

# Habitat Assessments of Joe Brook



**(F201-212)**

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## Executive Summary

In summer 2021, EOS completed habitat assessments of Joe Brook to help establish baseline conditions of the stream and identify areas of concern for future, potential restoration projects. These assessments consisted of collecting information on physical characteristics, riparian conditions, and basic water quality parameters in 100-meter increments throughout the stream.

EOS assessed a total of 7.7 km of Joe Brook, in 100-meter reach increments. A total of 77, one-hundred-meter reaches were assessed. Restrictions for these assessments included limited road access and challenging field conditions. A points system was used to rank each 100 m assessment. Six factors were used in the points system to define a potential restoration site, and the number of points were used to classify 100 m assessments as healthy, healthy with problems, or unhealthy.

In summary, 35.1% (27 reaches) of assessments in Joe Brook were deemed healthy, 63.6% (49 reaches) were healthy with problems, and 1.3% (1 reach) was unhealthy. Common themes in Joe Brook were bank erosion, and low shade cover. There were also some sites where the banks were covered in mostly grasses.

Recommendations for the Joe Brook Watershed consist of tree planting in riparian zones where the banks are bare of vegetation, have large amounts of grassy vegetation or are eroding, removing large debris from the stream bed, and engaging landowners.

These recommendations are to help direct EOS as we continue our efforts in Joe Brook. The recommendations are not all inclusive but rather an overview of the restoration activities that could be undertaken.

Stream habitat assessment data gathered from this project will provide a record of the current state of stream and riparian health of Joe Brook. Using this data, EOS and other organizations can plan restoration projects for problem areas and work to prevent potential future problems by maintaining the healthy reaches of streams. In the future, EOS would like to

- 1) Extend assessments of Joe Brook to areas upstream that were not reached, perform habitat assessments on other streams in the Tantramar River Watershed, the Cape Tormentine watershed and Rockport – Dorchester watershed.
- 2) Restore unhealthy sections of Joe Brook

## Introduction

In 2021, EOS Eco-Energy conducted habitat assessments along 7.7 km of Joe Brook with funding from the New Brunswick Wildlife Trust Fund. The goal of this work was to obtain baseline data for Joe Brook, find what types of habitats exist, how healthy they are, and identify any issues facing the riparian and aquatic habitats, along the brook.

Healthy riparian zones provide a number of ecosystem services which protect and strengthen the environment, such as improved water quality, water storage and flood mitigation, erosion protection, and groundwater recharge. In addition, healthy riparian zones benefit wildlife, as species living in riparian zones and the water body are dependent on the area for habitat and food requirements. Healthy riparian zones lead to healthy aquatic ecosystems. They help improve water quality and reduce sedimentation into the river, which can be detrimental to aquatic ecosystems by suffocating fish and burying aquatic insects.

There are many unknowns in terms of watershed health in our region due to the previous lack of a watershed group, until the establishment of EOS's Chignecto Watersheds Committee in 2017. EOS assessed Joe Brook, with no baseline data available. The brook contributes greatly to habitat diversity, the food chain, and water chemistry within the watershed. The brook is a spawning habitat for brook trout and is an important recreational fishing area. It flows into Silver Lake, a popular swimming, boating, and fishing area, and is the main inlet.

Land uses in the area include forestry activity, residential developments, and agriculture, all of which can have varying degrees of impact on our watershed habitats. Degradation of various habitat diminishes a watershed's capacity to provide critical ecosystem functions, which in turn impacts aquatic ecosystems.

The goal of this work was to obtain baseline data on Joe Brook and identify any problem areas along the brook, to guide future restoration activities. The information gathered from this project will provide valuable data including stream channel characteristics (wet width, depth), riparian characteristics (vegetative cover, shade cover, bank conditions), and aquatic habitat conditions (substrate composition, flow). These assessments are among the first steps in establishing baseline conditions for this watershed, through identifying existing areas of concern, and will ultimately help with developing a watershed management plan. Using this data, we can work towards improving and maintaining healthy aquatic & riparian habitats.

## Methodology

Stream habitat assessments were conducted using an EOS Habitat Assessment Field Sheet which was based on the "Habitat Assessment Field Sheet" developed by the Kennebecasis Watershed Restoration Committee (KWRC). A copy of the EOS Habitat Assessment Field Sheet can be found in Appendix 1. The assessments involved a number of measurements, including GPS coordinates, photos, reach length (100 m reaches were used), stream channel

characteristics (wet width, depth), riparian characteristics (vegetative cover, shade cover, bank conditions), and aquatic habitat conditions (substrate composition, flow). Any other notes of interest were included (e.g., any wildlife seen, aquatic barriers, bridges, threats to water quality, garbage/dump sites, beaver activity, etc.). In-situ water quality measurements (temperature, pH, conductivity, dissolved oxygen, total dissolved solids, salinity) were also taken using a Hanna Multiparameter probe. Most of the data was based on observation and is therefore subject to interpretation.

Following data collection, EOS staff compiled site information into a condensed, readable format (Appendix 2). An [interactive Google map](#) was created, mapping the coordinates and habitat information for each assessment. Mapped assessments also included photos of riparian and stream habitat, and a link to raw data sheets that were transcribed onto Google Docs (Figure 1).



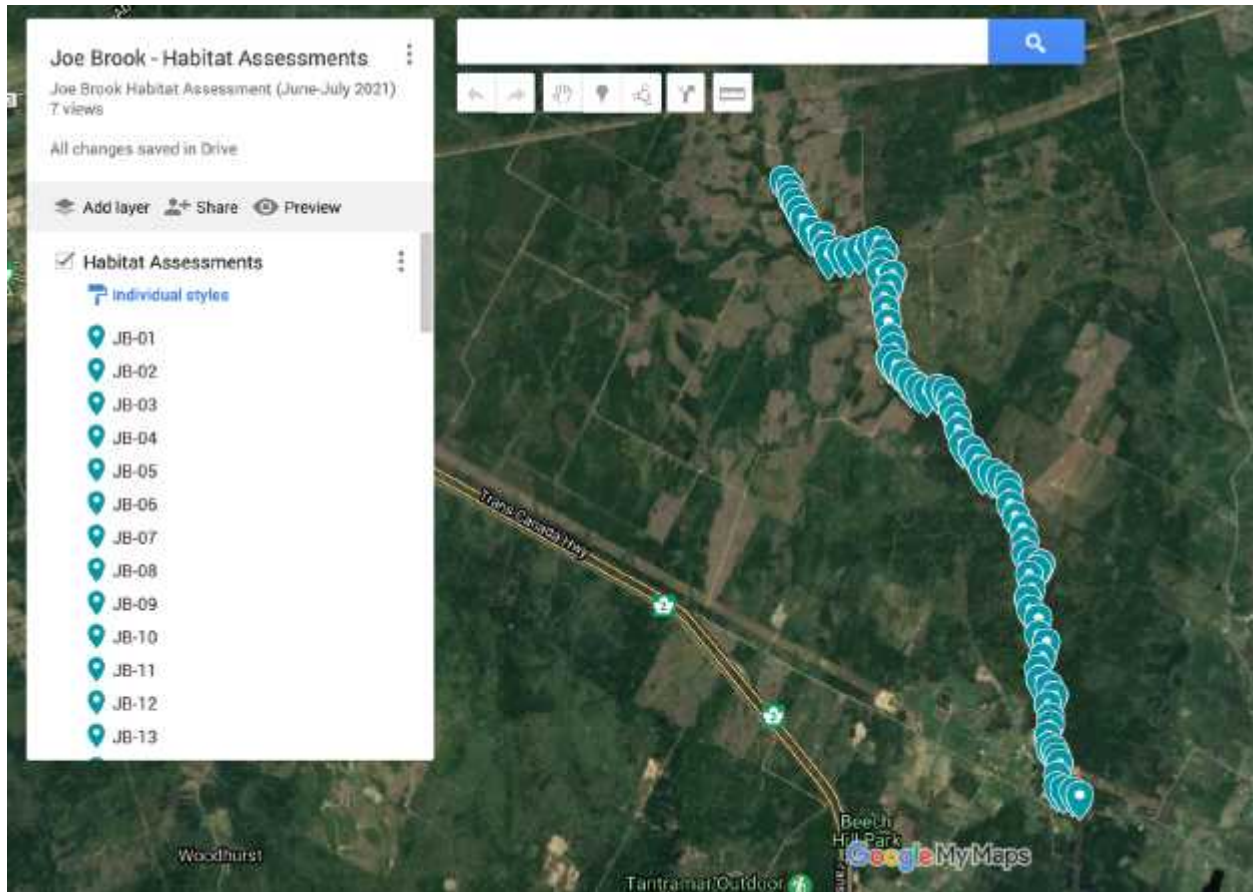


Figure 1: Screenshot of the Joe Brook Interactive Google Map (Link: <https://www.google.com/maps/d/u/0/edit?mid=1AX8vFMAwCaoizforofeXHTqkSOEo9lyW&ll=45.97952315912335%2C-64.39435593652343&z=13>)

## Results

In the summer of 2021, EOS conducted stream habitat assessments covering 7.7 km of Joe Brook. Assessments were performed every 100 meters; therefore, a total of 77 assessments were completed along Joe Brook. Restricted road access and challenging field conditions were limitations for this project.

Raw data is summarised into tables below that represent the 3 main component of a habitat assessment. Riparian Zone Conditions (Table 1), Channel Conditions (Table 2), Aquatic Habitat Conditions (Table 3). Assessment conditions were averaged for each section of the stream. The stream was divided into three sections for the purposes of analysis. The three sections were recently *clear cut* (1-30), previously clear-cut *forested* (31-64) and residential/agricultural (*fields*) (65-77). Appendix 3 gives more details around clear cutting in the area. Appendix 4 shows the residential and agricultural areas in more detail.

These correspond with upstream, midstream, and downstream, respectively. The following tables represent a summary of average habitat conditions for each section of the brook, that are important for identifying healthy watersheds (Table 1, 2, and 3).

Table 1: Averaged data for riparian zone conditions of Joe Brook

Stream Section	Riparian Zone Conditions										
	Left Bank Conditions			Right Bank Conditions			Vegetative Cover				
	Stable (%)	Slightly Eroding (%)	Heavily Eroding (%)	Stable (%)	Slightly Eroding (%)	Heavily Eroding (%)	Bare (%)	Grasses (%)	Shrubs (%)	Trees (%)	Shade Cover (%)
Clear-cut	39	54	7	50	42	6	7	44	1	48	32
Forested	45	43	12	46	45	8	6	34	2	58	20
Fields	69	28	2	64	35	1	2	32	38	29	17

Riparian zone conditions were on average, fair, with high amounts of slight erosion and low shade cover affecting the overall scores. Average bank conditions had high amounts of slight erosion (over 40%) for the first two sections of stream, on both sides of the bank (Table 1). Average vegetation cover for grasses were no more than 44% (Table 1). Combined averages of shrub and tree cover remained above 49% (Table 1). Lastly, downstream (fields) had the lowest average shade cover with 17% (Table 1) which is likely due to grasses and shrubs having the highest percentage of vegetation cover.

Table 2: Averaged data for channel conditions in Joe Brook

Stream Section	Channel Conditions									
	Stream Measurements			Substrate Composition						
	Reach length (m)	Average Depth (cm)	Average Wet Width (m)	% Bedrock	% Boulder	% Rocks	% Gravel	% Sand	% Fines	% Embeddedness
Clear-cut	3000	18	5	10	7	45	16	11	9	15
Forests	3400	27	6	4	7	64	11	9	6	11
Fields	1300	34	5	0.6	6	42	11	30	10	13

Channel conditions were on average relatively healthy. There was a high percentage of rock for all 3 sections of the brook, between 42% and 64%. The downstream section had a relatively high percentage of sand, at 30%. All other substrate materials were found in relatively low quantities, comparatively. The average percentage of fines was low, between 6 and 10 percent for all parts of the brook.

Table 3: Averaged data for aquatic habitat conditions in Joe Brook

Stream Name	Aquatic Habitat Conditions								
	Surface Water Measurements						Reach Composition		
	Water Temperature (°C)	Dissolved Oxygen (mg/L)	pH	Conductivity (uS/cm)	Total Dissolved Solids (ppm)	Salinity (ppt)	% Pool	% Riffle	% Run
<b>Clear-cut</b>	16	9	7	38	19	0.017	2	37	61
<b>Forests</b>	16	9	7	41	21	0.018	4	43	52
<b>Fields</b>	17	9	7	61	31	0.03	27	9	64

Aquatic habitat conditions across all sites demonstrated average water temperatures between 16 and 17 degrees Celsius. All dissolved oxygen (DO) values remained above 6.5 mg/L, with an average of 9 mg/L in all 3 sections of the brook and pH was an average of 7 (Table 3). Average conductivity, total dissolved solids and salinity did not indicate signs of saltwater intrusion. Lastly, average reach composition ranged from pool, to riffle, to run, with run being the highest percentage, over 50% in all 3 sections of the brook. (Table 3).

## Discussion

Habitat assessments are a great way to find what types of habitats exist, how healthy they are, and identify any issues facing the riparian and aquatic habitats throughout the watershed. EOS assessed Joe Brook with no existing baseline data available. This brook contributes greatly to habitat diversity, the food chain, and water chemistry within the Tantramar River Watershed. Joe Brook is the major inlet for Silver Lake. Silver Lake is a popular, recreational fishing spot, is stocked with brook trout and other species and is open to ice fishing in the winter.

On average, the brook was identified as being relatively healthy with some sections having high levels of slight erosion along the banks.

To take a closer look into stream habitat, EOS used a points system to rank each 100m assessment, to identify potential restoration sites within Joe Brook. Factors were used to assign

points to sites based on the quality of habitat (Table 4). Using a points system allows for the identification of healthy habitat or sites in need of restoration.

Six factors were used in the points system to define a potential restoration site (Table 4). Each factor was allotted a certain number of points, while taking into consideration the impacts each factor has on the overall health of the watershed. Eleven is the highest amount of points a site can receive, which would indicate very poor habitat conditions, and be a site in absolute need of restoration. The point system is an easy way to identify sites in need of restoration; however, sites still require further evaluation to decide which restoration efforts are best suited for the area.

Table 4: Points System for Evaluating Potential Restoration Sites

<b>Factors that Define a Potential Restoration Site</b>	<b>Points</b>
60% or more of the substrate is composed of fines	1
25% or more of the stream banks are bare	2
60% or more of the vegetation present is grass	2
Vegetative shade is under 25%	1
Heavy erosion is over 25%/Slight erosion is over 40%	4
Dissolved oxygen is under 5 mg/L	1

The number of points assigned to each site was used to classify 100 m reaches as healthy (0 – 3 points), healthy with problems (4 – 6 points), or unhealthy (7 – 11 points) (Table 5). Reaches were colour coded as green for healthy, orange for healthy with problems, and red for unhealthy. Colour coding 100m reaches is an easy way to identify areas of stream habitat in need of restoration. The colour designation has been used by EOS for previous habitat assessments.

Table 5: Potential for Restoration Colour Designation Based on Points System

<b>Green (Healthy)</b>	<b>0 – 3 points</b>
<b>Orange (Healthy with problems)</b>	<b>4 – 6 points</b>
<b>Red (Unhealthy)</b>	<b>7 – 11 points</b>

### Joe Brook – Upstream (Reach 1- Reach 30)

Habitat assessments on Joe Brook began nearly 9 kilometers down a logging road off the Upper Aboujagane Road. Thirty assessments were done in the upstream region of the brook. Of these 30 assessments, only 1 had a total score of 0, meaning that it was in good condition, while the remaining sites could benefit from potential restoration projects. The remaining 29 sites ranged in number of total points. Most sites, or 67% of them, were designated as healthy with problems (4-6 points), while 9 sites or 30% were categorized as healthy (i.e., 1 – 3 points) (Figure 2)

Of these 30 sites, 10 sites recorded less than 25% shade cover, 4 sites recorded vegetation consisting of 60% or more grasses and 19 sites recorded that 40% or more of the bank was slightly eroded.

In terms of *in-situ* water measurements taken with the Hannah probe, 25 sites had dissolved oxygen (DO) values below what is required for early life stages of aquatic life.<sup>1</sup> 4 sites had an average pH value below what is suitable for biota<sup>2</sup>

Photos below demonstrate the state of stream habitat (Figures 3,4,5)

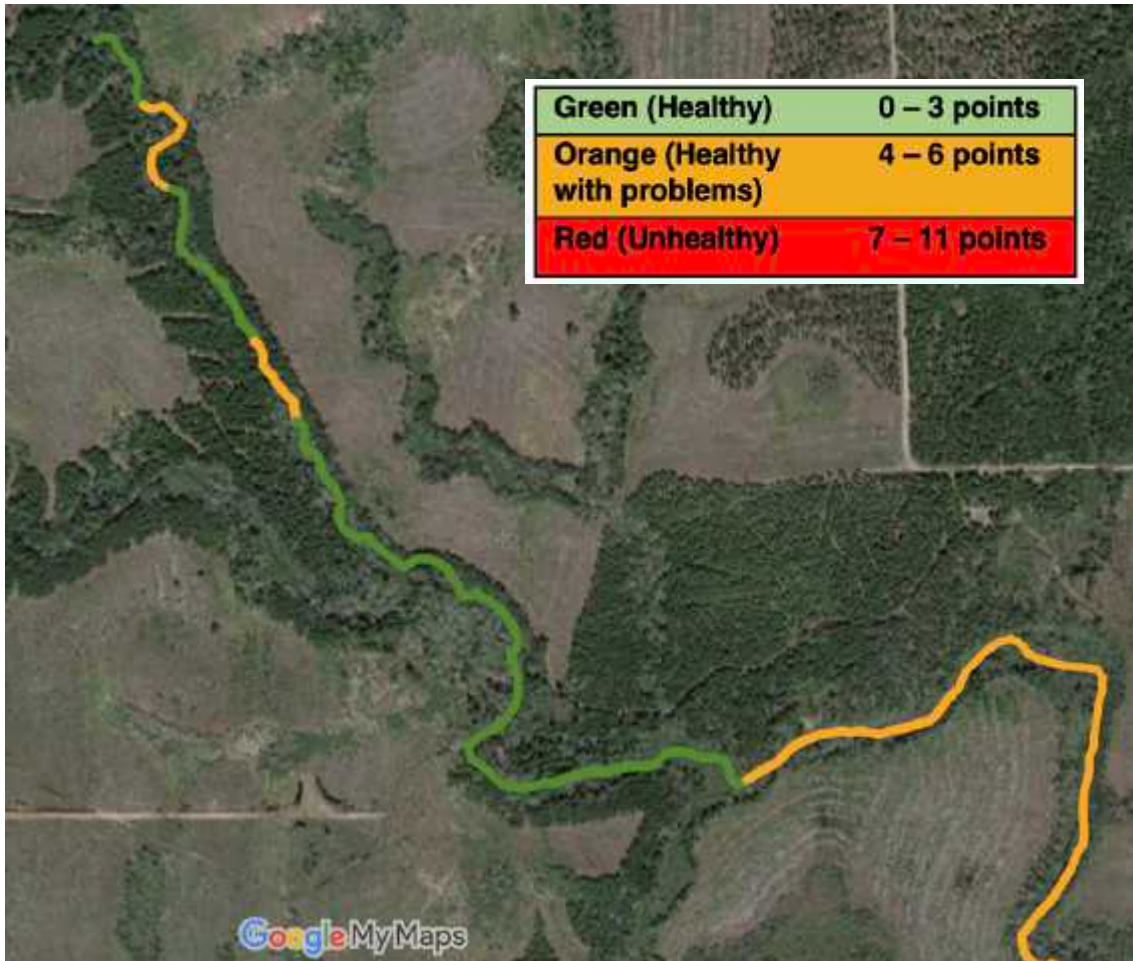


Figure 2: Joe Brook Upstream Point Systems Map (Reach 1-30)

Additional site photos can be found in the [Google Map](#), as mentioned above in the methods section (Figure 1)

<sup>1</sup> The CCME guidelines for aquatic life, set the minimum of 6.5 mg/L for most forms of life, and a minimum of 9.5 mg/L for early life stages.

<sup>2</sup> CCME (1987) indicates that healthy surface water should have a pH that falls between 6.5 and 9.0.



*Figure 3: Photo from JB-19 showing an eroded bank*



*Figure 4: Photo from JB-14 showing a lack of shade cover*



*Figure 5: A photo from JB-26 showing grassy vegetation*

## Joe Brook – Mid-stream (Reach 31-64)

Midstream Joe Brook was accessed a variety of different ways including driving over 3 kilometers down trails off Mount View Road, using Coates Rd off the Upper Aboujagane Road to access the stream and Mahoney Rd. We completed 3.4 kilometers of the brook mid-stream, which resulted in 34 assessments.

Of these 34 assessments, only 1 had a total score of 0, meaning that it was in good condition, while the remaining sites could benefit from potential restoration projects. The remaining 33 sites ranged in number of total points. Most sites, or 70.6% of them, were designated as healthy with problems (4-6 points), while 8 sites or 23.5% were categorized as healthy (i.e., 1 – 3 points). One site was designated as unhealthy. (Figure 6) (Appendix)

Of these 34 sites, 24 sites recorded less than 25% shade cover, 21 sites recorded that 40% or more of the bank was slightly eroded, 5 sites recorded that over 25% of the bank was heavily eroded,

In terms of *in-situ* water measurements taken with the Hannah probe, 1 site had average temperatures above recommended guidelines.<sup>3</sup> 28 sites had dissolved oxygen (DO) values below what is required for early life stages of aquatic life.<sup>4</sup> 3 sites had an average pH value below what is suitable for biota<sup>5</sup>

Photos below demonstrate the state of brook habitat at 4 different sites (Figure 7, 8, 9, 10). Additional site photos can be found on the Google Map, as mentioned above in the methods section (Figure 1).

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<sup>3</sup> According to Environment Canada recommended guidelines, water temperatures of streams should not exceed 20°C.

<sup>4</sup> The CCME guidelines for aquatic life, set the minimum of 6.5 mg/L for most forms of life, and a minimum of 9.5 mg/L for early life stages.

<sup>5</sup> CCME (1987) indicates that healthy surface water should have a pH that falls between 6.5 and 9.0.



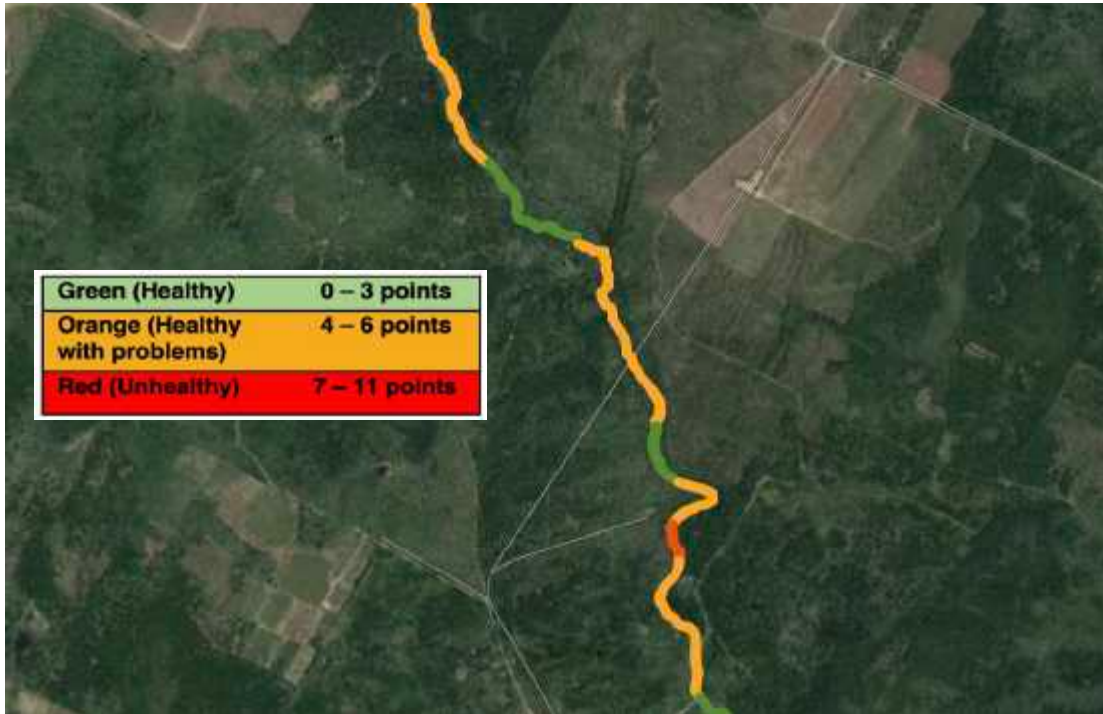


Figure 6: Midstream Point System Map (Reach 31 – Reach 64)



Figure 7: Photo from JB- showing undercut banks and grassy vegetation



*Figure 8: Photo from JB-57 showing a heavily eroded section of the bank*



*Figure 9: Photo from JB- 49 showing low shade cover*



*Figure 10: Photo from JB-61 – part of a dump site*

## Joe Brook – Downstream (Reach 65 – Reach 77)

The downstream section of Joe Brook had various access points off Mahoney Road and Mount View Road. We completed 1.3 kilometers of the down-stream section, which resulted in 13 assessments.

Of these 13 assessments, none had a total score of 0, meaning that all of the sites could benefit from potential restoration projects. The sites ranged in number of total points, 5 sites were designated as healthy with problems (4-6 points), while 8 sites were categorized as healthy (i.e., 1 – 3 points). (Figure 11) (Appendix 2)

Of these 13 sites, 10 sites recorded less than 25% shade cover, and 4 sites recorded that 40% or more of the bank was slightly eroded.

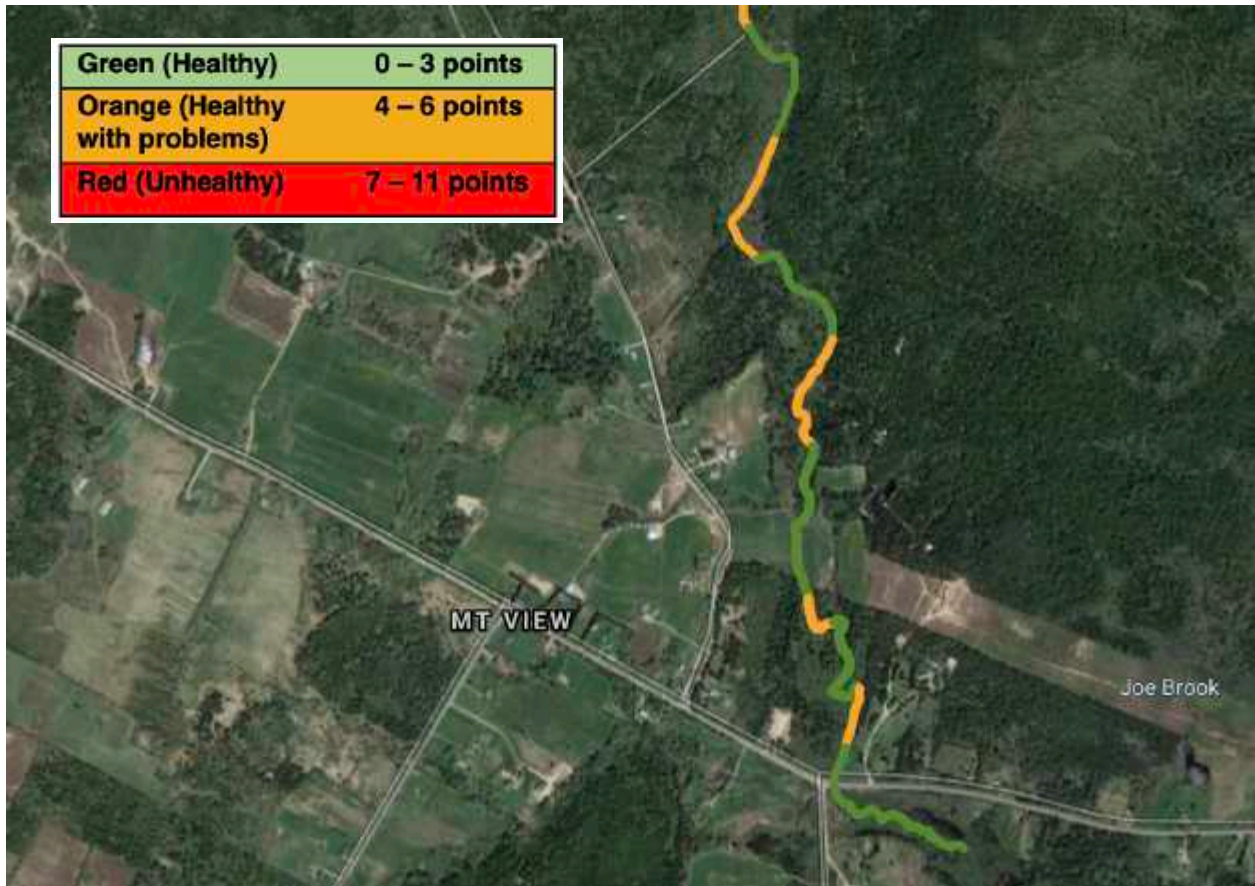
In terms of *in-situ* water measurements taken with the Hannah probe, 10 sites had dissolved oxygen (DO) values below what is required for early life stages of aquatic life<sup>6</sup> and 2 sites had an average pH value below what is suitable for biota<sup>7</sup>

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<sup>6</sup> The CCME guidelines for aquatic life, set the minimum of 6.5 mg/L for most forms of life, and a minimum of 9.5 mg/L for early life stages.

<sup>7</sup> CCME (1987) indicates that healthy surface water should have a pH that falls between 6.5 and 9.0.

Photos below demonstrate the state of brook habitat at 3 different sites (Figure 12, 13, 14). Additional site photos can be found on the [Google Map](#), as mentioned above in the methods section (Figure 1).



*Figure 11: Downstream Point System Map (Reach 65-77)*



*Figure 12: Photo of JB-75, showing low shade cover*



*Figure 13: Photo of JB-73 showing undercut banks*



*Figure 14: Photo of JB-70, showing an eroding bank, where a property owner has cut the grass right to the edge of the stream bank*



## Public Engagement

EOS staff created an interactive Google Map which can be accessed by the public on the EOS website at <https://www.google.com/maps/d/u/0/edit?mid=1AX8vFMAwCaoizforofeXHTqkSOEo9lyW&ll=45.97952189261171%2C-64.39435593652343&z=13>. The map includes the coordinates and habitat information for each assessment location along the brook. Mapped assessments also included photos of riparian and stream habitat, and a link to raw data sheets.

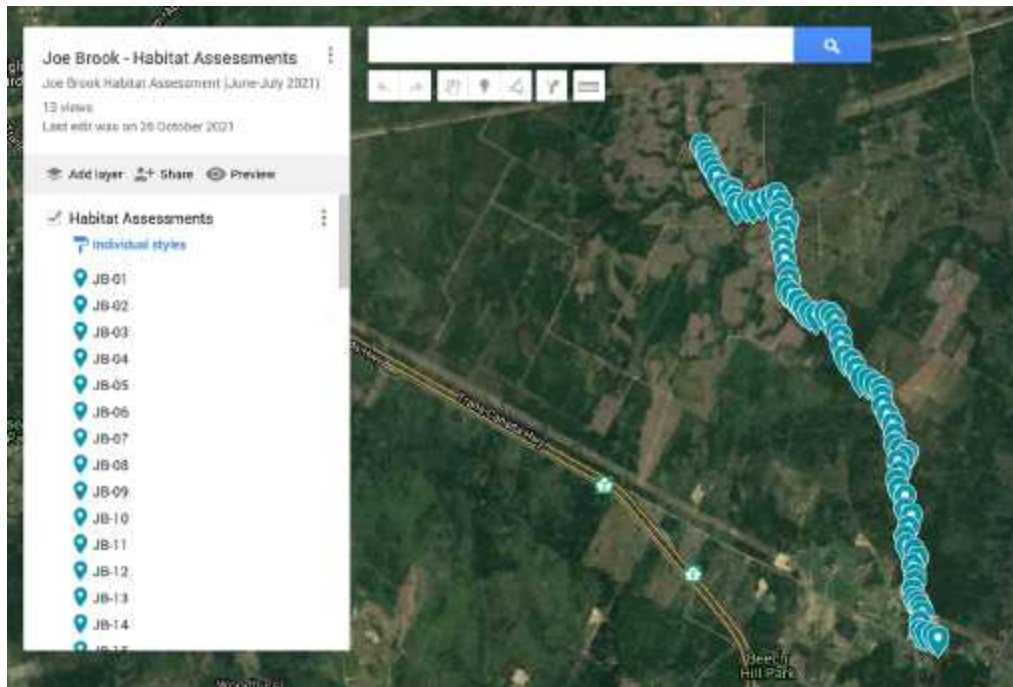


Figure 15: Screen shot of interactive Google map.

Further public education about this project and the results includes social media posts and the project report is available on the EOS website.

A presentation of results was also made on February 22<sup>nd</sup>. Further public presentations of the results are planned for March 22<sup>nd</sup>, around World Water Day, and at the EOS AGM in May. The NB Wildlife Trust Fund has and continues to be promoted as our project funder on our website, social media posts and at events.

## Recommendations and Next Steps for Joe Brook

In summary, 35% (27 reaches) of assessments done on Joe Brook were deemed healthy, 64% (49 reaches) were healthy with problems and 1% (1 reach) was unhealthy. Common themes across sites in Joe Brook were slight or heavy erosion impacting bank stability, banks covered in grasses and low shade cover. These recommendations are to help direct EOS we continue our efforts in Joe Brook. The recommendations are not all inclusive but rather an overview of the restoration activities that could be undertaken.

Potential restoration efforts could include tree planting in riparian zones for sites with stream banks that are bare of vegetation or have large amounts of grassy vegetation. Grass provides little shade cover over stream habitat and has a shallow root system with poor soil stabilizing qualities. Increasing and maintaining deep-rooted, native vegetation along the riparian area will help stabilize streambanks, as well as encourage further growth of vegetation. Therefore, restoration activities for these streams could be as easy as tree planting. However, it is important to keep in mind, these sites would need further investigation, landowner engagement and partnerships, before planning restoration activities. Large debris could be removed from the stream, and cleanups could be organized of dump sites. The construction of brush mats along silty stream beds is something that could also be considered, although there were very few sites in Joe Brook with high levels of silt. A campaign to engage landowners along Joe Brook could be launched, in order to establish healthy buffer zones. Buffer zones as narrow as 8 meters on one side were observed, particularly upstream.

Stream habitat assessment data gathered from this project will provide a record of the current state of stream and riparian health of Joe Brook. Using this data, EOS can plan restoration projects for problem areas and work to prevent potential future problems by encouraging and supporting the maintenance of the healthy reaches of streams. In the future, EOS would like to extend habitat assessments to other streams and rivers in the Tantramar River watershed, Rockport/Dorchester area and Port Elgin/Cape Tormentine area. Further assessments will ultimately help with developing a watershed management plan.

# Appendix 1 – Habitat Assessment Field Sheet

## EOS Habitat Assessment Field Sheet

Date: \_\_\_\_\_ Reach #: \_\_\_\_\_ Time: \_\_\_\_\_

River: \_\_\_\_\_ Stream order: \_\_\_\_\_

Set reach length:     30m   50m   100m

Upstream coordinates: N \_\_\_\_\_ W \_\_\_\_\_

Downstream coordinates: N \_\_\_\_\_ W \_\_\_\_\_

Air temp (°C) \_\_\_\_\_

Amount of rain in the past 48 hrs: \_\_\_\_\_

Current weather: \_\_\_\_\_

### Water Quality Data:

pH: \_\_\_\_\_ DO (ppm): \_\_\_\_\_ Conductivity (uS/cm): \_\_\_\_\_ Tds (ppm): \_\_\_\_\_

Salinity(ppt): \_\_\_\_\_ Water Temp (°C): \_\_\_\_\_

### Channel Characteristics

#### Average depth (cm)

Depth	0m	25m	50m	75m
¼ depth				
½ depth				
¾ depth				

Average: \_\_\_\_\_

#### Wet Widths

Section	0m	25m	50m	75m	Avg
Wet width (cm)					

#### Bed Form Composition

amount (%)	0m	25m	50m	75m	Avg
Pool					
Riffle					
Run					

#### Bank Conditions:

Left Bank	0m	25m	50m	75m	Avg
Height (cm)					
% stable					
% slightly eroded					
% heavily eroded					

Right Bank	0m	25m	50m	75m	Avg
Height (cm)					
% stable					
% slightly eroded					
% heavily eroded					

**SUBSTRATE CHARACTERISTICS**

Substrate Type Cover %	0m	25m	50m	75m	Avg
Fines					
Sand					
Gravel					
Rocks					
Boulder					
Bedrock					

Embeddedness (%)					
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**RIPARIAN CHARACTERISTICS**

Shade Cover Assessment:

Bank Position Shade Cover %	0m	25m	50m	75m	Average
Left Bank					
Right Bank					

Vegetation Cover Assessment:

Vegetation Type Left Bank % Cover	0m	25m	50m	75m	Average
Bare					
Grasses					
Shrubs					
Trees					

Vegetation Type Right Bank % Cover	0m	25m	50m	75m	Average
Bare					
Grasses					
Shrubs					
Trees					

Other general information:

Notable issues: check all that apply

dump site

dead fish/animals

man-made obstruction

beaver dam

fallen trees

clear cut

Notes:

## Appendix 2 – Data Tables

Table 6: Joe Brook Habitat Assessment Data

Station	Upstream Northing	Upstream Westing	Reach Length	Water Temp (°C)	DO (ppm)	pH	Conductivity (uS/cm)	TDS (ppm)	Salinity (ppt)	Average depth (cm)	Average width (m)	% pool	% riffle	%run	LB Average Height (cm)	LB% stable	LB % slightly eroded	LB % heavily eroded
JB-01	46.00253	64.41144	100	13.40	9.70	7.5	35.9	23.40	0.02	9.5	3.2	0.0	62.5	37.5	35.8	68.8	23.8	0.0
JB-02	46.00191	64.41068	100	14.30	9.00	6.78	36.5	24.05	0.02	9.6	2.9	0.0	20.0	80.0	36.0	67.5	32.5	0.0
JB-03	46.00109	64.41036	100	13.40	9.36	7.02	38.0	19.00	0.02	17.1	2.2	0.0	22.8	75.0	25.5	67.5	32.5	0.0
JB-04	46.00050	64.41000	100	13.75	9.02	7.32	33.00	17.00	0.01	14.58	1.3	0.0	2.5	97.5	36.3	70.0	20.0	10.0
JB-05	45.99984	64.40942	100	14.58	9.24	7.23	34.00	17.00	0.01	30.74	2.3	0.0	21.3	78.8	38.3	35.0	60.0	5.0
JB-06	45.99913	64.40884	100	15.08	9.17	7.58	34.00	17.00	0.01	47.65	2.8	3.8	50.0	46.3	32.3	86.3	13.8	0.0
JB-07	45.99809	64.40789	100	15.67	7.83	7.31	32.00	16.00	0.01	13.53	3.2	3.8	31.3	67.5	35.3	70.0	30.0	0.0
JB-08	45.99751	64.40644	100	17.34	8.16	7.29	34.00	17.00	0.01	16.50	5.2	0.0	18.8	81.3	39.0	82.5	17.5	0.0
JB-09	45.99659	64.40599	100	16.70	8.95	6.79	36.00	18.00	0.02	13.45	4.1	0.0	18.8	81.3	40.3	72.5	25.0	0.0
JB-10	45.99590	64.40558	100	17.03	8.89	7.28	36.00	18.00	0.02	12.46	3.8	7.5	15.0	77.5	45.3	90.0	10.0	0.0
JB-11	45.99608	64.40411	100	18.08	9.08	7.36	36.00	18.00	0.02	7.81	3.5	0.0	40.0	60.0	42.3	83.8	16.3	0.0
JB-12	45.99595	64.40302	100	16.67	8.80	7.28	43.00	22.00	0.02	16.38	3.6	0.0	26.5	73.5	50.0	25.0	75.0	0.0
JB-13	45.99635	64.40160	100	17.34	8.87	7.28	42.00	21.00	0.02	14.9	4.2	0.0	42.5	57.5	40.7	35.0	65.0	0.0
JB-14	45.99669	64.40024	100	17.66	7.55	7.46	42.00	21.00	0.02	25.08	5.4	0.0	13.8	86.3	51.8	47.0	53.0	0.0
JB-15	45.99705	64.39928	100	18.72	8.89	7.51	42.00	21.00	0.02	20.17	5.0	2.5	26.3	71.3	54.8	22.5	77.5	0.0
JB-16	45.99614	64.39845	100	16.40	7.94	7.20	43.00	21.00	0.02	12.25	3.3	0.0	32.5	67.5	44.3	40.0	52.5	7.5
JB-17	45.99514	64.39869	100	16.66	7.38	7.48	44.00	22.00	0.02	13.71	5.2	2.5	35.0	62.5	45.3	20.0	80.0	0.0
JB-18	45.99429	64.39894	100	17.62	8.55	7.59	42.00	21.00	0.02	13.46	5.5	0.0	37.5	60.0	43.50	2.5	85.0	12.5
JB-19	45.99408	64.39740	100	18.15	8.64	7.49	42.00	21.00	0.02	11.46	5.8	5.0	70.0	25.0	57.75	3.8	75.0	21.3
JB-20	45.99308	64.39768	100	18.78	8.55	7.46	41.00	21.00	0.02	16.04	5.4	0.0	27.5	72.5	43.00	23.8	68.8	7.5

Station	RB Average Height (cm)	RB % Stable	RB % Slightly Eroded	RB % Heavily Eroded	% Embeddedness	% fines	% sand	% gravel	% rocks	% boulder	% bedrock	LB % shade cover	LB% bare	LB% grasses	LB% shrubs	LB% trees	RB% shade cover	RB% bare	RB %grasses	RB %shrubs	RB% trees	POINTS
JB-01	53.5	87.5	12.5	0.0	30.0	22.0	0.0	23.0	41.0	14.0	0.0	47.5	0.0	67.0	1.0	32.0	57.5	0.0	67.0	1.0	32.0	2
JB-02	41.8	50.0	50.0	0.0	30.0	8.8	15.0	18.7	50.5	7.0	0.0	59.0	6.0	45.0	10.0	49.0	71.0	6.0	45.0	10.0	49.0	4
JB-03	44.5	90.0	10.0	0.0	43.8	5.0	11.3	32.3	46.3	5.3	0.0	83.8	5.0	70.0	0.0	25.0	72.5	5.0	70.0	0.0	25.0	2
JB-04	72.5	67.5	10.0	7.5	28.8	16.3	48.5	13.3	18.5	1.0	0.0	36.3	2.5	61.3	0.0	36.3	40.0	2.5	61.3	0.0	36.3	2
JB-05	40.0	77.5	22.5	0.0	35.0	3.8	27.5	13.8	47.5	11.3	0.0	20.5	8.8	51.3	0.5	39.5	49.0	8.8	51.3	0.5	39.5	5
JB-06	41.3	90.0	10.0	0.0	26.8	5.0	15.8	28.8	42.5	8.0	0.0	28.3	3.8	49.5	3.0	43.8	20.3	3.8	49.5	3.0	43.8	1
JB-07	33.4	76.3	23.8	0.0	16.5	3.8	10.0	37.0	48.0	1.3	0.0	30.0	3.8	60.0	0.0	36.3	27.5	7.5	55.0	0.0	37.5	2
JB-08	46.5	62.5	17.5	0.0	3.0	8.8	9.8	14.5	22.5	3.3	21.3	7.5	0.0	55.0	5.0	40.0	9.3	7.5	51.3	0.0	41.3	1
JB-09	46.0	77.5	22.5	0.0	11.3	8.8	12.5	34.3	27.5	3.3	13.8	58.8	1.3	63.8	0.0	35.0	38.8	0.0	92.5	0.0	22.5	2
JB-10	42.5	95.8	4.25	0.0	9.3	8.8	16.3	27.5	35.0	2.3	10.3	38.8	3.8	43.8	0.0	52.5	41.3	7.5	62.5	0.0	30.0	2
JB-11	39.0	90.0	13.3	0.0	12.5	5.0	18.8	18.0	57.3	0.8	0.3	61.3	0.00	42.5	0.0	57.5	52.5	0.0	52.5	0.0	47.5	0
JB-12	45.5	30.0	70.0	0.0	5.3	10.0	8.8	8.8	45.0	5.0	22.5	46.3	0	51.3	0.0	48.8	48.8	3.8	40.0	2.5	53.8	4
JB-13	20.7	65.0	12.5	0.0	5.0	10.0	6.3	8.8	32.5	12.5	30.0	32.5	3.8	47.5	1.3	47.5	31.3	0.0	47.5	0.0	45.0	4
JB-14	33.8	71.3	28.8	0.0	5.3	13.8	8.8	5.0	57.3	6.5	8.8	4.3	21.3	23.8	0.0	55.0	3.8	1.3	30.0	2.5	66.3	5
JB-15	35.3	22.5	40.0	37.5	9.3	8.8	5.5	11.3	67.0	5.0	2.5	23.8	0.0	48.8	0.0	51.3	27.8	20.0	53.8	0.0	26.3	5
JB-16	53.5	22.5	68.8	8.8	15.0	7.5	11.3	7.5	66.0	7.8	0.0	55.0	1.8	47.3	0.0	51.0	50.0	8.8	37.5	2.5	51.3	4
JB-17	49.8	17.5	70.0	12.5	4.3	21.3	6.3	31.0	37.3	3.0	1.3	31.3	0.0	53.8	1.3	45.0	27.5	0.0	53.8	1.3	45.0	4
JB-18	51.3	33.8	53.8	12.5	5.0	12.5	7.5	8.5	32.5	10.3	28.8	7.5	10.0	21.3	0.0	68.8	16.3	2.5	46.3	2.5	48.8	5
JB-19	25.3	73.3	25.0	22.5	8.8	11.3	5.0	20.0	33.8	23.8	6.3	15.0	2.5	32.5	0.0	65.0	3.8	18.8	22.5	0.0	57.5	5
JB-20	55.3	32.5	67.5	0.0	8.8	12.5	8.8	4.5	68.8	5.5	0.0	16.5	0.0	35.0	2.5	62.5	25.0	6.3	22.5	2.5	56.3	5

Station	Upstream Northing	Upstream Westing	Reach Length	Water Temp (°C)	DO (ppm)	pH	Conductivity (uS/cm)	TDS (ppm)	Salinity (ppt)	Average depth (cm)	Average width (m)	% pool	% riffle	%run	LB Average Height (cm)	LB% stable	LB % slightly eroded	LB % heavily eroded
JB-21	45.99207	64.39840	100	16.72	7.98	7.02	44.00	22.00	0.02	8.88	3.9	2.5	65.0	32.5	45.25	6.3	81.3	12.5
JB-22	45.99105	64.39825	100	16.90	8.35	7.00	44.00	22.00	0.02	13.50	6.2	15.0	41.3	43.8	49.50	3.8	91.3	5.0
JB-23	45.98977	64.39790	100	16.93	8.18	7.25	45.00	23.00	0.02	14.67	5.7	0.0	30.0	70.0	49.50	5.0	78.8	16.3
JB-24	45.98840	64.39748	100	17.01	8.08	7.40	45.00	23.00	0.02	12.58	6.4	0.0	37.5	62.5	41.75	17.5	80.0	2.5
JB-25	45.98758	64.39728	100	12.38	11.84	6.34	33.00	16.00	0.01	17.38	8.1	0.0	32.5	67.5	52.50	7.5	62.5	30.0
JB-26	45.98655	64.39767	100	12.72	9.00	6.24	33.00	16.00	0.01	24.83	7.7	0.0	52.5	47.5	37.50	0.0	67.5	32.5
JB-27	45.98597	64.39695	100	12.98	10.70	6.26	33.00	16.00	0.01	23.50	8.1	0.0	45.0	55.0	51.50	35.0	57.5	7.5
JB-28	45.98597	64.39695	100	13.68	10.00	6.78	33.00	16.00	0.01	33.25	5.5	2.5	77.5	20.0	40.75	42.5	52.5	5.0
JB-29	45.98443	64.39507	100	14.02	10.45	6.42	33.00	16.00	0.01	17.81	7.3	0.0	47.5	52.5	25.25	12.5	85.0	2.5
JB-30	45.98396	64.39397	100	15.36	8.70	6.50	36.00	18.00	0.02	28.17	5.8	7.5	67.5	25.0	55.50	26.3	35.0	38.8
JB-31	45.98359	64.39287	100	15.67	9.25	6.48	35.00	17.00	0.02	28.67	5.3	7.5	52.5	40.0	62.25	0.0	45.0	55.0
JB-32	45.98380	64.39157	100	16.6	8.28	7.00	35.00	18.00	0.02	27.58	4.8	10.0	32.5	57.5	33.75	35.0	65.0	0.0
JB-33	45.98365	64.39046	100	17.28	9.34	7.15	35.00	18.00	0.02	12.88	5.6	0.0	45.0	55.0	44.50	22.5	77.5	0.0
JB-34	45.98296	64.38981	100	17.76	10.93	6.95	35.00	18.00	0.02	21.00	4.4	2.5	47.5	50.0	41.00	30.0	57.5	12.5
JB-35	45.98195	64.38963	100	13.13	9.68	7.13	38.00	19.00	0.02	30.58	5.4	17.5	70.0	12.5	60.25	30.0	12.5	57.5
JB-36	45.98120	64.38900	100	19.00	10.15	6.93	38.00	19.00	0.02	36.17	3.9	11.3	43.8	45.0	64.00	72.5	0.0	27.5
JB-37	45.98010	64.38882	100	21.00	8.36	7.48	40.00	20.00	0.02	20.83	4.1	2.5	41.3	56.3	57.00	25.0	57.5	17.5
JB-38	45.97901	64.38828	100	14.69	8.95	7.21	39.00	19.00	0.02	17.25	6.6	0.0	42.5	57.5	49.25	0.0	100.0	0.0
JB-39	45.97835	64.38712	100	14.84	8.73	7.2	39.00	20.00	0.02	57.67	10.2	0.0	0.0	100.0	29.50	72.5	27.5	0.0
JB-40	45.97752	64.38646	100	13.34	10.13	6.63	31.00	15.00	0.01	34.42	3.9	7.5	42.5	50.0	17.25	92.5	7.5	0.0
JB-41	45.97658	64.38577	100	13.99	9.81	7.03	31.00	16.00	0.01	43.58	6.2	6.3	23.8	70.0	27.50	88.8	11.3	0.0
JB-42	45.97633	64.38457	100	14.72	8.70	6.45	34.00	17.00	0.01	24.67	5.9	5.0	30.0	65.0	33.75	65.0	35.0	0.0
JB-43	45.97583	64.38345	100	15.7	9.43	7.23	33.00	17.00	0.01	16.38	4.9	0.0	33.8	66.3	62.25	52.5	49.0	0.0
JB-44	45.97526	64.38249	100	16.65	9.44	7.00	32.00	16.00	0.01	41.42	6.5	0.0	26.3	73.8	41.00	62.5	37.5	0.0
JB-45	45.97447	64.38227	100	14.46	9.33	6.45	34.00	17.00	0.01	28.58	6.1	8.8	32.5	58.8	31.00	75.0	25.0	0.0
JB-46	45.97345	64.38213	100	14.77	9.26	7.24	44.00	22.00	0.02	15.17	4.8	1.3	35.0	38.8	56.75	45.0	55.0	0.0

Station	RB Average Height (cm)	RB % Stable	RB % Slightly Eroded	RB % Heavily Eroded	% Embeddedness	% fines	% sand	% gravel	% rocks	% boulder	% bedrock	LB % shade cover	LB% bare	LB% grasses	LB% shrubs	LB% trees	RB% shade cover	RB% bare	RB %grasses	RB %shrubs	RB% trees	POINTS
JB-21	41.5	47.5	52.5	0.0	8.8	6.3	6.3	20.0	51.3	15.0	1.3	47.5	16.3	23.8	0.0	60.0	26.3	2.5	48.8	0.0	48.8	4
JB-22	54.3	1.3	86.3	12.5	12.5	13.8	10.0	13.8	38.8	5.0	18.8	12.5	15.0	28.8	3.8	52.5	16.8	5.0	35.0	2.5	57.5	5
JB-23	45.8	10.0	90.0	0.0	5.5	5.8	4.0	6.5	22.5	6.3	42.5	31.3	15.0	18.8	0.0	68.8	8.8	13.8	28.8	1.3	56.3	5
JB-24	40.0	27.5	65.0	7.5	8.8	7.5	6.3	6.3	28.8	7.5	41.3	42.5	15.0	27.0	0.0	51.3	35.0	42.5	15.0	0.0	42.5	4
JB-25	25.3	21.3	77.5	1.3	12.5	7.5	7.5	15.0	57.5	7.5	5.0	41.3	12.5	32.5	0.0	55.0	33.8	13.8	40.0	0.0	46.3	4
JB-26	22.8	46.3	53.8	0.0	20.0	6.3	7.5	12.5	36.3	10.0	27.5	35.0	16.3	25.0	0.0	58.8	18.3	16.3	25.0	0.0	58.8	5
JB-27	39.0	25.0	52.5	22.5	12.5	5.0	5.0	6.3	72.3	7.8	3.8	25.0	16.3	25.0	1.3	57.5	40.0	3.8	58.8	1.3	36.3	4
JB-28	29.3	12.5	70.0	2.5	12.5	7.5	6.3	11.3	53.0	6.3	0.0	17.5	1.3	53.8	0.0	45.0	25.0	20.0	23.8	2.5	53.8	5
JB-29	32.8	37.5	60.0	2.5	23.8	7.5	16.3	8.8	64.5	3.0	0.0	26.3	6.3	32.5	0.0	61.3	17.5	22.5	30.0	0.0	47.5	5
JB-30	37.8	50.0	17.5	32.5	9.8	11.3	16.3	7.5	61.0	4.0	0.0	10.0	6.3	17.5	1.3	75.0	16.0	1.3	45.0	2.5	51.3	5
JB-31	30.0	30.0	37.5	25.0	4.8	6.0	4.8	15.0	70.8	3.8	0.0	27.5	8.8	30.0	0.0	61.3	6.8	3.8	40.0	1.3	47.5	5
JB-32	36.8	10.0	90.0	0.0	10.0	10.0	8.8	10.0	65.0	6.3	0.0	33.0	1.3	42.5	3.8	52.5	41.3	7.5	21.3	0.0	71.3	4
JB-33	40.8	0.0	87.5	12.5	11.0	5.0	4.3	12.5	44.5	10.0	23.8	21.3	2.5	41.3	1.3	55.0	27.5	10.0	22.5	0.0	67.5	5
JB-34	54.3	12.5	60.0	27.5	15.0	5.0	5.0	7.5	68.8	13.8	0.0	42.5	12.5	31.3	1.3	55.0	57.5	1.3	35.0	1.3	62.5	4
JB-35	60.5	17.5	67.5	15.0	6.8	3.5	2.0	9.5	50.0	10.0	25.0	31.3	6.8	32.5	1.3	59.5	31.8	4.3	21.3	0.0	74.5	4
JB-36	87.3	23.8	0.0	76.3	8.8	7.0	5.0	6.3	70.8	12.5	0.0	26.8	0.0	26.3	2.5	86.3	15.5	2.5	17.5	0.0	80.0	5
JB-37	50.0	26.3	61.3	12.5	6.3	5.5	4.3	6.3	74.8	6.8	2.5	16.3	5.0	26.8	1.3	63.8	21.3	6.8	27.5	1.3	64.5	5
JB-38	43.8	47.5	52.5	0.0	8.8	6.3	6.3	7.5	72.5	7.5	0.0	36.3	6.3	30.0	0.0	63.8	3.8	1.3	27.5	2.5	68.8	5
JB-39	28.0	50.0	30.0	20.0	17.5	30.0	5.0	8.8	51.3	5.0	0.0	6.3	1.3	38.8	2.5	57.5	6.3	2.5	43.8	0.0	53.8	1
JB-40	23.3	85.0	15.0	0.0	7.5	14.3	18.8	10.0	56.8	0.3	0.0	13.8	0.0	22.5	1.3	75.0	30.0	0.0	32.5	7.5	60.0	1
JB-41	26.0	71.3	28.8	0.0	20.0	17.5	12.5	10.0	58.3	1.8	0.0	32.5	0.0	52.5	0.0	47.5	36.3	1.3	55.0	0.0	43.8	0
JB-42	24.3	75.0	25.0	0.0	9.3	6.8	22.5	15.0	53.0	5.3	0.0	7.5	0.0	32.5	3.8	63.8	6.3	0.0	36.3	2.5	61.2	1
JB-43	41.8	70.0	30.0	0.0	12.5	5.0	15.0	8.8	67.5	2.5	0.0	11.3	2.5	35.0	7.5	55.0	10.0	1.3	32.5	3.8	62.5	5
JB-44	52.5	0.0	100.0	0.0	15.0	7.5	15.0	13.8	55.0	8.8	0.0	4.3	0.0	42.5	5.0	52.5	16.3	1.3	25.0	1.3	72.5	5
JB-45	30.8	50.0	50.0	0.0	11.3	8.5	20.0	17.5	53.8	0.3	0.0	11.3	0.0	32.5	3.8	63.8	9.3	0.0	32.5	5.0	62.5	5
JB-46	55.5	72.5	27.5	0.0	6.3	3.5	6.3	11.3	64.8	5.5	8.8	23.8	8.8	40.0	0.0	51.3	12.5	0.0	46.3	3.8	37.5	5



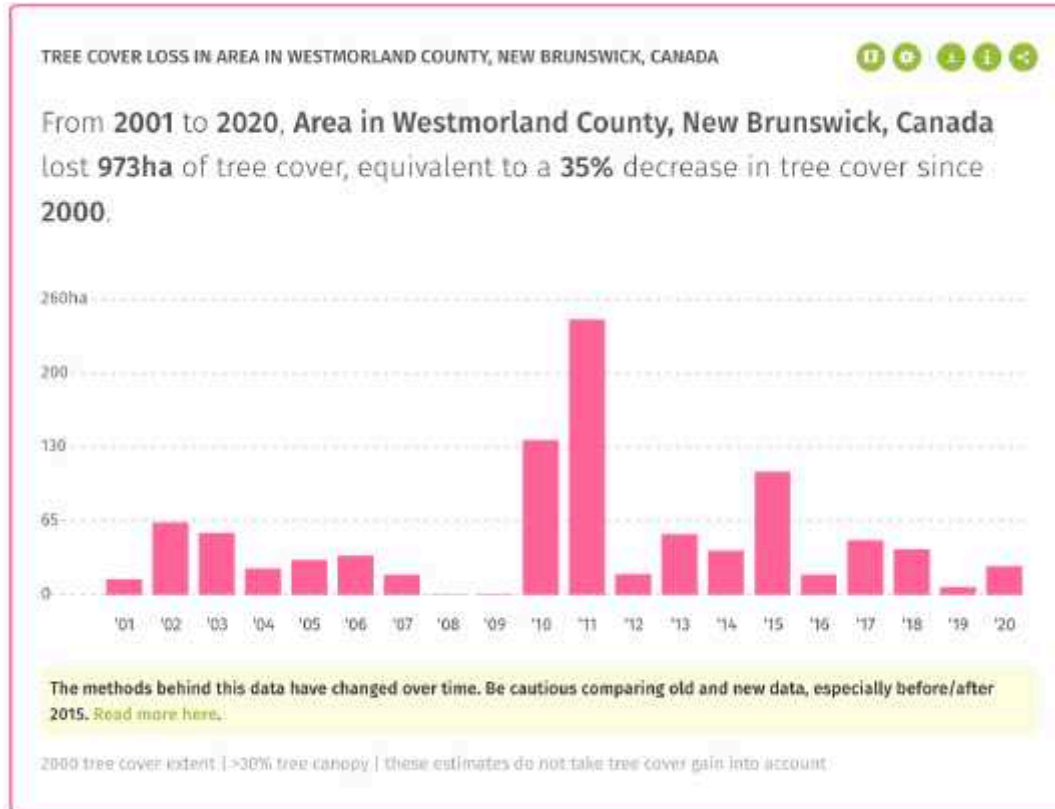
Station	Upstream Northing	Upstream Westing	Reach Length	Water Temp (°C)	DO (ppm)	pH	Conductivity (uS/cm)	TDS (ppm)	Salinity (ppt)	Average depth (cm)	Average width (m)	% pool	% riffle	%run	LB Average Height (cm)	LB% stable	LB % slightly eroded	LB % heavily eroded
JB-47	45.97241	64.38148	100	15.47	9.3	7.00	45.00	22.00	0.02	16.67	6.0	0.0	31.3	68.8	53.0	50.0	50.0	0.0
JB-48	45.97126	64.38051	100	16.11	9.12	7.28	46.00	23.00	0.02	25.75	4.6	2.5	56.3	41.3	27.5	37.5	60.0	2.5
JB-49	45.97013	64.38031	100	16.50	8.73	7.06	46.00	23.00	0.02	19.92	7.2	0.0	13.8	86.3	56.5	93.8	6.3	0.0
JB-50	45.96900	64.38024	100	15.70	9.50	6.90	44.00	22.00	0.02	29.00	7.2	0.0	41.3	58.8	25.8	73.8	13.8	12.5
JB-51	45.96843	64.37939	100	15.99	9.44	7.01	45.00	22.00	0.02	30.08	7.2	0.0	57.5	42.5	74.8	17.5	75.0	7.5
JB-52	45.96809	64.37815	100	16.25	9.43	6.83	46.00	23.00	0.02	36.58	6.2	2.5	56.3	41.3	34.0	65.0	35.0	0.0
JB-53	45.96758	64.37873	100	16.54	9.35	6.99	44.00	22.00	0.02	29.17	6.8	0.0	61.3	38.8	41.5	12.5	86.3	1.3
JB-54	45.96711	64.37969	100	16.88	9.29	6.79	44.00	22.00	0.02	36.42	6.8	0.0	73.8	26.3	155.0	1.3	41.3	57.5
JB-55	45.96597	64.37938	100	17.14	8.45	6.88	43.00	21.00	0.02	21.00	6.5	0.0	87.5	12.5	49.0	60.0	40.0	0.0
JB-56	45.96503	64.37993	100	17.42	8.15	7.29	43.00	21.00	0.02	27.92	6.9	0.0	27.5	72.5	64.8	0.0	27.5	72.5
JB-57	45.96404	64.37947	100	18.32	8.13	7.10	43.00	22.00	0.02	30.17	6.4	0.0	95.0	5.0	51.5	15.0	67.5	5.0
JB-58	45.96321	64.37855	100	18.82	8.27	7.28	43.00	21.00	0.02	24.08	7.0	0.0	52.5	47.5	73.3	25.0	65.0	10.0
JB-59	45.96176	64.37850	100	18.94	8.28	7.10	43.00	22.00	0.02	23.83	7.0	7.5	50.0	42.5	58.5	77.5	12.5	10.0
JB-60	45.96103	64.37751	100	19.10	8.19	7.09	43.00	21.00	0.02	21.58	7.0	0.0	60.0	40.0	46.0	45.0	55.0	0.0
JB-61	45.95977	64.37792	100	15.80	7.88	7.20	55.00	27.00	0.02	18.75	7.5	1.3	28.8	70.0	56.3	42.5	57.5	0.0
JB-62	45.95861	64.37852	100	15.94	8.77	7.51	53.00	27.00	0.02	16.94	5.7	13.8	26.3	60.0	105.3	17.5	52.5	30.0
JB-63	45.95768	64.37834	100	16.19	8.53	7.24	55.00	27.00	0.02	13.67	5.1	6.3	37.5	56.3	34.5	75.0	25.0	0.0
JB-64	45.95710	64.37710	100	16.35	7.93	7.52	55.00	28.00	0.02	47.13	7.1	28.8	18.8	52.5	63.8	65.0	20.0	12.5
JB-65	45.95629	64.37652	100	16.67	8.15	7.24	55.00	28.00	0.03	19.42	5.6	0.0	10.0	90.0	66.3	40.0	60.0	0.0
JB-66	45.95547	64.37724	100	16.91	8.29	7.58	57.00	29.00	0.03	23.47	6.4	33.8	7.5	58.8	50.0	17.5	62.5	7.5
JB-67	45.95443	64.37694	100	16.37	9.2	7.30	63.00	32.00	0.03	21.92	6.1	3.8	46.3	50.0	50.3	62.5	37.5	0.0
JB-68	45.95361	64.37705	100	16.71	9.23	7.25	64.00	32.00	0.03	28.05	5.2	25.0	22.5	52.5	48.3	45.0	42.5	12.5
JB-69	45.95272	64.37733	100	17.43	9.45	7.35	66.00	33.00	0.03	35.25	5.8	0.0	10.0	90.0	48.8	100.0	0.0	0
JB-70	45.95175	64.37708	100	17.98	8.97	7.50	70.00	35.00	0.03	26.75	5.4	2.5	17.5	80.0	71.5	17.5	75.0	7.5
JB-71	45.95133	64.37646	100	18.53	8.95	7.48	72.00	36.00	0.03	36.58	5.4	15.0	5.0	80.0	52.8	83.8	16.3	0.0

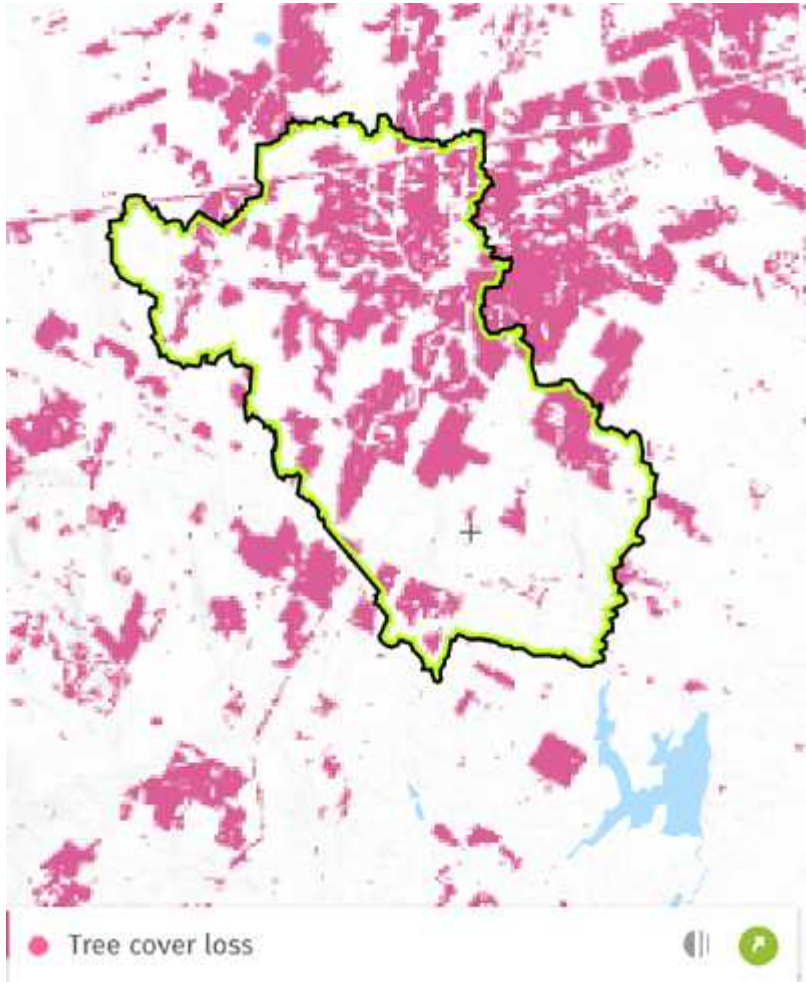
Station	RB Average Height (cm)	RB % Stable	RB % Slightly Eroded	RB % Heavily Eroded	% Embeddedness	% fines	% sand	% gravel	% rocks	% boulder	% bedrock	LB % shade cover	LB% bare	LB% grasses	LB% shrubs	LB% trees	RB% shade cover	RB% bare	RB %grasses	RB %shrubs	RB% trees	POINTS
JB-47	42.50	62.5	37.5	0.0	11.3	3.5	11.3	12.5	67.8	5.0	0.0	28.8	3.8	27.5	3.8	65.0	11.75	1.8	27.5	1.3	69.5	5
JB-48	45.25	21.3	78.8	0.0	11.8	3.5	7.5	12.5	74.0	2.5	0.0	10.0	0.0	38.8	11.3	50.0	8.8	3.8	26.3	1.3	68.8	5
JB-49	40.75	93.8	6.3	0.0	11.3	3.5	11.3	7.5	74.0	3.8	0.0	8.8	5.0	16.3	3.8	75.0	5.5	1.3	20.0	5.0	73.8	1
JB-50	27.50	100.0	0.0	0.0	14.0	1.8	5.0	11.3	67.5	2.0	12.5	9.5	8.0	31.3	6.3	54.5	6.3	0.0	40.0	5.0	55.0	1
JB-51	36.00	50.0	50.0	0.0	10.5	1.5	7.5	15.0	72.5	14.8	0.0	10.0	6.3	48.8	0.0	45.0	15.0	1.3	51.8	0.0	47.0	5
JB-52	37.50	45.0	47.5	7.5	13.8	2.0	7.5	8.8	69.3	7.5	2.5	4.3	1.3	43.8	2.5	52.5	47.5	9.0	33.5	1.3	56.3	5
JB-53	42.75	50.0	50.0	0.0	8.8	4.0	6.8	15.0	68.8	4.3	1.3	12.5	11.3	38.8	0.0	50.0	12.5	3.8	50.0	0.0	46.3	5
JB-54	40.25	60.0	40.0	0.0	7.5	3.5	8.3	11.3	60.8	16.3	0.0	30.0	27.5	25.0	2.5	45.0	11.3	3.8	32.5	5.0	58.8	7
JB-55	46.00	25.0	65.0	10.0	12.5	1.8	4.0	8.8	61.8	11.5	12.5	8.8	9.3	35.0	3.8	52.0	21.3	8.8	17.5	0.0	73.8	5
JB-56	59.50	5.0	85.0	10.0	13.8	2.0	10.0	11.3	58.8	6.8	11.3	23.8	17.5	27.5	0.0	55.0	42.5	17.5	27.5	0.0	55.0	5
JB-57	70.50	15.0	40.0	45.0	13.8	0.5	5.0	10.0	45.3	13.0	26.3	41.3	21.3	15.0	3.8	57.5	15.0	15.0	20.0	2.5	62.5	5
JB-58	45.75	45.0	50.0	5.0	10.0	0.5	6.8	8.8	71.5	8.8	3.75	17.5	9.3	34.5	0.0	56.3	12.5	11.0	27.5	0.0	59.5	5
JB-59	29.25	87.5	12.5	0.0	17.5	1.8	3.3	9.3	68.3	17.5	0.0	11.8	6.3	30.0	3.8	60.0	5.5	3.8	32.5	7.5	56.3	1
JB-60	66.25	15.0	85.0	0.0	7.5	1.0	5.5	13.8	74.8	5.0	0.0	45.0	2.5	47.5	0.0	50.0	31.3	22.5	31.3	0.0	60.0	4
JB-61	50.75	70.0	30.0	0.0	8.8	5.5	6.3	15.0	73.4	1.0	0.0	9.3	0.0	47.5	3.8	46.3	12.5	11.3	35.0	2.5	51.3	5
JB-62	42.50	70.0	30.0	0.0	7.5	3.5	8.0	12.5	70.5	4.0	1.5	27.5	12.5	45.0	0.0	42.5	30.5	1.3	58.8	2.5	37.5	4
JB-63	36.75	75.0	25.0	0.0	7.5	4.3	8.0	16.3	70.0	1.5	0.0	20.0	6.8	42.5	1.3	49.5	32.5	2.5	35.0	5.0	55.0	1
JB-64	61.5	17.5	32.5	0.0	4.3	3.5	20.0	8.8	56.3	1.5	10.0	4.3	3.8	51.3	1.3	43.8	10.0	3.8	47.5	1.3	47.5	1
JB-65	68.25	35.0	65.0	0.0	10.0	7.5	11.3	17.5	60.0	2.5	1.3	27.5	1.3	38.8	3.8	56.3	17.5	11.3	25.0	20.0	43.8	5
JB-66	60.50	17.5	82.5	0.0	7.5	8.3	9.3	10.0	71.5	1.3	0.0	25.0	0.0	52.5	12.5	35.0	36.3	2.5	55.0	0.0	42.5	4
JB-67	62.25	61.3	38.8	0.0	23.8	2.8	8.8	16.3	48.5	26.3	0.0	28.8	1.3	32.5	5.0	61.3	19.3	0.5	45.0	5.0	49.5	1
JB-68	36.75	70.0	30.0	0.0	18.0	8.0	12.5	7.5	54.3	14.0	3.8	32.5	13.8	23.8	25.0	37.5	25.0	5.0	40.0	30.3	25.0	4
JB-69	55.75	100.0	0.0	0.0	6.3	6.3	27.5	10.0	51.3	5.0	0.0	14.5	0.0	5.0	95.0	9.0	5.5	0.0	2.8	96.8	0.5	1
JB-70	42.25	40.0	60.0	0.0	10.0	8.8	25.0	9.3	55.8	0.0	1.3	21.3	0.0	45.0	10.0	45.0	7.5	6.3	45.0	20.0	28.8	5
JB-71	46.75	87.5	12.5	0.0	11.3	8.8	43.8	21.3	25.0	1.3	0.0	11.3	0.0	37.5	6.3	56.3	5.0	0.0	37.5	7.5	55.0	1

Station	Upstream Northing	Upstream Westing	Reach Length	Water Temp (°C)	DO (ppm)	pH	Conductivity (uS/cm)	TDS (ppm)	Salinity (ppt)	Average depth (cm)	Average width (m)	% pool	% riffle	%run	LB Average Height (cm)	LB% stable	LB % slightly eroded	LB % heavily eroded
JB-72	45.95079	64.37608	100	16.42	10.00	6.85	60.00	30.00	0.03	43.50	4.7	36.3	1.3	62.5	33.00	82.5	16.3	0.0
JB-73	45.95018	64.37576	100	16.51	9.18	6.85	60.00	30.00	0.03	53.08	5.3	25.0	0.0	75.0	47.50	55.0	45.0	0.0
JB-74	45.94917	64.37611	100	16.53	9.24	6.63	59.00	29.00	0.03	51.33	4.6	60.0	0.0	40.0	44.75	98.8	1.3	0.0
JB-75	45.94820	64.37619	100	16.46	8.36	7.34	64.00	32.00	0.03	NA	NA	52.5	0.0	47.5	NA	100.0	0.0	0.0
JB-76	45.94791	64.37521	100	13.99	10.47	5.86	50.00	25.00	0.02	NA	NA	50.0	0.0	50.0	NA	90.0	10.0	0.0
JB-77	45.94768	64.37412	100	14.11	9.66	6.49	56.00	28.00	0.03	NA	NA	50.0	0.0	50.0	NA	100.0	0.0	0.0

Station	RB Average Height (cm)	RB % Stable	RB % Slightly Eroded	RB % Heavily Eroded	% Embeddedness	% fines	% sand	% gravel	% rocks	% boulder	% bedrock	LB % shade cover	LB% bare	LB% grasses	LB% shrubs	LB% trees	RB% shade cover	RB% bare	RB %grasses	RB %shrubs	RB% trees	POINTS
JB-72	33.50	88.8	10.0	0.0	5.0	12.5	48.8	20.0	18.8	0.0	0.0	30.0	0.0	14.8	83.8	1.5	20.0	0.0	19.8	78.8	1.5	1
JB-73	35.75	17.5	82.5	0.0	28.8	16.3	65.5	2.5	15.3	0.5	0.0	18.8	7.5	41.3	8.8	42.5	18.8	0.0	42.5	7.5	50.0	5
JB-74	49.50	63.8	31.3	5.0	13.0	18.8	50.8	0.0	20.0	10.5	0.0	10.0	0.0	32.5	65.0	2.5	15.0	1.3	42.5	32.5	23.8	1
JB-75	NA	50.0	37.5	12.5	NA	NA	NA	NA	NA	NA	NA	10.0	0.0	32.5	66.3	1.3	10.5	0.0	27.5	71.3	1.3	1
JB-76	NA	100.0	0.0	0.0	NA	NA	NA	NA	NA	NA	NA	13.8	3.8	10.0	46.3	42.5	15.5	0.0	21.3	51.3	27.5	1
JB-77	NA	100.0	0.0	0.0	NA	NA	NA	NA	NA	NA	NA	7.5	0.0	15.0	85.0	0.0	4.3	0.0	38.8	60.0	1.25	1

## Appendix 3: Tree Cover Loss Charts and Images





Source: Global Forest Watch. Area in Westmorland County, New Brunswick, Canada. World Resources Institute. August 19, 2021. [globalforestwatch.org](https://globalforestwatch.org)

## Appendix 4: Land Use Around Joe Brook

