

SALMONID HABITAT RESTORATION
INVERNESS SOUTH ANGLERS ASSOCIATION

MacLeod's Settlement Installation Project

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Date: 2019

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PROJECT BRIEF

CONTACT INFORMATION	
GROUP	Inverness South Anglers Association, (ISAA)
CONTACTS	Dave Cameron, <i>Chair Official</i> Geoff Nishi, <i>Chair Official</i> Kailey Mortensen, <i>Field Technician</i>
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WEBSITE	N/A

PROJECT TITLE
Salmonid Habitat Restoration – 2019 Installation Project in MacLeod’s Settlement

SITE LIST (ALL)	
Watercourse(s):	Southwest Mabou River, MacLeod’s Brook
Watershed(s):	Mabou Harbour Watershed

PROJECT BRIEF DESCRIPTION
Describing this year’s project, including habitat issues this project is addressing, and restoration techniques used.
This year’s project had taken place in MacLeod’s Settlement where the Inverness South Anglers Association had restored 3,612.5 meters of fish habitat between two watercourses on the Mabou Harbour Watershed. The 12 weeks of restoration was spent installing a total of 45 new structures such as digger logs, deflectors, rock sills,

brush bundles, and bank stabilization done by hand rock.

Out of the 45 structures built, eight were placed on the Southwest Mabou River. The Southwest Mabou River is a 16-18 meters wide channel which made the distance between structures approximately 100 meters apart. Due to the width of this river, the channel is straight in some areas and lacks a meandering pattern. It also has shallower water, especially in the warmer months which can increase the water temperature and decrease migratory access for fish. As the width of the river is so large, we chose to build large tree deflectors and stabilized a bank with hand rock. The deflectors are two tiers high and are braced in with 6x3 meter logs. Each deflector alternates sides of the river and are filled with rock out of the substrate which tapers up into the bank height. These deflectors will direct the stream flow and will eventually create a narrowed-out river with a meandering pattern. This will also form deeper channels and pools which are great for fish habitat and will also supply migratory access. On this river alone, ISAA had restored 800 meters of fish habitat and an area of 1,600 squared meters.

The remaining 37 structures were built on MacLeod's Brook which is a tributary to the Southwest Mabou River. This channel averages between 7-9 meters in width which made the distance between structures approximately 50 meters apart. The structures placed within this brook includes several digger logs, rock sills, digger logs with deflectors, brush bundles, and one deflector. These structures will enhance the quality of the pools, meandering patterns, gravel/sand deposits and will narrow out the channel even more over time. By the end of project completion, ISAA had restored 2,812.5 meters of habitat which equaled out to 22,500 squared meters of area.

Project Delivery (Overall Project)

VOLUNTEERS	
Describe How Volunteers Contribute to your Adopt-A-Stream Project and to your Organization in General	<p>ISAA's volunteers contributed to the Adopt-A-Stream project and to the overall organization in several ways. The volunteer components include:</p> <ul style="list-style-type: none"> • Project Management (127.5 hrs) • Accounting/Bookkeeping (390 hrs) • Project Involvement (655 hrs) • Committee Meetings (20 hrs) • Trout Stocking and Salmon Brood Stock Collection (72 hrs and 48 hrs) • Fishing Derby (220 hrs) • NSLC Adopt-A-Stream

Number of People Volunteering on All Aspects of the Project	2 +
Total Volunteer Hours	1,532.5 hours
Approximate Breakdown of Roles	Both Dave Cameron and Geoff Nishi, chair officials of the Inverness South Anglers Association volunteer their time to organize and coordinate project activities for each season of Salmonid Habitat Restoration. Each project requires funding money and is obtained by the volunteers of ISAA with the help of Adopt-A-Stream. Both Dave and Geoff work together on project management, accounting/bookkeeping, taking part in committee meetings, stocking trout and collection of brood stock, organizing the annual fishing derby and much more.
Management/Supervision	Dave Cameron, and Geoff Nishi are both project managers for the Inverness South Anglers Association. Each volunteer approximately 127.5 hours of their time each year to project management.
Labour	N/A
Other	N/A

PAID PERSONNEL	
Number of Project Workers	<p><u>Crew Members:</u> (5 Crew Members) Nathan MacLean (18 weeks) Alex MacKinnon (17 weeks) Michael Campbell (17 weeks) Sandy Rankin (14 weeks) Shaw Cameron (3 weeks)</p> <p><u>Field Technicians:</u> (2 Field Tech.) Kailey Mortensen (18 weeks) Cody Langille -<i>Student Intern</i> (10 weeks)</p>
Total Tally Weeks of Work	18 weeks total <ul style="list-style-type: none"> • 6 weeks of winter damage assessments and remediation • 12 weeks of new installation

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Start Date:	May 27 th ,2019
End Date:	September 27 th , 2019
Other Paid Staff Contributing to the Project	Charles MacInnis, <i>Planning and Technical Consultant</i>

MABOU HARBOUR WATERSHED

During the 2019 season of habitat restoration, the Inverness South Anglers Association focused on two watercourses installing new structures to improve fish habitat and migratory access within the Mabou Harbour Watershed. The Southwest Mabou River Project was funded by Adopt-A-Stream, and the Project on MacLeod's Brook was funded by both Parks Canada and Adopt-A-Stream. The structures built mostly consisted of digger logs and deflectors along with a few rock sills, and brush bundles.

To see a further breakdown of the type and amount of structures installed on the Southwest Mabou River, and MacLeod's Brook, see table 1.

Table 1. Showing a breakdown of the type of structures built in the Mabou Harbour Watershed during the 2019 installation project.

WATERSHED:	Mabou Harbour Watershed		
WATERCOURSES:	Southwest Mabou River	MacLeod's Brook	TOTAL
STRUCTURES INSTALLED:	-	-	-
Digger Logs	0	17	17
Deflectors	7	1	8
Digger Logs with Deflectors	0	5	5
Rock Sills	0	11	11
Rock Sills with Deflector	0	1	1
Brush Bundles	0	2	2
Bank Stabilization	1	0	1
TOTAL	8	37	45

The map below displays the GPS coordinates of where each structure was built within the Southwest Mabou River and MacLeod's Brook. Each flag placed on the map is color coded, representing a different structure type.

- Blue Flag = deflector
- Blue Triangle = digger log with deflector
- Red Flag = digger log
- Red Triangle = rock sill
- Green Flag = brush bundle and bank stabilization
- Circle with **X** = debris jam/beginning of beaver dam

- Red Track = beaver dam boundary line

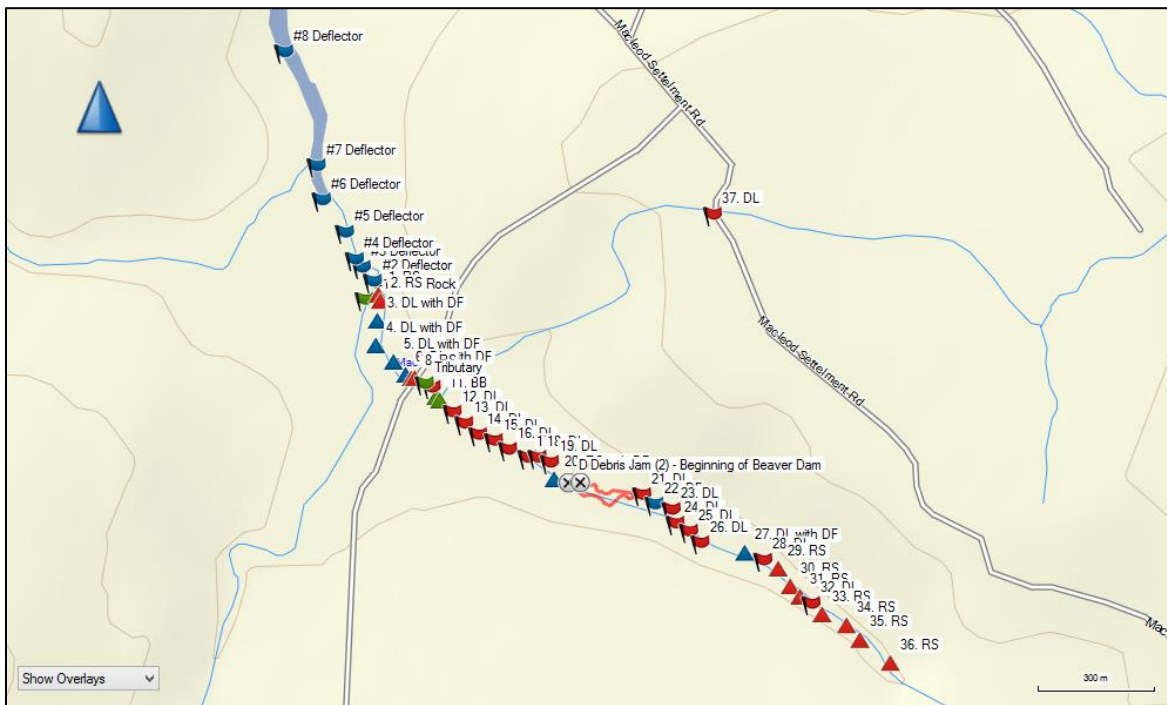


Figure 1. Showing the flagged coordinates of each structure installed on the Southwest Mabou River and MacLeod's Brook, 2019.

Watershed Maps

The maps seen below display both a secondary and tertiary watershed boundaries for the Mabou Harbour Watershed along with all the water crossing locations.

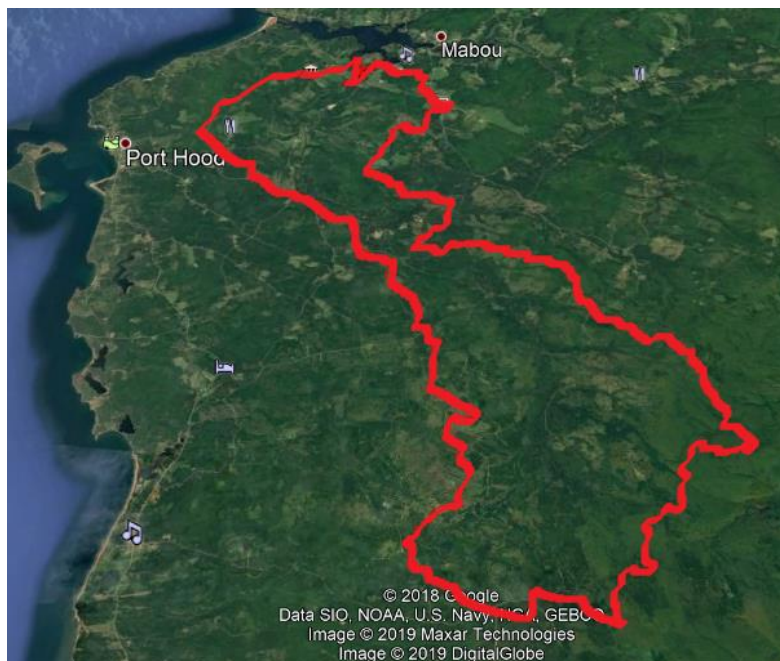


Figure 2. Showing the secondary watershed boundaries for the Mabou Harbour Watershed.



Figure 3. Showing the tertiary boundaries for the Mabou Harbour Watershed.

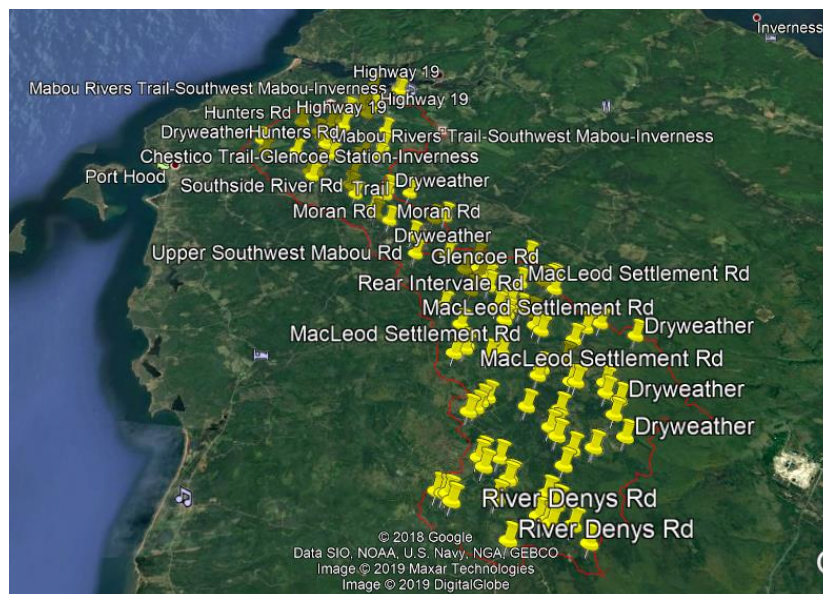


Figure 4. Showing all water crossing locations on the Mabou Harbour Watershed.

Context Maps & Directions

The maps below were retrieved from Google Maps. One map shows the location of MacLeod's Settlement without satellite imagery which better displays where the watercourses are located and shows directions to the site. The second map shows the location of the site within the watershed boundary, with satellite imagery.

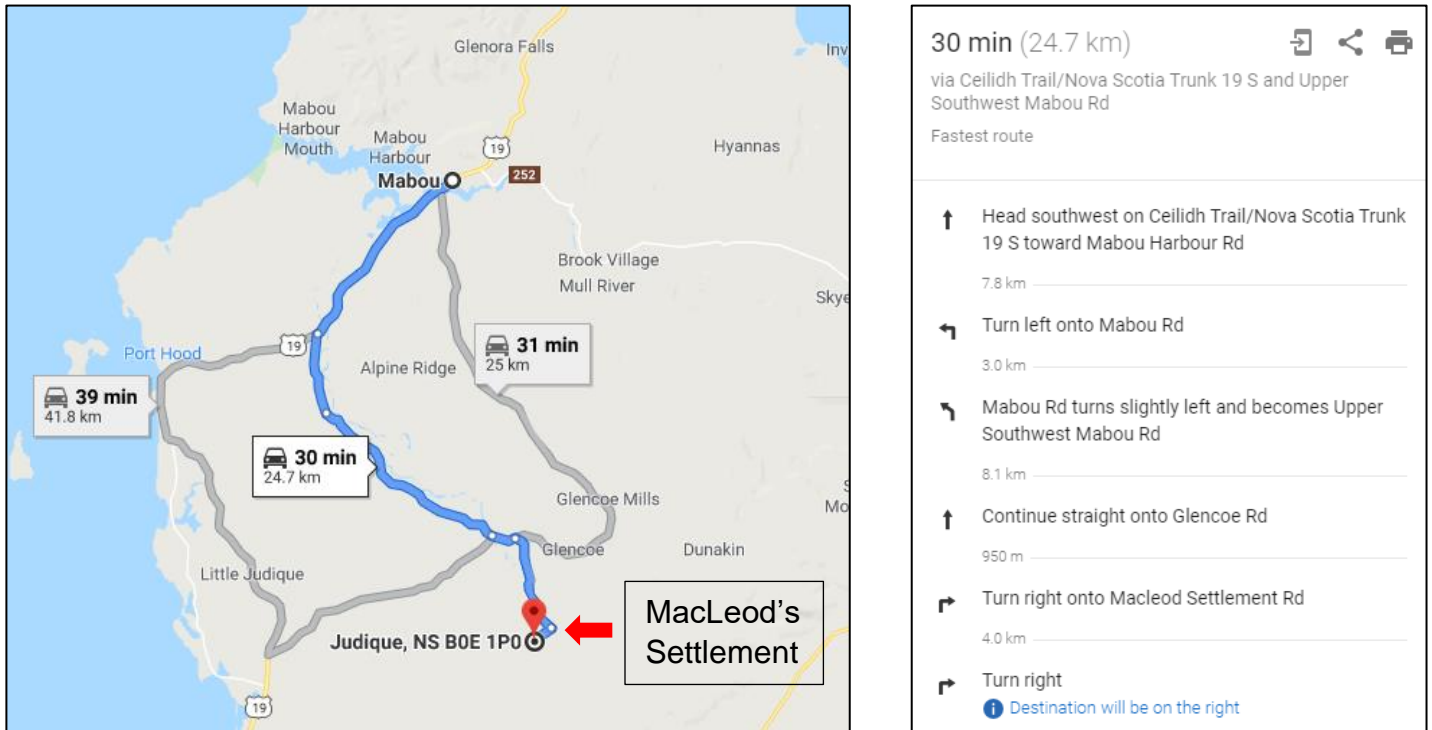


Figure 6. Showing a context map with the directions on how to get to the MacLeod's Settlement worksite from Mabou.

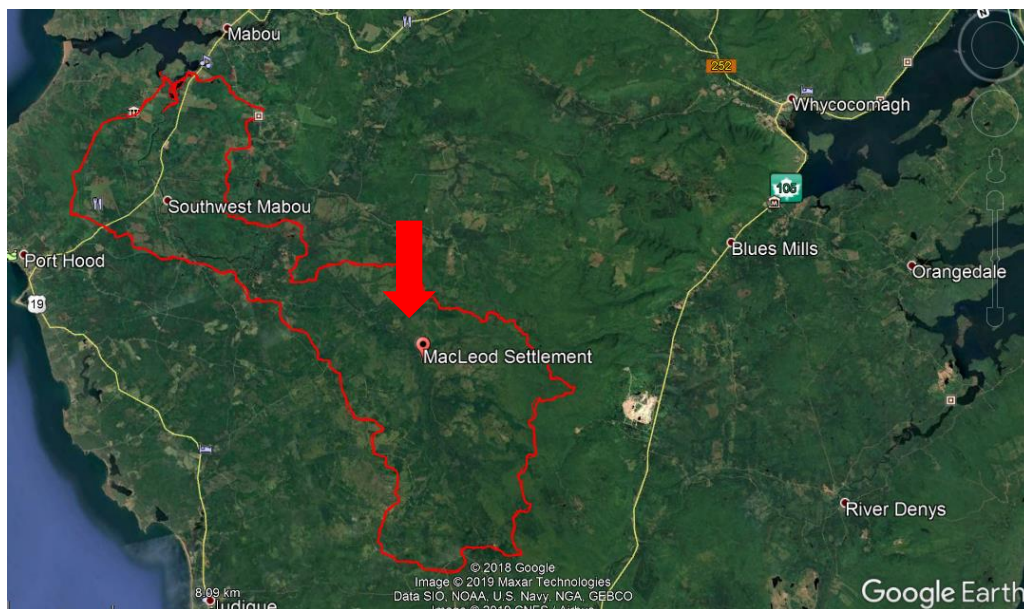


Figure 5. Showing a context map of the project location within the boundary lines of the Mabou Harbour Watershed.

MacLeod's Brook

<u>LOCATION INFORMATION</u>	
Watercourse	MacLeod's Brook
Watershed	Mabou Harbour Watershed
Location	MacLeod's Settlement
Nearest Community	Judique/Mabou
Road Crossing (Access Point)	Unnamed Road off MacLeod's Settlement Road
Map # (NS Topo Series 1:50,000)	Lake Ainslie 11K/3
Coordinates: UTMS	
Downstream Project Limit: Easting	0627714
Downstream Project Limit: Northing	5086186
Upstream Project Limit: Easting	0629004
Upstream Project Limit: Northing	5085487
<u>PROJECT RESULTS:</u>	
INSTREAM HABITAT STRUCTURES	
Design Width	Downstream from the road: 9 meters Upstream from the road: 7-8 meters
Distance Between Structures (average design)	50 meters
Number and Type of Structures	Digger Logs with Deflectors: 5 Rock Sills: 11 Rock Sills with Deflectors: 1 Digger Logs: 17 Deflectors: 1 Brush Bundles: 2
Total Length (meters) of Habitat Restored	2,812.5 meters or 2.81 kilometers
Total Area (Sq. Meters) of Habitat Restored	22,500 squared meters

The map seen below displays the structures that were installed in MacLeod's Brook during the 2019 season of salmonid habitat restoration. Each flag is color coded and stands for a different type of structure.

- Red Flag = digger log
- Red Triangle = rock sill
- Blue Flag = deflector
- Blue Triangle = digger log with deflector
- Green Flag = brush bundle
- Circle with X = debris jam/beginning of beaver dam
- Red Track = beaver dam boundary line

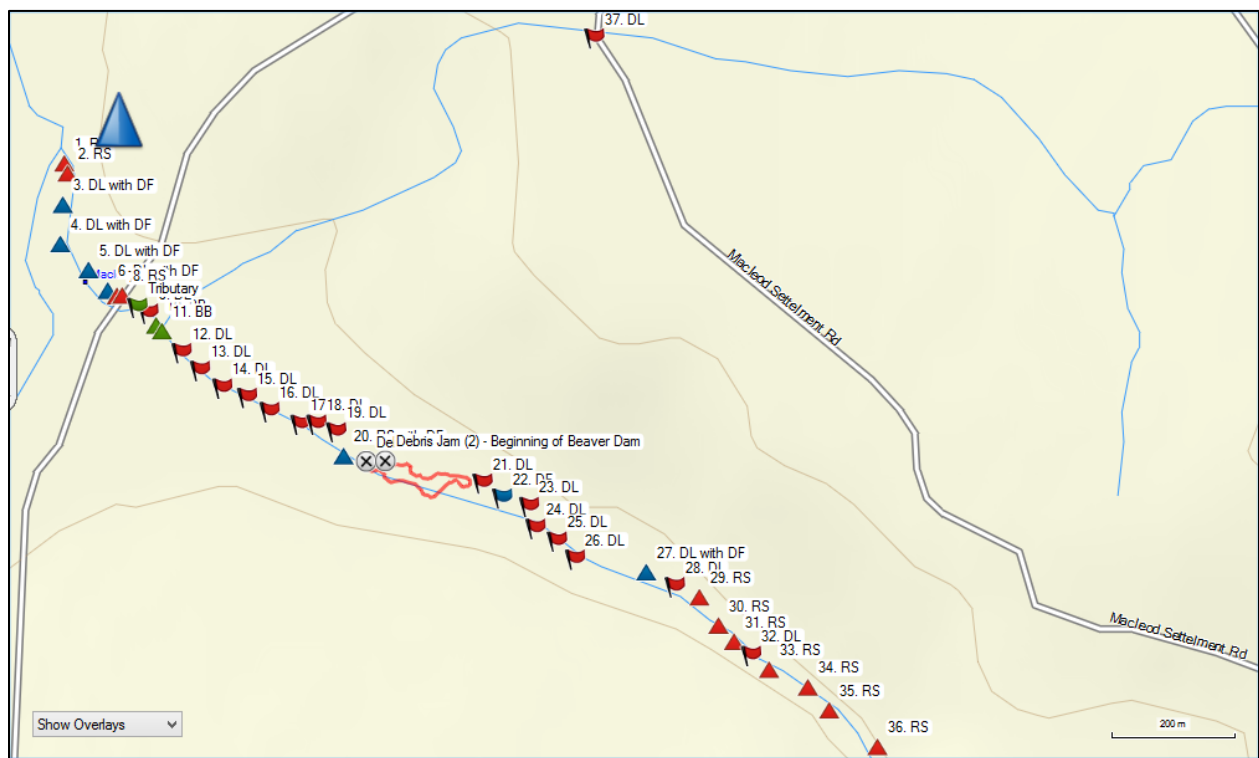


Figure 7. Showing the flagged coordinates of each structure installed in MacLeod's Brook during the 2019 season of salmonid habitat restoration.

The photos seen below show the before and after results of each structures that was installed in MacLeod's Brook. The photos start from the furthest structure downstream and continues upstream. The last photo shows the structure that was installed on a cold-water tributary that enters MacLeod's Brook.



Figure 8. Structure #1 - rock sill. This is the furthest structure downstream.

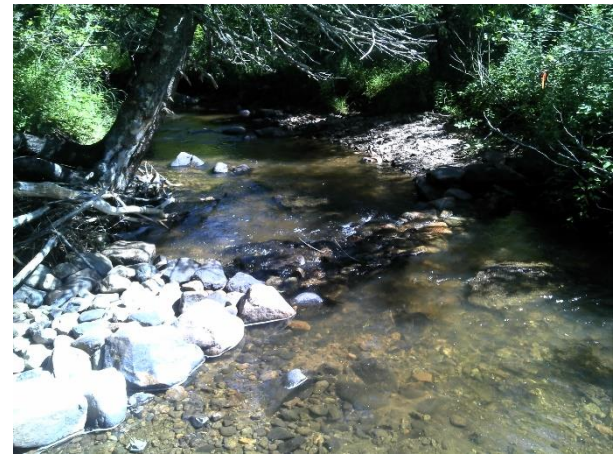


Figure 9. Structure #2 - rock sill.



Figure 10. Structure #3 - digger log with deflector.



Figure 11. Structure #4 - digger log with deflector.



Figure 12. Structure #5 - digger log with deflector.



Figure 13. Structure #6 - digger log with deflector.



Figure 14. Structure #7 - rock sill.



Figure 15. Structure #8 - rock sill just below the culvert

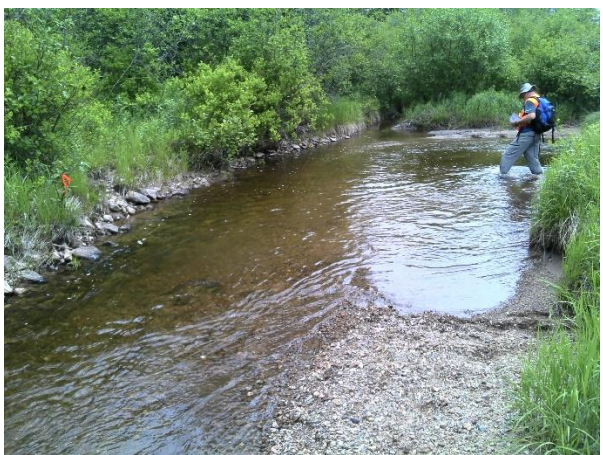


Figure 16. Structure #9 - digger log. This is the first structure installed upstream from the road.

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Figure 17. Structure #10 - brush bundle made with hay bails.



Figure 18. Structure #11 - brush bundle made with alders.



Figure 19. Structure #12 - digger log.



Figure 20. Structure #13 - digger log.

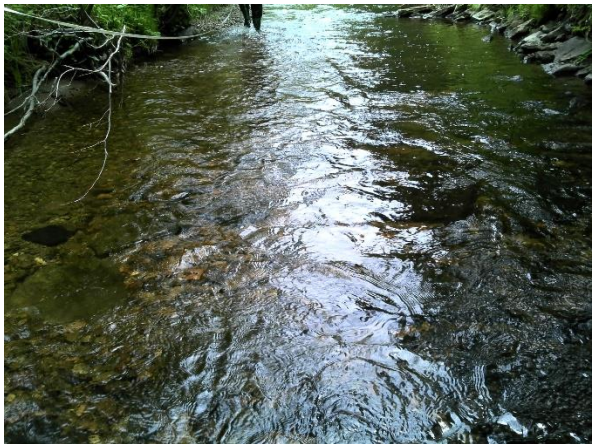


Figure 21. Structure #14 - digger log.



Figure 22. Structure #15 - digger log.



Figure 23. Structure #16 - digger log.



Figure 24. Structure #17 - digger log.



Figure 25. Structure #18 - digger log.



Figure 26. Structure #19 - digger log.



Figure 27. Structure #20 - rock sill with a deflector.

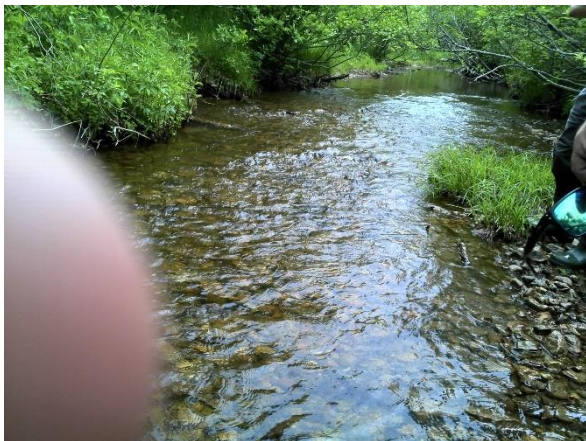


Figure 28. Structure #21 - digger log.



Figure 29. Structure #22 - deflector.



Figure 30. Structure #23 - digger log.



Figure 31. Structure #24 - digger log.



Figure 32. Structure #25 - digger log.



Figure 33. Structure #26 - digger log.



Figure 34. Structure #27 - digger log with deflector.



Figure 35. Structure #28 - digger log.



Figure 36. Structure #29 - rock sill.



Figure 37. Structure #30 - rock sill.



Figure 38. Structure #31 - rock sill.



Figure 39. Structure #32 - digger log.

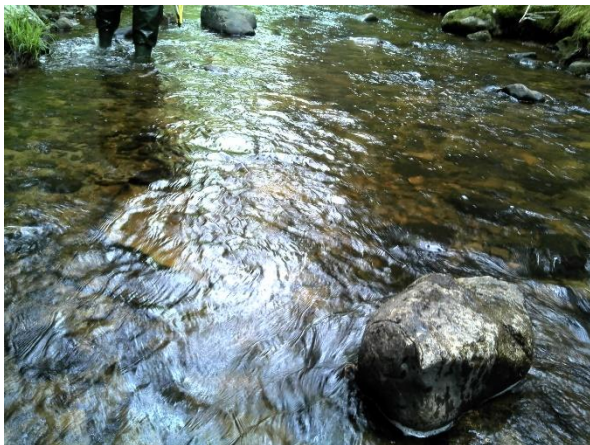


Figure 40. Structure #33 - rock sill.



Figure 41. Structure #34 - rock sill.

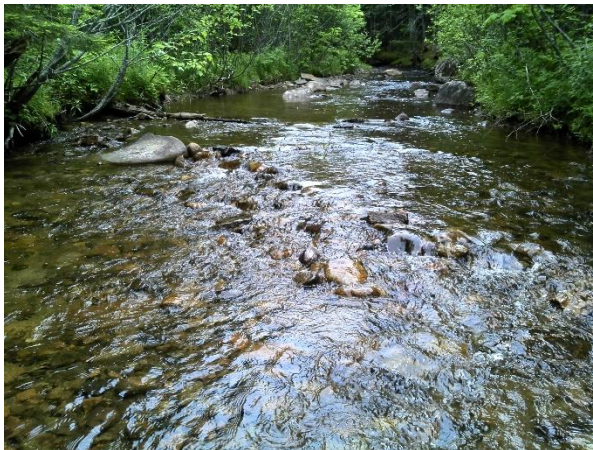


Figure 42. Structure #35 - rock sill.

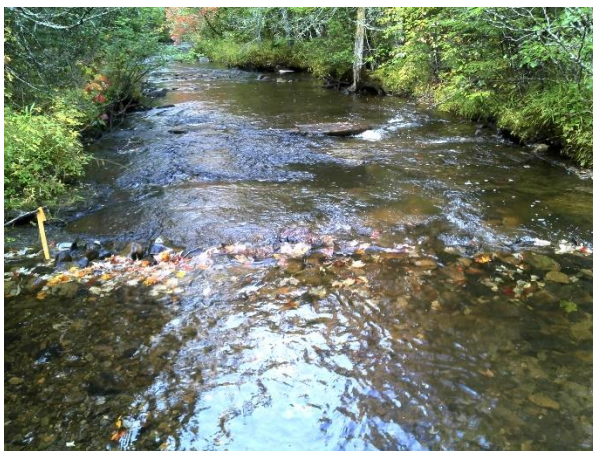


Figure 43. Structure #36 - rock sill below the falls.



Figure 44. Structure #37 - digger log on cold water tributary.

Other Activities & Results

On July 23rd, 2019 ISAA had received a Nuisance Wildlife Permit for MacLeod's Brook to trap/remove a colony of beavers and to notch the dam to lowers the water levels and create fish passage.

The permit was authorized by the Department of Natural Resources Wildlife Division, Whycocomaugh Office. It allowed ISAA to destroy Nuisance Wildlife while following the safety measures outlined in the Wildlife Act – section 28. This task was carried out by a licenced Nuisance Wildlife Operator between the dates of July 23rd – August 12th, 2019.

The Nuisance Wildlife Operator had successfully removed six beaver from MacLeod's Brook which makes the beaver dam no longer "active".

Watercourse: MacLeod's River

Watershed: Mabou Harbour Watershed

Location: MacLeod's Settlement

Area of Beaver Dam: 0.9531 Acres

Maps and Coordinates:

COORDINATES			
DMS		UTM 20 T	
Longitude	N45° 54' 53.9"	Easting	0628164
Latitude	W61° 20' 50.5"	Northing	5085929



Figure 45. Showing the boundary lines of the beaver dam located on MacLeod's Brook, 2019.

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PID #: 50042928

Parcel Size: 4,356,000 sq. ft. (100.00 acres)

Parcel Location: Macleod Settlement Road, Macleod Settlement

COORDINATES			
DMS		UTM 20 T	
Longitude	N45° 54' 46.0590"	Easting	0628320
Latitude	W61° 20' 43.4031"	Northing	5085689

Woodlot Description:

The 100-acre woodlot located in MacLeod's Settlement is considered to be a vacant lot. The woodlot appears to be previously cut and regenerated with an abundance of softwood species. The species composition is primarily made up of softwood tree species such as balsam fir, white spruce, and black spruce with an average height of 10-14 meters. The remaining hardwood tree species include sugar maple, alder, and service berry with a height range from 4-12 meters. The surrounding areas around MacLeod's Brook mostly consists of alders, and sugar maple with many other small shrubs, grass, and ferns.

Southwest Mabou River

<u>LOCATION INFORMATION</u>	
Watercourse	Southwest Mabou River
Watershed	Mabou Harbour Watershed
Location	MacLeod's Settlement
Nearest Community	Judique/Mabou
Road Crossing (Access Point)	Unnamed Road off MacLeod's Settlement Road
Map # (NS Topo Series 1:50,000)	Lake Ainslie 11K/3
Coordinates: UTMS	
Downstream Project Limit: Easting	0627345
Downstream Project Limit: Northing	5087003
Upstream Project Limit: Easting	0627575
Upstream Project Limit: Northing	5086377
<u>PROJECT RESULTS:</u>	
INSTREAM HABITAT STRUCTURES	
Design Width	16-18 meters
Distance Between Structures (average design)	100 meters
Number and Type of Structures	Deflectors – 7 Bank Stabilization (Hand Rock) - 1
Total Length (meters) of Habitat Restored	800 meters
Total Area (Sq. Meters) of Habitat Restored	1,600 squared meters

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The map seen below displays the structures that were installed in the Southwest Mabou River during the 2019 season of salmonid habitat restoration. Each flag is color coded and stands for a different type of structure.

- Blue Flag = deflector
- Green Flag = bank rock

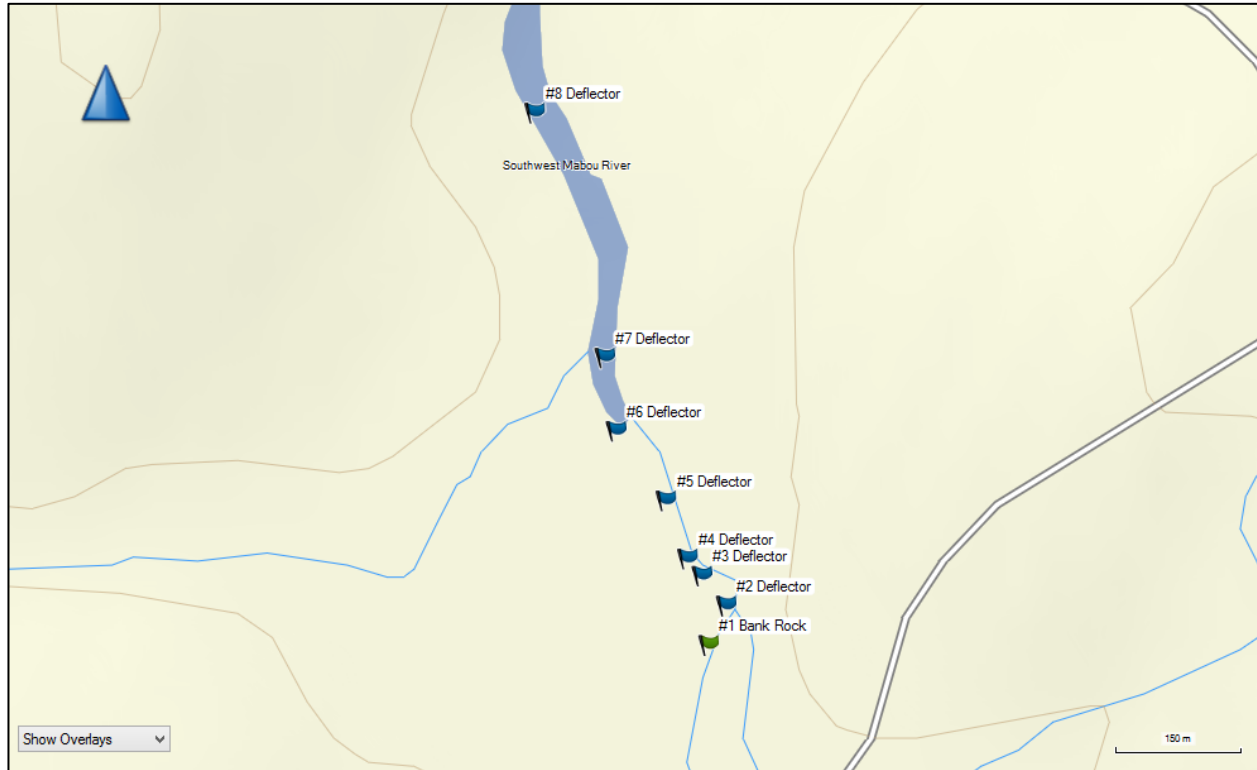


Figure 46. Showing a map of the flagged coordinates of each structure installed in the Southwest Mabou River, 2019.

The photos seen below show the before and after results of each structures that was installed in the Southwest Mabou River. The photos start from the furthest structure upstream and continues downstream.

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Figure 47. Structure #1 - bank rock. This is the furthest structure upstream.



Figure 48. Structure #2 - deflector 6x3 meters, two tier.



Figure 49. Structure #3 - deflector 6x3 meters, two tier.



Figure 50. Structure #4 - deflector 6x3 meters, two tier.



Figure 51. Structure #5 - deflector 6x3 meters, two tier.



Figure 52. Structure #6 - deflector 6x3 meters, two tier.





Figure 55. Structure #7 - deflector 6x3 meters, two tier.



Figure 54. Structure #8 - deflector 6x3 meters, two tier.