upper Limit (coordinates and landmarks)	Site Details	Adjacent Land Use Considerations	Prescription for Restoration	Project Priority Ranking	Project Status
				<p>began flowing through the wooded area off the left bank, eventually finding an old channel which rejoins the other channel approx. 150 m above the new (2013) wooden trail bridge. There is a large build-up of silt, sand, and gravel below confluence of new and old channels.</p> <p>As the upper section of the new channel is not part of the brook's historic path, the brook is still in the process of digging a channel in this section and so banks are absent or minimal here. Riparian habitat in upper section consists largely of mature trees (mixed hardwood and softwood). There are a lot of dead standing and fallen trees (mostly spruce) along the upper section of the new channel.</p> <p>The brook meanders nicely through the mid-section of the new channel. Larger cobble is present where the brook rejoined its abandoned former channel. There are some nice pools in this section. Riparian habitat is mostly mature trees, with a considerable volume of dead trees along the brook (standing and fallen).</p> <p>There is beaver activity (dam + lodge, 2013) on the lower section of the new channel starting approximately 100 m upstream from where the new channel rejoins the established channel. The lower section of the new channel is narrow and the substrate is partially embedded and consists of a mixture of silt and sand with some gravel and small cobble. There is a lot of partially embedded woody material, including large logs, throughout this section. Riparian vegetation is mostly alders and dogwood which overhang the brook heavily in places. Other trees include ash, birch, larch, spruce, etc.</p> <p>Note: a small amount of water</p>		<p>up as in-stream blockages). Beaver dam on the lower main channel should be assessed for removal. Additional efforts may be required to help encourage the development of a single main stem in the upper section of the new channel. Once the new channel becomes established, it should be reassessed and in-stream structures may be appropriate.</p> <p>The large pile-up of woody debris and old in-stream structures has not been removed from the old channel. There is also a number of damaged or ineffective in-stream structures that remain on this stretch of old channel. As this channel may serve as an overflow channel, the blockage and damage structures should be considered for clean-up and removal.</p>		<p>selectively removing standing trees mid-channel was carried out in the upper stretch in order to help encourage the brook to form a single main channel. A number of blockages or large, woody debris were identified and removed from the new channel in 2013. Beavers were trapped at the new wooden trail bridge during fall of 2013, but beaver structures remain.</p>



Section Number and Site	Stream Feature	Lower Limit (coordinates and landmarks)	Upper Limit (coordinates and landmarks)	Site Details	Adjacent Land Use Considerations	Prescription for Restoration	Project Priority Ranking	Project Status
				continued to flow on the old channel in 2013. Large volumes of gravel had been deposited along this now-abandoned stretch of channel in recent years, resulting in channel infill and an erratic channel that braids into smaller channels that flow through the riparian areas in places. A number of in-stream structures had been installed on this section of the brook, many of which were almost (or entirely) buried by gravel or damaged and/or washed out during the 2013 storm/flooding event. An unnamed tributary also joins the old channel at on the right bank at 20T 654576 UTM 5163938. Tributary is approximately 1.5 m wide and 15 cm deep. Temperature in June, 2013 was 10.23°C and pH is 7.16.				
Section 9	Upstream start of new (2013) channel to guardrail bridge. Section is approximately 350 m long. Average brook width is ~ 5.5 m. In-stream restoration work has been carried out in this section. Erosion is a problem throughout this section, and some of the structures (i.e., bank logs and cribs) have been built to help control/slow erosion and/or protect vulnerable banks. A number of digger logs were also installed in this section, although there are only a few that continue to be effective (some have been buried by substrate, others washed out or requiring maintenance). Date Sampled: June 14, 2013 Water Parameters: Temp: 10.18 °C; pH: 7.15; Conductivity: 66 us/cm; DO: 102.2 %, 11.47mg/L; Salinity 0.04; TDS: 0.060g/L							
9a	Erosion and unstable banks	Upstream start of new (2013) channel 20T 654523 UTM 5163816	Unstable, eroding left bank 20T 654501 UTM 5163726	Section is approximately 250 m long. Riparian habitat is mostly healthy – predominately mixed hardwood and softwood – although bankside trees are at risk of falling due to eroding banks in this section. There is also a somewhat thin riparian section just downstream of where the ATV path meets the brook on the left bank (20T 065401 5163774). Three bank logs (total ~10.4 m) were installed to help slow entry of eroding sediment into brook (654488 5163745). Section of left bank is especially vulnerable at outside bend of brook at upper limit of this section (654501 5163726) – several large mature trees (cedar and birch) fell into the brook at this location in 2013, and left bank is severely undercut and unstable. A number of digger logs were installed on	Site can be accessed by a short walk from nearby ATV trail (20T 0654501 5163774).	Some kind of structure should be installed to help protect and stabilize the left bank at the upper limit of this section (e.g., small retaining wall or crib). Additional efforts to stabilize other eroding banks in this section are also recommended (e.g., additional bank logs and/or hand rocking). This section should be reassessed for	High	Digger logs were installed in this section in 2012, however they are now fully or almost fully buried. A large wooden crib that had separated from the bank was removed from the upper limit of this section in 2013. A small (2 log-high) retaining wall was built along the left bank in its place and packed with rocks. This structure, however, was washed out in the August 2013 storm

Section Number and Site	Stream Feature	Lower Limit (coordinates and landmarks)	Upper Limit (coordinates and landmarks)	Site Details	Adjacent Land Use Considerations	Prescription for Restoration	Project Priority Ranking	Project Status
				this section in the past, however, they have been completely buried.		new digger logs. Section should be walked each spring and after major storm events to check for fallen trees and debris pile-ups.		event.
9b	In-stream structures	Unstable, eroding left bank 20T 654501 UTM 5163726	Guardrail bridge 20T 0654555 UTM 5163502	Section is approximately 100 m long. Average width of brook is just under 6 m. There are a number of sharply leaning trees and trees that have fallen across the brook in this section. With the exception of a straight, shallow stretch at the upper limit (20T 0654448 5163787), this section has a relatively good pool-riffle-run ratio. Erosion is an issue toward the upper limit of this section, particularly along the left bank. There are a variety of in-stream structures through this section, including digger logs, deflectors, and a crib. Rip rap has also been used to protect some vulnerable stretches of bank in this section. Few of the digger logs that were installed in this section are still functioning (most were washed out or damaged during the 2013 storm event in August).	Site can be accessed from the guardrail bridge at the upper limit or, at the lower limit, by a short walk from ATV trail (20T 0654501 5163774).  ATV path/dirt road runs roughly parallel to the left bank. In addition to recreational off-road vehicle users, the road is also used by trappers (coyote, weasel, etc.) and hunters.  There are a few places where old restoration materials and cut logs have been left along the brook.	Existing digger logs should be reassessed and maintenance performed as necessary. Some of the washed out digger logs are candidates for eventual replacement.  The straight, shallow section at upper limit of this section with poor/absent thalweg may benefit from installation of structures.  Erosion should be monitored.	Medium-High	Maintenance performed to existing structures in 2013. The crib on left bank near upper limit was extended to help with further erosion. A new digger log was installed (1 <sup>st</sup> digger log downstream of the guardrail bridge), and the deflector was added to the right side of the second digger log.
Section 10	Guardrail bridge over Aucoin Brook to unnamed tributary. This section is 400 m in length. Average width of this section is just under 7 m. The substrate varies in size and type: Mostly cobble, rock, scattered boulders, with more pebble and gravel in the lower stretch. Water movement is mostly fast in this section, and depth varies from an average of ~ 20 cm in runs and riffle sections to well over a meter in pools. There is a good ratio of pools, riffles, and runs. Riparian habitat is healthy in this section, and consists mostly of hardwood and softwood trees, as well as mosses, ferns, and other short vegetation. There is a considerable number of in-stream structures in this section, including digger logs, deflectors, cribs, and retaining walls.  Water Quality Sampled: June 12, 2013. Water Parameters: Temp: 9.46 °C; pH: 7.10; Conductivity: 44 us/cm; DO: 98.7 %, 11.29 mg/L; Salinity 0.03; TDS: 0.041 g/L							
10a	Guardrail bridge over Aucoin Brook	Guardrail bridge 20T 0654576 5163507 -	N/A	A bridge has been constructed over the brook that is used primarily for ATVs. The surface of the bridge is lined with old guardrails. There is a crib on the left bank underneath the bridge. Traps (weasel) have been seen under and around the bridge.	The bridge allows ATV traffic to pass over the brook. A path used primarily by ATVs but also passable by trucks also runs on the left side of the	N/A	N/A	N/A

Section Number and Site	Stream Feature	Lower Limit (coordinates and landmarks)	Upper Limit (coordinates and landmarks)	Site Details	Adjacent Land Use Considerations	Prescription for Restoration	Project Priority Ranking	Project Status
					brook, roughly parallel to the water.			
10b	In-stream structures	Guardrail bridge 20T 0654576 5163507	Old channel off left bank 20T 0654678 5163416	Section is approximately 250 m long. There are a number of in-stream structures in this section. There are digger logs, deflectors, and bank rocking; there is also evidence that some structures have been removed (e.g., cut digger log and some debris from old structures along banks in a few places). There are several trees that have fallen over the brook and are providing cover but are not barriers. There is a large accumulation of eroded rock from a steep hill (talus slope) off left bank approx. 100 m from guardrail bridge. A few large and deep pools are also located in this section. An old channel bed is located just off the left bank of the brook at the upper limit of this section. There is a large accumulation of rocks and large cobble, brought downstream during the August 2013 storm event, both in the old channel and in the brook at the upper limit of this section.	The section is accessible via the bridge at the lower limit.  There are snares and old rodent, small mammal traps in land adjacent to the brook.	There are a few sites along this section that are candidates for hand rocking to help stabilize banks. The left bank just downstream of the old channel at the upper limit (20T 0654678 5163416) can be built up with rocks. Not all digger logs in this section are functioning as intended. Existing structures should be assessed and removed or repaired if necessary.	Low-Medium	Structures were all installed since 2005. Ongoing maintenance is required.
10c	Eroding bank	Old channel off left bank 20T 0654678 5163416	Small, unnamed tributary 20T 0654821 5163308 (confluence of tributary and Aucoin Brook)	This section is short, approximately 100 m long. The riparian habitat is healthy, and is largely mixed hardwood and softwood. The right bank is steep in places and there is a site of active erosion, with considerable movement of soil and trees. The birch trees that have fallen from the eroding bank are only partially blocking the channel and their roots are helping to hold up soil. There are a number of older in-stream structures in this section (digger logs and deflectors).	Site is accessible via an ATV path/dirt road that leads to the brook at the upper limit of this section. There is some debris from old in-stream structures along the left bank. Little evidence of other land use.	The eroding bank may benefit from additional stabilization (e.g., bank logs). The existing structures should be assessed and maintenance performed as necessary.	Low-Medium	Eroding bank should be monitored. Fallen trees may eventually create blockages if enough debris accumulates. Ongoing monitoring and maintenance on digger logs and deflectors.
Section 11	Unnamed tributary by ATV path to two natural barrier falls. Section is 330 m in length. Average width of this section is ~ 6.5 m, and depth varies from an average of about 20 cm in runs and riffles to well over a meter in some of the large pools. Water movement is fast. Substrate size and type is variable in this section: boulder with large amount of rocks and cobble and some pebble and gravel (> 20% combined). Substrate is not embedded (> 10%). The riparian area is mostly undisturbed (largely hardwood and softwood, with some alders and other shrubs) and is considered healthy in this section. Alders and hardwood trees provide some coverage over the brook, both overhang and some fallen trees. There is							

Section Number and Site	Stream Feature	Lower Limit (coordinates and landmarks)	Upper Limit (coordinates and landmarks)	Site Details	Adjacent Land Use Considerations	Prescription for Restoration	Project Priority Ranking	Project Status
<p>some in-stream cover, including some large woody debris, particularly around pools.</p> <p>Water Quality Sampled: June 12, 2013. Water Parameters: Temp: 9.28 °C; pH: 7.46; Conductivity: 43 us/cm; DO: 99.2%, 11.39 mg/L</p>								
11a	Small unnamed tributary	20T 0654821 5163308 (confluence of tributary and Aucoin Brook)	N/A	Unnamed tributary is shallow, approximately 10 cm deep, and just over 1.3 m wide. In June, 2013, tributary pH was 7.13 and temperature was 8.46°C.	An ATV path stops at the edge of Aucoin Brook, on the bank opposite to the tributary. There is no sign of a crossing having been here previously.	N/A	N/A	N/A
11b	Upstream limit of in-stream structures	20T 0654821 5163308 (confluence of tributary and Aucoin Brook)	20T 0654968 5163214 (large pool at base of first barrier falls)	<p>This section is approximately 180 m long. 2 digger logs were installed by the Cheticamp River Salmon Association in this section (installed probably 2005 or 2006). The upper digger log was washed out in the extreme rain/flooding event on Aucoin Brook in August, 2013. This is the upper limit of in-stream structures, as the slope becomes too great and the substrate upstream is increasingly large rocks and boulders. The water is fast-moving and the digger logs helped create pools in this area. There is a site of erosion on the left bank downstream of the remnants of an old structure (partial foundation and some debris).</p> <p>Tributary – 1<sup>st</sup> digger log: 9.1m 1<sup>st</sup> site where 2<sup>nd</sup> digger log was: 28.0m</p>	Little evidence of use, with the exception of evidence of trapping (coyote snares observed). There is old debris from the dam and the remnants of an old building (foundation, old shingle, chimney upstream of the digger logs that could be eventually removed.	Remaining digger log is still functioning. There is a deep (1 m +) pool directly below the digger log, with a large boulder in the pool brought in during the August 2013 storm event. The location of the former upper log should be re-assessed and a new digger log may be appropriate here. The remaining log should continue to be monitored and maintenance performed as needed. Garbage clean-up could take place around old foundation. Monitor erosion and stabilize if site shows evidence of worsening.	Low	Digger logs installed in 2005 or 2006. Reassess location of former upper log, and possibly reinstall. Ongoing monitoring and maintenance.

Section Number and Site	Stream Feature	Lower Limit (coordinates and landmarks)	Upper Limit (coordinates and landmarks)	Site Details	Adjacent Land Use Considerations	Prescription for Restoration	Project Priority Ranking	Project Status
11c	Natural barrier falls	20T 0654968 5163214 (large pool at base of first barrier falls)	20T 0654950 UTM 5163230 (2 <sup>nd</sup> barrier falls)	This section is approximately 150 m long. There are two natural waterfalls in this section. Due to their elevation, they are considered barrier falls. There are remnants of an old dam on the lower falls (20T 0654902 5163171).	There is no evidence that the adjacent land is currently used.	No restoration work is needed in this section as the natural falls create a complete barrier for fish passage.	N/A	N/A
Section 12	Barrier falls to headwaters. Section is approximately 1750 m in length. There are two additional falls above the first two barriers falls. Channel width is variable, but averages around 5.5 through this section. The substrate is primarily bedrock between the third and fourth falls, and a combination of bedrock and rocks and smaller material at higher elevations. The riparian vegetation transitions to more species common in boreal habitats at higher elevations, including more mountain ash, mountain maple, and increasingly black spruce. There are a number of small tributaries above the uppermost falls.							
12		20T 0654950 UTM 5163230 (2nd barrier falls)		Just above 3 <sup>rd</sup> falls (20T 06552465163228)  There is a bog approx. 850 m south of the brook, off the left (20T 0656947 5161992 )  A tributary of approximately 600 m in length and 1.7 m wide joins the right bank of the brook in the upper reaches of this section (20T 0657322 5162887).		Large dead woody debris should be moved away from banks as LWD is making its way into the brook during storm events and contributing to pile ups and blockages.		

## 5. Restoration Plan Summary – Aucoin Brook Subwatershed

<p><b>Changes within the watershed</b></p>	<p><b>Significant changes to the condition of the Aucoin Brook subwatershed include the following:</b></p> <ul style="list-style-type: none"> <li>• Although population estimates are unavailable as a result of insufficient data (e.g., electrofishing counts, angler surveys), salmonid numbers within the larger Cheticamp River seem to have been experiencing a general downward trend compared to historical runs</li> <li>• Accelerated stream bank erosion has been a problem within the watershed, in part due to an increase in flooding events and the loss of healthy riparian trees</li> <li>• Increase in sedimentation and siltation in mid-reaches of the brook, likely due to a number of factors, including generation of siltation from ATV traffic (there has been an increase in recent decades of construction of ATV roads and trails, as well as installation of makeshift bridges), increase in flood events and bank erosion, possibility of slope failure and/or scour in upper channel during major storm events contributing to movement of larger sediment</li> <li>• Changes to the morphology of the watercourse have also occurred in recent years, including channel straightening and incision (former channel below upper limit of 8C) and the main channel reverting to a historic channel in 2013</li> </ul>
<p><b>Limiting factors in the watershed</b></p>	<p><b>The most likely limiting factors with regard to aquatic productivity in the Aucoin Brook subwatershed are:</b></p> <ol style="list-style-type: none"> <li>1. Habitat fragmentation/connectivity issues due to high number of beaver dams (note: a set of four stacked culverts were limiting the ability of salmon and trout to access upstream spawning and nursery habitat, however these were removed and replaced with a bridge in 2013)</li> <li>2. Siltation/sedimentation in some mid-sections of the brook likely resulting in a variety of negative impacts, including reduced spawning habitat and/or lower egg survival, decreased abundance and diversity of aquatic invertebrates, and degraded habitat for juvenile salmonids</li> <li>3. Degraded habitat connected to channel instability, e.g., associated with stream bank erosion, excessive/high deposition, channel adjustments</li> </ol>
<p><b>Most important habitat restoration needs in the watershed</b></p>	<p><b>The most important habitat restoration needs in the Aucoin Brook subwatershed are as follows:</b></p> <ol style="list-style-type: none"> <li>1. Improved habitat connectivity by addressing barriers caused by beaver dams, blockages of large woody debris, etc.</li> <li>2. Reduce siltation and sedimentation in problem areas (e.g., in stretch of brook below the old gypsum mine) using a multi-pronged approach (e.g., install structures such as brush mats, experiment with Sand Wand, or similar, technology, look into remedying problems at the source(s), etc.)</li> <li>3. Address issue of accelerated bank erosion using a variety of strategies (e.g., install structures to stabilize and protect eroding and/or vulnerable</li> </ol>



banks, thin dense alder growth, plant trees in areas of thin riparian vegetation, etc.)

4. Ensure habitat complexity and pool:riffle ratio by periodically surveying the watercourse and installing appropriate in-stream structures (e.g., digger logs) to restore degraded habitat
5. Continue to carry out maintenance to existing in-stream restoration structures (i.e., digger logs, deflectors, cribs, etc.) to ensure functionality

**Restoration projects from Part 4 that can be completed in the short term (next 5 years) include the following:**

1. An in-stream structure should be installed (e.g., small crib or retaining wall) in section 9A to help stabilize and protect a section of highly unstable, eroding left bank (20T 654501 UTM 5163726)
2. Remove large woody debris and washed out in-stream structures in the old channel (just downstream from upper limit of section 8C); this will allow the former channel to more effectively act as an overflow channel and should allow gravel to migrate into the lower brook, where there is a lot of silt, and to act as a storage area for the next big flood
3. Clear, as much as possible, fallen dead trees from riparian zone that are at risk of being carried into the brook during storm events and contributing to blockages/barriers (e.g., large volume in 8C and select material in section 12); note: it will be necessary to move the debris above the flood mark so that it isn't brought back to the channel during major storm events
4. Install additional brush mats in section 4D (in section downstream from bridge above structures installed in 2013) and identify sites in section 5A (above bridge) for additional structures
5. Experiment with use of Sand Wand (or similar) technology to further help with heavy siltation in 4D
6. Consider options for road/ATV trail restoration in sites where poorly constructed and/or maintained roads are generating siltation that is entering the brook (e.g., road beside the brook in 4D, road that crosses brook at 6A, and road along brook in 9B)
7. Install structures (e.g., bank logs or rip rap) to help stabilize and protect eroding banks, in particular in problem spots in 9A, 9B, 10B, 10C
8. Periodically thin alders in sections where growth is particularly dense, siltation is a problem, and banks appear weakened or vulnerable (e.g., 3A, 4A, & 7A)
9. Riparian areas where streamside vegetation is thin or absent (e.g., 4A, 5A, 5B, 6B, & 6C) can benefit from selective planting of native species
10. Selectively remove beaver dams that are barriers to fish passage, or, preferably, selectively remove material to create openings for fish during critical periods (e.g., migration) – sections requiring attention are 5B, 6A
11. Selectively thin (or remove if barrier to fish passage) accumulations of large woody debris (sections 3A, 4B, 5B, 6B, 6C)
12. Clear pile-up of dead spruce that have fallen across Gypsum Mine Brook (4C) and from riparian areas up to flood mark
13. Visually survey Gypsum Mine Brook above the dead spruce pile-ups to look

**Restoration projects that can be completed in the short term**

	<p>for additional nutrient sources to help explain abundance of green algae throughout the tributary</p> <ol style="list-style-type: none"> <li>14. Install in-stream structures to help stabilize/protect banks in any vulnerable locations around old farm crossings (rock fords) in 7B</li> <li>15. Install floating cover devices in open areas of lower brook (e.g., section 3)</li> <li>16. Investigate drainage pipe into brook in section 4B; identify source and look into follow-up actions if necessary</li> <li>17. Litter should be removed from sections of the brook close to the main roads or residential development (e.g., 3A, 3B)</li> <li>18. Continue to carry out maintenance to existing in-stream restoration structures (i.e., digger logs, deflectors, cribs, etc.) to ensure functionality in sections 8B, 9A, 9B, 10B, 10C, &amp; 11B</li> </ol>
<p style="text-align: center;"><b>Restoration projects that can be completed in the medium-long term</b></p>	<p><b>Restoration projects from Part 4 that can be completed in the medium-long term (5-10 years +) include the following:</b></p> <ol style="list-style-type: none"> <li>1. Although a considerable amount of effort has been directed at installing in-stream habitat restoration structures in sections 8 and 9 over the last decade, the channel should be left relatively untouched through much of these sections over the next few years in order to give the channel sufficient time to reform and stabilize after recent major disruptions (e.g., flash flood of August, 2013); once stabilized, this section should be reassessed for habitat requirements and a plan for new structures (e.g., digger logs, deflectors) should be considered</li> <li>2. Undersized bridges (i.e., narrow wooden bridges at upper and lower limits of section 6) should be considered for eventual replacement with larger structures; these undersized bridges can restrict flow (particularly during periods of high flow), lead to blockages and clogging (also targeted by beavers as dam sites), and are at risk of suffering from washouts</li> </ol>
<p style="text-align: center;"><b>Restoration projects that require monitoring or maintenance</b></p>	<p><b>Restoration projects from Part 4 that require ongoing monitoring or maintenance include the following:</b></p> <ol style="list-style-type: none"> <li>1. Sites with evidence of beaver activity (i.e., sections 5B, 5C, all of 6, 7B, and 8C) should be monitored and new beaver dams that create significant fish passage issues should be considered for removal</li> <li>2. Section of brook (8C) where main channel moved in 2013 into a channel bed occupied by the brook prior to 2003 should be monitored for problems with water spilling off and travelling down nearby ATV trails into the Fiset Brook watershed (this was a problem the last time the brook occupied this channel, in 2003)</li> <li>3. Effectiveness of techniques used to reduce siltation (e.g., installation of brush mats, use of Sand Wand technology) should be assessed (e.g., through 'before' and 'after' pictures) – in particular, section 4B, 5A, and possibly 5B</li> <li>4. In-stream structures should be revisited on an annual basis and after major storm events if possible in order to identify necessary maintenance needs, alterations, etc.; note: before installing any cover devices (e.g., as</li> </ol>

	<p>suggested as an option in open areas in lower brook) it is important to be aware that these can have high maintenance needs</p> <ol style="list-style-type: none"> <li>5. Locations where pile-ups of large woody debris have occurred should be monitored for new accumulations and any blockages should be removed or selectively thinned (e.g., 3A, 4B)</li> <li>6. Litter should be cleaned up periodically in sections of the brook close to high traffic roads or residential development (e.g., 3A, 3B)</li> </ol>
<p><b>Water quality improvements/monitoring projects</b></p>	<p><b>Water quality improvements/monitoring projects that should be considered:</b></p> <ol style="list-style-type: none"> <li>1. Establishment of a more structured water quality monitoring program (efforts to collect data on water quality in the past have suffered from a number of problems, including methodological inconsistencies, e.g., in terms of instruments used, locations sampled, etc)</li> </ol>

## Sections 1 & 2



1a – Confluence of Aucoin Brook and Cheticamp River



1a – Pitcher plant in bordering bog



1b – Wide channel in area by Lac a Mederic



1b – Narrow channel upstream from Lac a Mederic



2a – Wooden bridge on Chemin Bichoure



2a – Channel upstream from bridge



2a –Wetland vegetation at upper limit



## Section 3



## Section 4



4a – Narrow, incised bank & thin riparian



4b – Straight channel, mixed hardwood and softwood



4a – Inlet with oil and brown/orange algae



4c – Abundant periphyton (green algae) in Gypsum Mine Brook



4c – Confluence of gypsum mine tributary and Aucoin Brook



4d – Remnants of old crossing



4d – Old cavity tree



4d – Wooden trail bridge to gypsum mine (downstream view)



# Sections 5 & 6



5a – Remnants of old crossing



5a – Large woody debris & thin riparian area



5b – Large woody debris blockage



5b – Beaver dam



6a – Narrow wooden bridge with dam on upstream side



6a – Brook flooding road at bridge



6a – Beaver dam upstream



6c – Beaver lodge



6c – View upstream from dam

## Section 7



7a – Narrow wooden bridge



7a – Deep section – mud and silt above bridge



7b – Remnants of old rock crossings



7b – Recent beaver activity



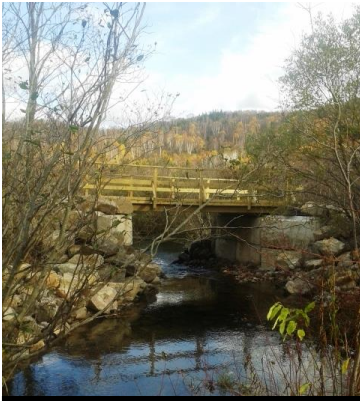
7c – Outlet of 4 culverts (Removed in 2013)



7c – New (2013) wooden trail bridge (in place of 4 culverts)



## Section 8



8a – Upstream view of new (2013) wooden trail bridge (was 4 culverts)



8b – Partially buried digger log



8b – Old deflector off right bank



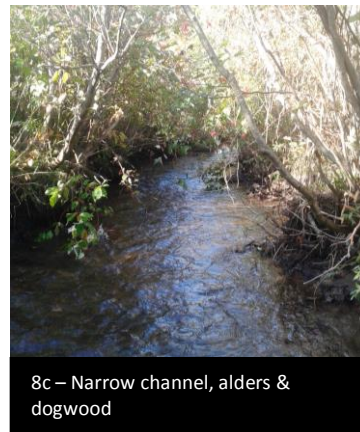
8b – Large dead spruce on right bank



8c – Downstream start of new (2013) channel



8c – Unnamed tributary



8c – Narrow channel, alders & dogwood



8c – Beaver activity on new channel



8c – Upstream start of new (2013) channel



8c – Blockage of woody debris – contributed to substrate build-up that led to channel changing course



8c – Unnamed tributary on right bank of old channel



8c – Old channel in area of heavy substrate deposition (prior to August 2013 storm event)



8c – Just downstream from start of new channel



## Section 9



9a – Example of brook running into forest just upstream of start of new channel



9a – Bank logs right bank (654488 5163745)



9a – Example of erosion on right bank



9a – Unstable, eroding left bank at upper limit



9b – Digger log and deflector requiring maintenance (DL no longer reaches right bank)



9b – Example of digger log requiring maintenance



9b – Crib to help stabilize eroding left bank



9b – Erosion of bank and road on left bank just downstream from bridge



9b – Rocks used to help stabilize washed out left bank and road



## Section 10



10a – Guardrail bridge (upstream view)



10b - Erosion left bank (talus slope)



10b – Example of old in-stream structure



10b – Example of old in-stream structure



10b – Rock accumulation by old channel off left bank (downstream view)



10c - Bedrock outcropping



10c – Erosion on right bank and pile up



## Section 11



11a – Unnamed tributary (right bank)



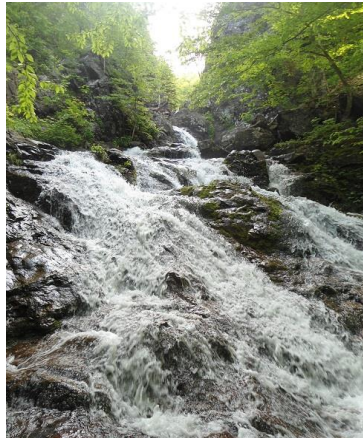
11b – Uppermost digger log



11b – Erosion, left bank



11b - Old foundation off of left bank



11c - First barrier falls



11c - Remnants of old dam on 1<sup>st</sup> barrier falls

## Section 12



12– Third falls



12 – Uppermost falls



12– Main channel above falls



12– Unnamed tributary



12 - Bog



## Reference Material

1. Agriculture and Agri-Food Canada. (1963). Soil Survey of Cape Breton Island, Nova Scotia. Accessible online at <http://sis.agr.gc.ca/cansis/publications/surveys/ns/ns12b/index.html>
2. Bridgland, James. (2014). Personal Correspondence. Park Ecologist, Cape Breton Highlands National Park
3. Caines, Stephen. (2011). Aucoin Brook. Report on Aucoin Brook for the Cheticamp River Salmon Association prepared by staff with Nova Scotia Salmon Association's Adopt-a-Stream program
4. Natural Resources Canada. (2012). The Atlas of Canada – Toporama. Accessible online at <http://atlas.gc.ca/site/english/toporama/index.html>
5. Nova Scotia Department of Natural Resources. (2006). Ecological Land Classification Map of Nova Scotia. Accessible online at <http://gis4.natr.gov.ns.ca/website/nselcmap/viewer.htm>
6. Nova Scotia Salmon Association. (2005). The Nova Scotia Adopt-a-Stream Manual: A Watershed Approach to Community-based Stewardship. Accessible online at <http://manual.adoptastream.ca/Manual.html>
7. Smith, Rosie. (2013). Temperature Data from Cheticamp 2005 – 2013. Parks Canada, Cape Breton Highlands National Park.