

# INITIAL STUDY REPORT

FOR

**Gile Flowage Storage Project (FERC Project No. 15055)**  
Minimum Flow Habitat Evaluation Study  
and  
Shoreline Stability Assessment

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## INTRODUCTION

### Project Information and Background

Great Lakes Environmental Center, Inc. (GLEC) conducted a Minimum Flow Habitat Evaluation Study and Shoreline Stability Assessment for the Gile Flowage Project (FERC No. 15055) in August 2022. The purpose of the habitat study was to determine if the current minimum flow is sufficient to protect aquatic resources in the West Fork of the Montreal River downstream of the Gile Dam. The stability assessment was conducted along the reservoir shoreline and the tailwater area downstream of the Gile Dam following the methods outlined in the Request for Proposal (RFP) and in accordance with Wisconsin Administrative Code NR 328.08 to identify and inventory erosion sites.

### Description of the Study Area

The Gile Flowage (Flowage) is located within the northern highland area of northern Wisconsin which is widely known for its forests, lakes, and wetlands. The Flowage is an approximately 3,200-acre reservoir formed by the impounding of the west branch of the Montreal River (FIGURE 1). The Flowage and the west branch of the Montreal River are located in the vicinity of the Gogebic and Trap Ranges (Wisconsin Geological & Natural History Survey (WGNHS) 2022) which form two conspicuous ridges in Iron and Ashland Counties in northern Wisconsin. Both ridges are composed of rock types that are more resistant to erosion than the rock that underlies the valley separating them. A thin layer of sediment deposited during the most recent glaciation covers the valley and parts of the ridges. This thin layer of sediment is exposed along the Flowage shoreline where erosion is present. The Flowage is situated on the southern ridge of the Gogebic Range and contains iron-rich rock that is approximately 1.9 billion years old. Bare rock faces and boulders are common along the shoreline of the flowage. Most, if not all, of the natural beaches on the flowage are made up of gravel and cobble. Swimming beaches, when present, appear to be man-made and represent a very small portion of the overall shoreline. The West Branch of the Montreal River flows through the northern ridge, (Trap Range) which is distinctly different in composition from the southern ridge; it is composed of younger volcanic rock, consisting primarily of basaltic-lava flows that are approximately 1.1 billion years old.



FIGURE 1. GILE FLOWAGE STUDY AREA

A survey of the littoral zone was conducted on the Flowage in 2005 by Friends of the Gile Flowage ([www.friendsofthegile.org/home/flowage-publications](http://www.friendsofthegile.org/home/flowage-publications)). The study analyzed the substrates in the littoral zone in areas up to six feet below the full pool elevation of 1,490 feet. The report indicated that substrates within the upper 6 feet consisted of: 20.3% bedrock, boulder, or cobble; 26.9% gravel, gravel with cobble, or gravel with boulders; 39.8% sand, muck or detritus; and 13% sand with gravel, cobble, and/or boulders (FOG, 2005).

## METHODS

### Gile Flowage Shoreline Stability Assessment

The Shoreline Stability Assessment (stability assessment) was conducted on August 9 and 29, 2022. The entire shoreline of the Flowage, including the islands, was assessed via boat by slowly cruising along the shoreline. The backwater areas east of County Hwy C were assessed from the shoreline along County Hwy C, Knights Road and U.S. Hwy 51 (Map sheets 01 and 02). The field crew assessed only those areas that appeared to have exposed eroded soil along the shoreline. Erosion or bank instability was defined as evidence of soil movement or slumping. Bare rock areas or gravel areas were not assessed (using the data sheet) but were observed. Areas of erosion, when identified, were described by number and zone (e.g., Zone 10; site Number 1). An outline of Gile Flowage and the 10 grid (zone) patterns (Map Sheets) are shown in FIGURE 2. Raw field data scoresheets are shown in Appendix A.

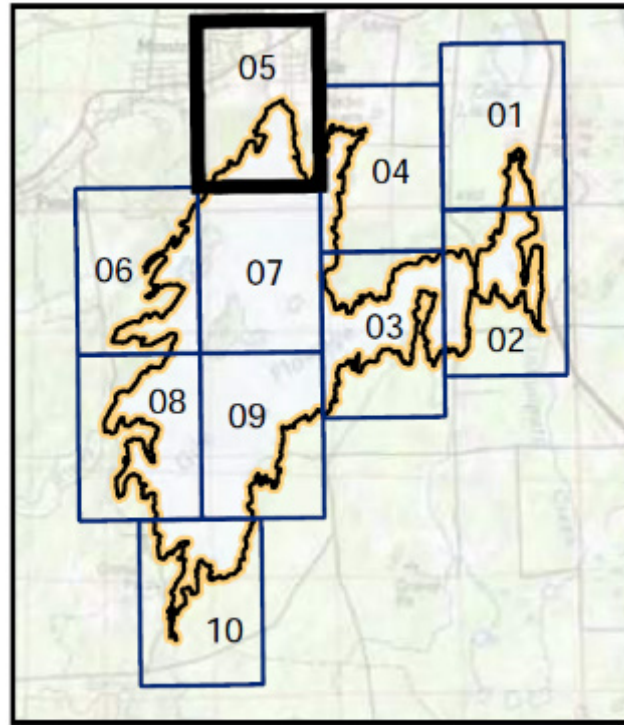


FIGURE 2. GILE FLOWAGE OUTLINE AND GRID PATTERN USED IN THE SHORELINE STABILITY ASSESSMENT (MAP SHEETS 1 THROUGH 10)



FIGURE 3. PROJECT AREA DOWNSTREAM OF THE GILE DAM INCLUDED IN THE SHORELINE STABILITY ASSESSMENT.

The stability assessment also included a survey of the project area downstream of Gile Dam (FIGURE 3). When erosion was identified, the location was photographed and recorded with a handheld GPS. Each erosion site was assigned an intensity score that was recorded on a field form. A single form was completed for each erosion site as shown in FIGURE 4.

SHORELINE VARIABLES	DESCRIPTIVE CATEGORIES							ASSIGNED EI
	Erosion Intensity Value is Located in Parenthesis on Left Side of Each Category Box							
AVERAGE FETCH <sup>1</sup> —, average distance (miles), across the open water to the opposite shore measure 45° other side of the perpendicular to the shoreline.	(0) <1/10	(2) 1/10 –1/3	(4) 1/3–1	(7) 1 –3	(10) 3–10	(13) 10–30	(16) >30	
DEPTH AT 20 FEET, depth of water (feet) 20 feet from shoreline	(1) <1	(2) 1–3	(3) 3–6	(4) 6–12	(5) >12			
DEPTH AT 100 FEET, depth of water (feet) 100 feet from shoreline	(1) <1	(2) 1–3	(3) 3–6	(4) 6–12	(5) >12			
BANK HEIGHT <sup>2</sup> , height of bank (feet), measure from toe of the bank to top of the bank-lip.	(1)<1	(2) 1–5	(3) 5–10	(4) 10–20	(5) >20			
BANK COMPOSITION composition and degree of cementation of the sediments	(0) rock, marl, tight clay, well cemented sand (dig with a pick)		(7) soft clay, clayey sand, moderately cemented (easily dug with a knife)		(15) uncemented sands or peat (easily dug with your hand)			
INFLUENCE OF ADJACENT STRUCTURES, likelihood that adjacent structures are causing bank erosion at the site	(0) no hard armoring on either adjacent property	(1) hard armoring on one adjacent property	(2) hard armoring on both adjacent properties	(3) hard armoring on one adjacent property with measurable recession	(4) hard armoring on both adjacent properties with measurable recession adjacent to both structures			
AQUATIC VEGETATION <sup>3</sup> type and abundance of vegetation occurring in the water off the shoreline	(0) rocky substrates unable to support vegetation		(1) dense or abundant emergent, floating or submerged vegetation	(4) scattered or patchy emergent, floating or submerged vegetation		(7) lack of emergent, floating or submerged vegetation		
BANK VEGETATION, type and abundance of the vegetation occurring on the bank face and immediately on top of the bank lip	(0) bank composed of rocky outcropping unable to support vegetation		(1) dense vegetation, upland trees, shrubs and grasses, including lawns	(4) clumps of vegetation alternating with areas lacking vegetation		(7) lack of vegetation (cleared), crop or agricultural land		
BANK STABILITY, The degree to which bank and adjacent area (within 10 feet of the bank-lip) is stabilized by natural ground, shrub, and canopy vegetation (outside a 10' pier access corridor). Human disturbance is typified by tree removal, brushing, mowing, and lawn establishment.	(0) established lawn with few canopy trees		(1) established lawn with moderate to dense canopy trees	(4) moderate to dense natural ground vegetation and canopy trees with shrub layer substantially reduced; or few canopy trees with moderate to dense natural shrub layer.			(7) moderate to dense canopy trees with moderate to dense natural shrub layer; or other natural features prevents establishment of vegetation.	
SHORELINE GEOMETRY general shape of the shoreline at the point of interest plus 200 yards on either side.	(1) coves or bays			(4) irregular shoreline or straight shoreline		(8) headland, point, or island		
SHORE ORIENTATION <sup>4</sup> geographic direction the shoreline faces	(0) < 1/3 mile fetch	(1) north to east to south-south-east (349°–360°, 1°–168°)		(4) south to west-southwest (169°–258°)		(8) west to north-north-west (259°–349°)		
BOAT WAKES <sup>5</sup> proximity to and use of boat channels	(1) no channels within 100 yards, broad open water body, or constricted shallow water body; or channels within no-wake zones		(6) thoroughfare within 100 yards carrying limited traffic, or thoroughfare 100 yards to ½ mile offshore carrying intensive traffic		(12) thoroughfare within 100 yards carrying intensive traffic (unregulated boating activity)			
EROSION INTENSITY SCORE (EI)								

FIGURE 4. EROSION INTENSITY (EI) SCORE WORKSHEET (Wisconsin Administrative Code: NR 328.08)

### Minimum Flow Habitat Evaluation Study

The primary objective of the Minimum Flow Habitat Evaluation Study (habitat study) was to evaluate whether the existing minimum flow (12 cfs) at the Project is sufficient to provide suitable habitat for aquatic resources in the West Fork downstream of the Gile Dam. Additional study flows of 24 and 36 cfs were also planned to assess how the suitability of available habitat may change with increases in flow. The habitat study included a survey of two representative reaches (stations) downstream of the Gile Dam. The reaches were determined after reviewing the 2017 WDNR fishery data and WDNR's Guidelines for Evaluating Habitat of Wadable Streams (WDNR Guidelines). Water depth and velocity information were collected at both stations at baseflow conditions reported as 12 cfs. The water depth information was collected by hand measurements and point velocity measurements were collected with an electromagnetic flow meter mounted to a top-setting wading rod. The sampling methodology for each station followed the general sampling procedures outlined in WDNR Guidelines. GLEC incorporated improved/current methodology with the field data collection and interpretation such as habitat suitability curves, weighted usable area and current instream flow methodologies. The data recommended by the WDNR Guidelines was collected for each of 12 transects within each of the two study reaches.

During the course of collecting the first set of habitat data, GLEC used a SonTek River Surveyor to verify the 12 cfs minimum flow from the dam when the sluice gate was closed as far as possible<sup>1</sup>. Flow measurements just below the dam, as well as 0.44 miles downstream (FIGURE 5), revealed that the discharge was actually much closer to the anticipated highest study flow of 36 cfs. The average of the measured flows equaled 35.25 cfs. As such, the full suite of habitat data was collected only at the high study flow (36 cfs) until such a time when lower flows can be produced.



FIGURE 5. LOCATIONS OF STREAM FLOW MEASUREMENTS DURING GILE HABITAT STUDY

<sup>1</sup>Two metal tabs are fastened to the bottom plate of the sluice gate preventing it from fully closing and thus ensuring the minimum flow is discharged at all times.



### Habitat Study Reaches

Wisconsin DNR staff previously collected fisheries data in the West Fork of the Montreal River during backpack and/or stream shocking surveys from 2007-2018 (WDNR fisheries survey data provided to Northern States Power of Wisconsin (NSPW) April 28, 2021). During these surveys, fish were collected from five different locations downstream of the Gile Flowage (FIGURE 6). A total of 15 fish species were collected across all years and sampling areas.

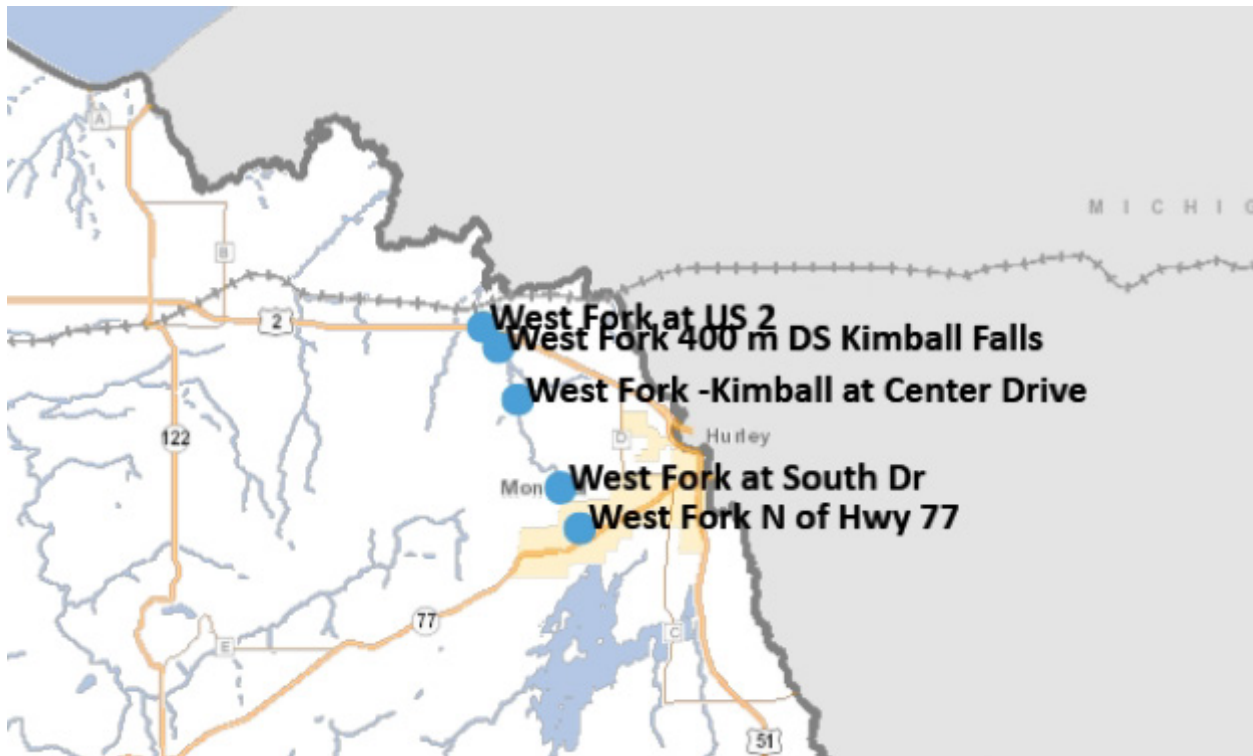


FIGURE 6. WDNR FISH SAMPLING LOCATIONS IN THE WEST FORK OF THE MONTREAL RIVER (2007-2018)

After reviewing the fish data provided by WDNR, two study reaches were selected for the Minimum Flow Habitat Evaluation Study that corresponded to two of the WDNR fish sampling locations. The upper study reach (Reach A) began just downstream of the US Highway 77 bridge and the lower study reach (Reach B) included areas both upstream and downstream of South Drive. Results of the WDNR fish surveys from these two locations included all 15 species of fish collected throughout the surveys. Numbers of each species collected and percent abundance of each species is displayed in TABLE 1.

Species Common Name	Species Scientific Name	Number of Fish Collected	Percent Abundance
LONGNOSE DACE	<i>Rhinichthys cataractae</i>	329	42.56%
CREEK CHUB	<i>Semotilus atromaculatus</i>	84	10.87%
PUMPKINSEED	<i>Lepomis gibbosus</i>	81	10.48%
SMALLMOUTH BASS	<i>Micropterus dolomieu</i>	70	9.06%
HORNYHEAD CHUB	<i>Nocomis biguttatus</i>	52	6.73%
WHITE SUCKER	<i>Catostomus commersonii</i>	49	6.34%
YELLOW PERCH	<i>Perca flavescens</i>	29	3.75%
COMMON SHINER	<i>Luxilus cornutus</i>	24	3.10%
BLACKNOSE SHINER	<i>Notropis heterolepis</i>	23	2.98%
WALLEYE	<i>Sander vitreus</i>	13	1.68%
MOTTLED SCULPIN	<i>Cottus bairdii</i>	9	1.16%
ROCK BASS	<i>Ambloplites rupestris</i>	4	0.52%
WESTERN BLACKNOSE DACE	<i>Rhinichthys obtusus</i>	3	0.39%
BROOK TROUT	<i>Salvelinus fontinalis</i>	2	0.26%
CENTRAL MUDMINNOW	<i>Umbra limi</i>	1	0.13%

TABLE 1. LIST OF FISH SPECIES COLLECTED BY WDNR FROM THE GILE FLOWAGE MINIMUM FLOW HABITAT EVALUATION STUDY REACHES

Habitat sampling at each reach was conducted following WI DNR Guidelines for Evaluating Habitat of Wadable Streams (2002). At each study reach, the mean stream width (MSW) was determined and the reach length was calculated as 35 times the MSW. Within each reach, 12 transects were established (FIGURE 7 and FIGURE 8). The first (most upstream) transect was established 1 MSW from the upstream end of the study reach and subsequent transects were spaced 3 MSW apart (approximately 45 meters in both reaches). At each transect, the following data was collected:

- Distance from start of study reach
- Wetted width
- Habitat type
- Depth at deepest point along transect (thalweg)
- Length of each transect containing various types of cover for adult fish
- Amount of bank erosion
- Riparian land use within 5 meters of stream edge
- Riparian buffer width

Along each transect, four equally spaced sampling points were established, effectively dividing each transect into five equal segments. Within a 0.3m x 0.3m quadrat on the stream bottom centered on the transect point, the following data was collected:

- Water depth (if a boulder was directly on the transect point, depth was measured next to the boulder)
- Depth of fines and water
- Embeddedness of coarse gravel and rubble/cobble
- Percent of the stream bottom covered by various substrate types, algae, and macrophytes
- Percent of the transect shaded by canopy
- Water velocity (from a location equal to 0.6 times the water depth at the point)

The available habitat (in square meters) of each sub-reach segment was calculated by multiplying the width of each segment by the sub-reach length. To calculate the weighted useable area (WUA) of each segment, habitat suitability formulas (Aadland and Kuitunen, 2006) were applied to the depth and velocity values at each sampling point for the 10 most common fish species collected and then summed to create a single WUA index for each species and in each study reach. Collectively, these 10 species accounted for over 97.5 percent of the fish collected from the two study reaches. The habitat suitability curves for depth and velocity of these 10 species are presented in FIGURE 9. A habitat suitability formula for pumpkinseed was not available, so the formula for bluegill was used as a surrogate. Pumpkinseeds are generally considered very similar to bluegill, and are often found in the same habitat.

As flows change within the West Fork of the Montreal River, depth and velocity will change accordingly. Other parameters, such as substrate type, cover for fish, canopy cover, percent embeddedness, etc. are expected to remain relatively consistent. For this reason, habitat suitability indices used in the calculation of weighted usable area were restricted to depth and velocity. When lower flows (i.e., 12 cfs) are able to be discharged and verified below the dam, similar calculations will be made to allow a direct comparison of weighted useable areas for each species at each study flow.

Using the habitat data collected, and the Fish Habitat Rating system (TABLE 2) developed by WDNR (Simonson, Lyons, and Kanehl, 1993.), an overall fish habitat score was developed for each reach. This score, which ranges from zero to 100, is designed to provide a qualitative rating of fish habitat that ranges from poor to excellent using the following scoring ranks.

- Excellent  $\geq 80$
- Good 60-80
- Fair 20-60
- Poor  $< 20$



FIGURE 7. APPROXIMATE LOCATION OF TRANSECTS A1-A12 DOWNSTREAM OF HIGHWAY 77 ON THE WEST BRANCH OF THE MONTREAL RIVER



FIGURE 8. APPROXIMATE LOCATION OF TRANSECTS B1-B12 IN THE VICINITY OF SOUTH ROAD ON THE WEST BRANCH OF THE MONTREAL RIVER

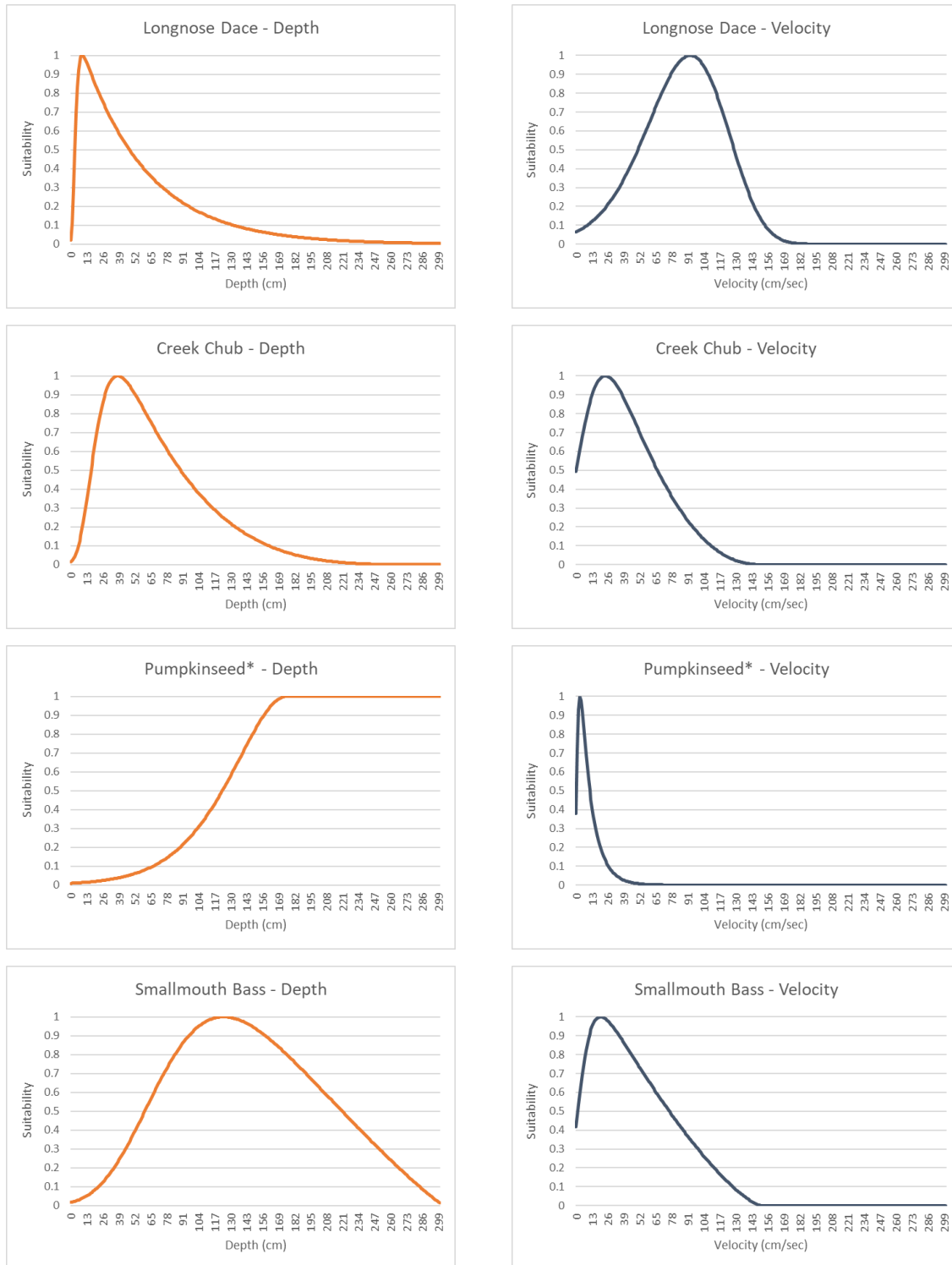


FIGURE 9. HABITAT SUITABILITY CURVES FOR DEPTH AND VELOCITY OF THE 10 MOST COMMON SPECIES IN THE GILE FLOWAGE MINIMUM FLOW HABITAT EVALUATION STUDY REACHES.

\* Habitat suitability curves for pumpkinseed were not available, so the curves for bluegill were used instead



FIGURE 9 (CONT.). HABITAT SUITABILITY CURVES FOR DEPTH AND VELOCITY OF THE 10 MOST COMMON SPECIES IN THE GILE FLOWAGE MINIMUM FLOW HABITAT EVALUATION STUDY REACHES.

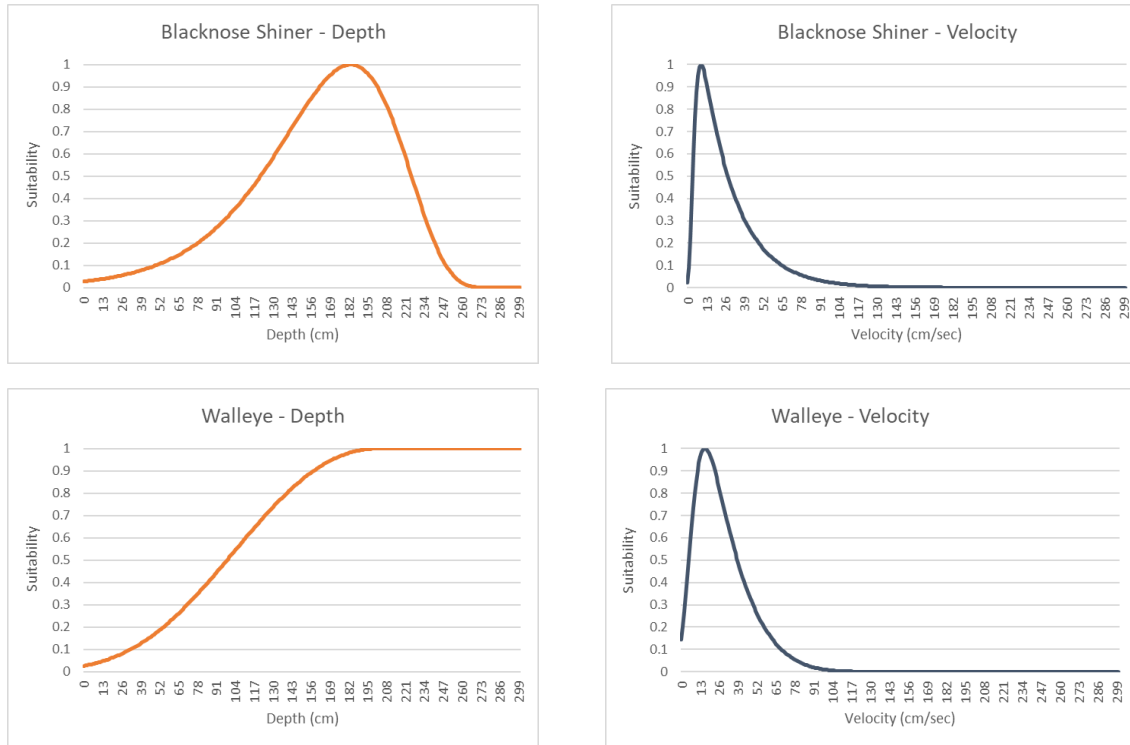


FIGURE 9 (CONT.). HABITAT SUITABILITY CURVES FOR DEPTH AND VELOCITY OF THE 10 MOST COMMON SPECIES IN THE GILE FLOWAGE MINIMUM FLOW HABITAT EVALUATION STUDY REACHES.



<b>RATING ITEM</b>	<b>EXCELLENT</b>	<b>GOOD</b>	<b>FAIR</b>	<b>POOR</b>
<b>Bank Stability</b> (% of bank protected by rock or vegetation)	No significant bank erosion; $\geq$ 90% of bank protected; $\leq$ 10% bare soil <b>(12)</b>	Limited erosion; 70 to 90% of bank protected; 10 to 30% bare soil <b>(8)</b>	Moderate erosion; 50 to 60% of bank protected; 10 to 30% bare soil <b>(4)</b>	Extensive erosion; $<$ 50% of bank protected; $>$ 50% bare soil <b>(0)</b>
<b>Maximum Thalweg Depth</b> (average of the four deepest depths recorded)	Stream very deep; $\geq$ 1.5 meters <b>(25)</b>	Stream relatively deep; 1 to 1.5 meters <b>(16)</b>	Stream moderately deep; 0.6 to 0.9 meters <b>(8)</b>	Stream relatively shallow; $<$ 0.6 meters <b>(0)</b>
<b>Riffle:Riffle or Bend:Bend Ratio</b> (average distance between riffles or bends divided by average stream width)	Diverse habitats; meandering stream with deep bends and riffles common; ratio $\leq$ 10 <b>(12)</b>	Diverse habitats;bends and riffles present but not abundant; ratio 10 to 14 <b>(8)</b>	Habitat diversity low; occasional riffles or bends; ration 15 to 25 <b>(4)</b>	Habitat monotonous; riffles or bends rare; generally continuous run habitat; ratio $>$ 25 <b>(0)</b>
<b>Rocky Substrate</b> (% of the substrate, by area, that is bedrock, boulder, rubble/cobble, or gravel)	Extensive rocky substrate; $\geq$ 65% of stream bed <b>(25)</b>	Moderate rocky substrate; 45 to 65% of stream bed <b>(16)</b>	Limited rocky substrate; 15 to 44% of stream bed <b>(8)</b>	Rocky substrate uncommon; $<$ 15% of stream bed <b>(0)</b>
<b>Cover for Fish</b> (% of the stream area with cover)	Cover/shelter for fish abundant; $\geq$ 12% of stream <b>(25)</b>	Cover common, but not extensive; 7 to 12% of stream <b>(16)</b>	Occasional cover, limited to one or two areas; 2 to 6% of stream <b>(8)</b>	Cover rare or absent; limited to , 2% of stream <b>(0)</b>

TABLE 2. FISH HABITAT RATING SYSTEM (FHR) DEVELOPED BY WDNR (SIMONSON, LYONS, AND KANEHL, 1993.)

## STUDY RESULTS

### Shoreline Stability Study

Seven shoreline sites and the downstream project area were scored using the Wisconsin Erosion Intensity Score worksheet. Six sites located on the Flowage appeared to have significant active erosion with evidence of soil movement or slumping (Sites 1, 2, 4, 5, 6 and 7). Site #3 was assessed to evaluate the worksheet scoring at a non-erosional site for comparison. In addition, specific attention was given to the assessment of roadsides, manmade beaches, docks or otherwise developed shorelines for evidence of soil movement or slumping. On the Flowage, none of the developed shorelines showed any evidence of erosion. A list of the sites assessed using the Erosion Intensity Score worksheet is provided in TABLE 3 and their locations are shown in FIGURE 10. Photographs of each site are provided in FIGURE 13 through FIGURE 19. The field data worksheets are included in Appendix A.

Five of the six sites identified with erosion were located on small islands within the Flowage (Sites 1, 2, 4, 6 and 7). One site (Site #5) was located along the northwest shoreline near the dam. In each instance, the erosion features appeared to be above the waterline.

There was one small area with evidence of shoreline erosion in the tailrace. That area is located on the west bank at the toe of the water control structure, adjacent to the west wingwall downstream of the dam gatehouse. It appears that human traffic, and possibly high springtime flows, have scoured the bank and exposed the soil adjacent to the concrete wingwall (FIGURE 11). Given the location of the area of interest, an Erosion Intensity work sheet was not completed. There were no other erosion sites identified in the project area downstream of the dam. A typical depiction of the downstream project area is shown in FIGURE 12.

<u>Site # (Map Sheet Location)</u>	<u>Coordinates</u>	<u>Erosion Intensity Score</u>
Site #1 (Map Sheet 7)	N46.41403; W90.22038	36
Site #2 (Map Sheet 7)	N46.4133, W90.2205	36
Site #3 (Map Sheet 10)	N46.369216, W90.244506	27 <sup>@</sup>
Site #4 (Map Sheet 9)	N46.378467, W90.24095	42
Site #5 (Map Sheet 5)	N46.424921, W90.228208	39
Site #6 (Map Sheet 4)	N46.415217, W90.217717	39
Site #7 (Map Sheet 7)	N46.411840, W90.22258	33

TABLE 3. GILE FLOWAGE SHORELINE STABILITY ASSESSMENT SITES AND THE RESULTING EROSION INTENSITY SCORE.

<sup>@</sup> Site #3 was not an area of concern nor an erosional site.

The Wisconsin Administrative Code NR 328.08 categorizes erosion intensity into three groups; low energy, with a score of 47 or less, moderate energy with a score of 48-67, and high energy with a score of greater than 67. Each site assessed in the Gile Flowage shoreline stability study ranked in the low energy category.

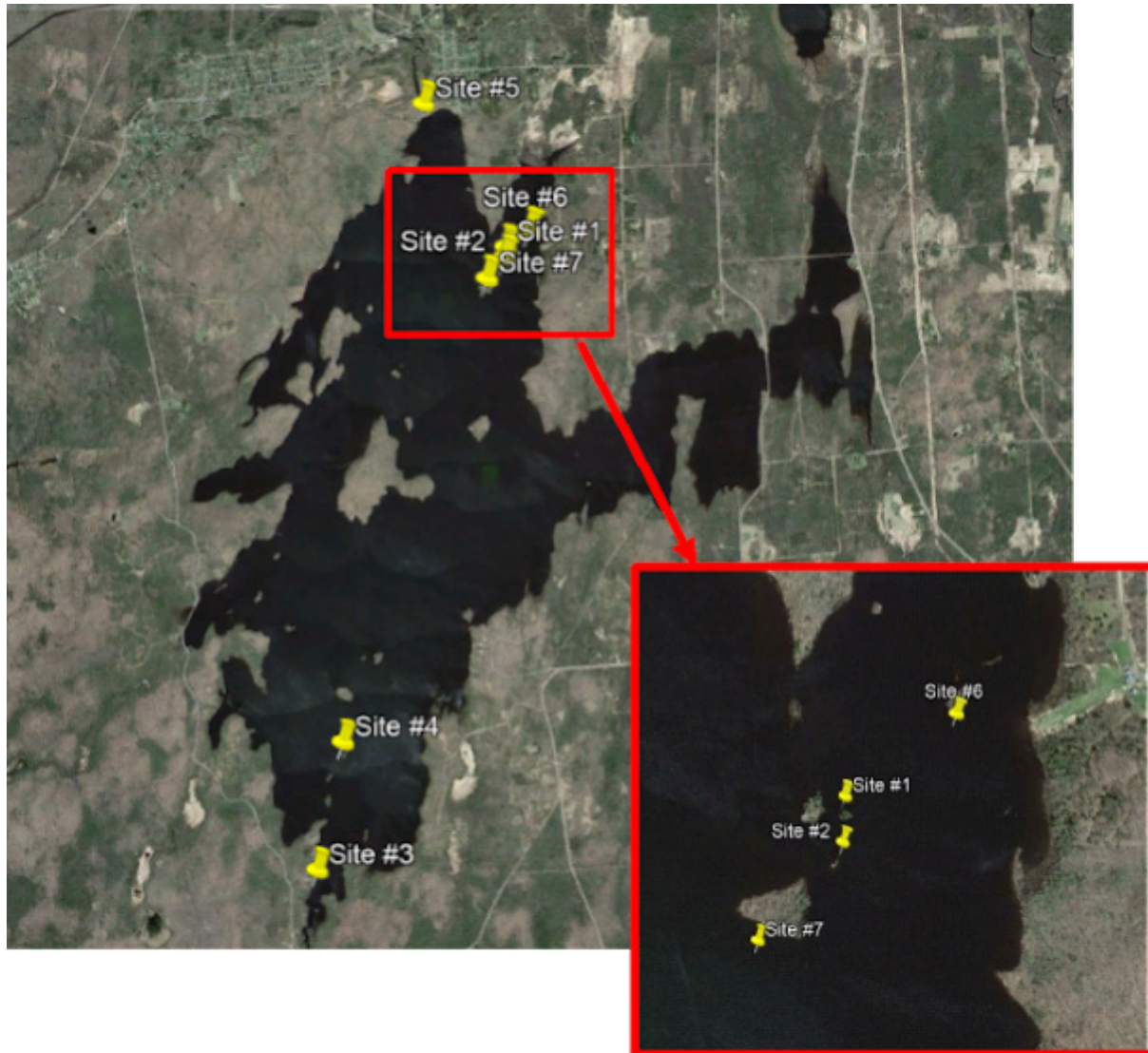


FIGURE 10. SHORELINE STABILITY ASSESSMENT SITES IN THE GILE FLOWAGE.



FIGURE 11. AREA OF INTEREST ON THE LEFT EMBANKMENT (WEST WINGWALL) FACING DOWNSTREAM AT THE TOW OF THE EMBANKMENT (August 30, 2022).



FIGURE 12. WEST BRANCH OF THE MONTREAL RIVER IMMEDIATELY DOWNSTREAM OF THE GILE FLOWAGE (AUGUST 9, 2022)



FIGURE 13. SITE #1 FROM THE 2022 GILE FLOWAGE SHORELINE STABILITY ASSESSMENT.



FIGURE 14. SITE #2 FROM THE 2022 GILE FLOWAGE SHORELINE STABILITY ASSESSMENT.



FIGURE 15. SITE #3 FROM THE 2022 GILE FLOWAGE SHORELINE STABILITY ASSESSMENT.





FIGURE 16. SITE #4 FROM THE 2022 GILE FLOWAGE SHORELINE STABILITY ASSESSMENT.



FIGURE 17. SITE #5 FROM THE 2022 GILE FLOWAGE SHORELINE STABILITY ASSESSMENT.



FIGURE 18. SITE #6 FROM THE 2022 GILE FLOWAGE SHORELINE STABILITY ASSESSMENT.



FIGURE 19. SITE #7 FROM THE 2022 GILE FLOWAGE SHORELINE STABILITY ASSESSMENT.

## ANALYSIS AND DISCUSSION

### Shoreline Stability Study

The Wisconsin Administrative Code NR 328.08 categorizes erosion intensity into three groups; low energy, moderate energy, and high energy. Each site assessed in the stability study ranked in the low energy category (TABLE 3). Five of the six sites identified with erosion were located on small islands within the flowage (Sites 1, 2, 4, 6 and 7). One site (Site #5) was located along northwest shoreline of the flowage near the dam. In each instance, the erosion features appeared to be above the waterline; the area between the water line and the eroded embankment was covered with cobble or sandy beach. In the downstream tailrace and riverine area downstream of the dam within the project boundary, there was one instance of shoreline erosion or instability. All shorelines along the roadways, including culverts and small bridges showed no signs of erosion. An inventory of each erosion site is provided in TABLE 4.

The bedrock in Iron and Ashland Counties in northern Wisconsin is resistant to erosion. The thin layer of sediment that is exposed in erosional areas around the Flowage lays atop the bedrock. Bare rock faces and boulders are common along the flowage shoreline. Most, if not all, of the natural beaches on the flowage are composed of gravel and cobble. Swim beaches, if present, appear to be man-made and represent a very small portion of the Flowage shoreline. Developed shorelines within the project boundary did not appear to have significant erosion.

Previous work completed by the Friends of the Gile (FOG 2005) included an analysis of the substrates in the littoral zone in areas up to six feet below the full pool elevation of 1,490 feet. That report indicated that substrates within the upper 6 feet consisted of: 20.3% bedrock, boulder, or cobble; 26.9% gravel, gravel with cobble, or gravel with boulders; 39.8% sand, muck or detritus; and 13% sand with gravel, cobble, and/or boulders (FOG, 2005). FOG's information, when combined with the observations and erosion intensity assessments from this study, indicate that there is very little risk of erosion on the Flowage primarily due to the surrounding geology.

Five of the six erosion sites identified were located on small islands within the flowage where the erosion was limited to the thin soil layer atop the bedrock. One site (Site #5) was located along the northwest shoreline of the flowage near the dam. Although located away from the dam and in a wooded area, this site did exhibit significant soil movement and warrants further investigation. The small area of interest in the tailrace also deserves further attention due to its proximity to the dam structures.

Erosion Site #	Length of Eroded Area (ft)	Coordinates (lat/lon)
Site #1	74	N46.41403, W-90.22038
Site #2	26	N46.41330, W-90.22055
Site #4	24	N46.37847, W-90.24095
Site #5	75	N46.42492, W-90.22831
Site #6	54	N46.41522, W-90.21772
Site #7	210	N46.411840, W90.22258
Downstream Embankment	21	N46.42571, W-90.22692

TABLE 4. INVENTORY OF POSSIBLE ERODABLE SITES IN THE GILE FLOWAGE (AUGUST 2022)

#### Minimum Flow Habitat Evaluation Study

Both study reaches contained a mix of riffle, run, and pool habitat dominated by a hard substrate (boulder, cobble and gravel). Maximum transect depths typically ranged from 35 to 60 cm, with shallow water and soft substrates rarely encountered. Average water velocities ranged from 30 cm/sec to 36 cm/sec. Slack water areas were rarely observed. Field worksheets are included in Appendix B.

Habitat suitability formulas for depth and velocity were applied to each of the ten most common fish species observed during the study to calculate an overall suitability value (TABLE 5 and TABLE 6.).

Reach A	Depth	Vel	Depth and Velocity
LONGNOSE DACE	65.2%	36.1%	50.7%
CREEK CHUB	76.5%	80.9%	71.1%
PUMPKINSEED	4.0%	10.5%	6.6%
SMALLMOUTH BASS	22.4%	81.8%	47.1%
HORNYHEAD CHUB	26.6%	89.5%	52.5%
WHITE SUCKER	14.3%	93.3%	48.7%
YELLOW PERCH	22.8%	61.8%	38.3%
COMMON SHINER	49.3%	88.7%	62.3%
BLACKNOSE SHINER	7.5%	35.9%	19.6%
WALLEYE	12.0%	51.1%	28.5%
Average	30.1%	63.0%	42.5%

TABLE 5. HABITAT SUITABILITY FOR THE 10 MOST COMMON FISH SPECIES IN STUDY REACH A

Reach B	Depth	Vel	Depth and Velocity
LONGNOSE DACE	63.1%	27.7%	45.39%
CREEK CHUB	91.8%	89.2%	90.50%
PUMPKINSEED	3.7%	15.0%	9.39%
SMALLMOUTH BASS	21.9%	89.8%	55.86%
HORNYHEAD CHUB	26.0%	89.0%	57.53%
WHITE SUCKER	13.4%	91.9%	52.62%
YELLOW PERCH	17.1%	77.9%	47.49%
COMMON SHINER	52.7%	87.3%	70.02%
BLACKNOSE SHINER	7.4%	50.3%	28.83%
WALLEYE	11.8%	68.8%	40.31%
Average	30.9%	68.7%	49.80%

TABLE 6. HABITAT SUITABILITY FOR THE 10 MOST COMMON FISH SPECIES IN STUDY REACH B

Overall, the 36 cfs study flow provided a relatively high depth and velocity suitability for the ten most common fish species present. Overall suitability values for 9 of the 10 species exceeded 40%. The highest overall suitability was for the creek chub (90.5%) and the lowest was for the pumpkinseed (9.39%).

Estimating how the amount of available habitat of the weighted useable area may change with lower study flows (12 cfs and 24 cfs) is not possible at this time.

#### Fish Habitat Rating Score

When the habitat data was entered into the WDNR fish habitat scoring worksheet for streams greater than 10 meters wide, both study reaches scored in the “good” range. Study reach A received a score of 69 and study reach B received a score of 61. Deductions from the top score of 100 were due primarily to shallow depths and a lack of bends or other stream complexes which add to the overall diversity of the stream structure.

#### **Agency Consultation**

GLEC had no direct consultation with the resource agencies regarding either the erosion or habitat studies at Gile Flowage.

#### **Literature Cited**

Aadland, L., and A. Kuitunen. 2006. Habitat suitability criteria for stream fishes and mussels of Minnesota. Minnesota Department of Natural Resources, Special Publication 162, St. Paul.

Friends of the Gile Flowage (FOG). 2005. website at <http://www.friendsofthegile.org/home/flowage-publications>.

Simonson, Timothy D.; Lyons, John; Kanehl, Paul D. 1993. Guidelines for evaluating fish habitat in Wisconsin streams. General Technical Report NC-164. St. Paul, MN: U.S. Dept. of Agriculture, Forest Service, North Central Forest Experiment Station

Wisconsin Administrative Code: NR 328.08. Erosion Intensity (Ei) Score Worksheet.

WDNR. 2021. Fisheries survey data provided to Xcel Energy April 28, 2021

Wisconsin Geological & Natural History Survey. 2022. <https://wgnhs.wisc.edu/wisconsin-geology/ice-age/>. 817 Mineral Point Road, Madison, Wisconsin 53705, (608) 262-1705, info@wgnhs.wisc.edu.



**APPENDIX A – EROSION DATA SHEETS**

9 Aug 22  
SMC/Smiley

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NR 328.08

WISCONSIN ADMINISTRATIVE CODE

52

Site #4  
Island Area (P9)

Map Sheet 9

N 46° 22.708 (46.378467)  
W 090° 14.457 (090.24095) SW Wind light

Table 1

Erosion Intensity (EI) Score Worksheet

Applicants and department staff shall use this worksheet to calculate erosion intensity pursuant to s. NR 328.08 (2).

Exposed  
Soil Bank  
gravel  
beach

15-20 ft

of exposed  
Bank,

Confined  
to one  
area.

Evidence  
of Human  
Activity  
on Bank  
(pathway)

Images

IMG 1254  
1253 (3)

SHORELINE VARIABLES	DESCRIPTIVE CATEGORIES							ASSIGNED EI
	Erosion Intensity Value is Located in Parenthesis on Left Side of Each Category Box							
AVERAGE FETCH <sup>1</sup> , average distance (miles), across the open water to the opposite shore measured 45° other side of the perpendicular to the shoreline.	(0) <1/10	(2) 1/10 - 1/3	(4) 1/3 - 1	(7) 1 - 3	(10) 3 - 10	(13) 10 - 30	(16) >30	2
DEPTH AT 20 FEET, depth of water (feet) 20 feet from shoreline	(1) <1	(2) 1-3	(3) 3-6	(4) 6-12	(5) >12			2
DEPTH AT 100 FEET, depth of water (feet) 100 feet from shoreline	(1) <1	(2) 1-3	(3) 3-6	(4) 6-12	(5) >12			3
BANK HEIGHT <sup>2</sup> , height of bank (feet), measured from toe of the bank to top of the bank-top	(1) <1	(2) 1-5	(3) 5-10	(4) 10-20	(5) >20			3
BANK COMPOSITION, composition and degree of cementation of the sediments	(0) rock, marl, tight clay, well cemented sand (dig with a pick)	(7) soft clay, clayey sand, moderately cemented (easily dug with a knife)	(15) uncemented sands or peat (easily dug with your hand)					3
INFLUENCE OF ADJACENT STRUCTURES, likelihood that adjacent structures are causing bank erosion at the site	(0) no hard armoring on either adjacent property	(1) hard armoring on one adjacent property	(2) hard armoring on both adjacent properties	(3) hard armoring on one adjacent property with measurable recession	(4) hard armoring on both adjacent properties with measurable recession adjacent to both structures			3
AQUATIC VEGETATION <sup>3</sup> , type and abundance of vegetation occurring in the water off the shoreline	(0) rocky substrates unable to support vegetation	(1) dense or abundant emergent, floating or submerged vegetation	(4) scattered or patchy emergent, floating or submerged vegetation	(7) lack of emergent, floating or submerged vegetation				4
BANK VEGETATION, type and abundance of the vegetation occurring on the bank face and immediately on top of the bank-top	(0) bank composed of rocky outcropping unable to support vegetation	(1) dense vegetation, upland trees, shrubs and grasses, including lawns	(4) clumps of vegetation alternating with areas lacking vegetation	(7) lack of vegetation (cleared), crop or agricultural land				1
BANK STABILITY, The degree to which bank and adjacent area (within 10 feet of the bank-top) is stabilized by natural ground, shrub and canopy vegetation (measured by 30' pier access corridor) (measured by tree removal, breaching, mowing, and lawn establishment)	(0) established lawn with few canopy trees	(1) established lawn with moderate to dense canopy trees	(4) moderate to dense natural ground vegetation and canopy trees with shrub layer substantially reduced; or few canopy trees with moderate to dense natural shrub layer.	(7) moderate to dense canopy trees with moderate to dense natural shrub layer; or other natural features prevents establishment of vegetation.				7
SHORELINE GEOMETRY, general shape of the shoreline at the point of interest plus 200 yards on either side	(1) coves or bays	(4) irregular shoreline or straight shoreline	(8) trendland, point, or island					8
SHORE ORIENTATION <sup>4</sup> , geographic direction the shoreline faces	(0) < 1/3 mile fetch	(1) north to east to south-south-east (349° - 360°, 1° - 168°)	(4) south to west-southwest (169° - 258°)	(8) west to north-northwest (259° - 349°)				9
BOAT WAKES <sup>5</sup> , proximity to and use of boat channels	(1) no channels within 100 yards, broad open water body, or constricted shallow water body; or channels within no-wake zones	(6) thoroughfare within 100 yards carrying limited traffic, or thoroughfare 100 yards to 1/2 mile offshore carrying intensive traffic	(12) thoroughfare within 100 yards carrying intensive traffic (unregulated boating activity)					1
<b>EROSION INTENSITY SCORE (EI)</b>								<b>42</b>

Note: Table 1 is adapted from Knutson, P. L., H. H. Allen, and J. W. Webb, 1990. "Guidelines for Vegetative Erosion Control on Wave-Impacted Coastal Dredged Material Sites." Dredging Operations Technical Support Program Technical Report D-90-13, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS 39180. 35 pp.

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Register February 2014 No. 698

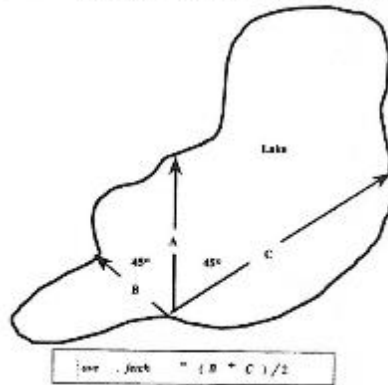
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DEPARTMENT OF NATURAL RESOURCES

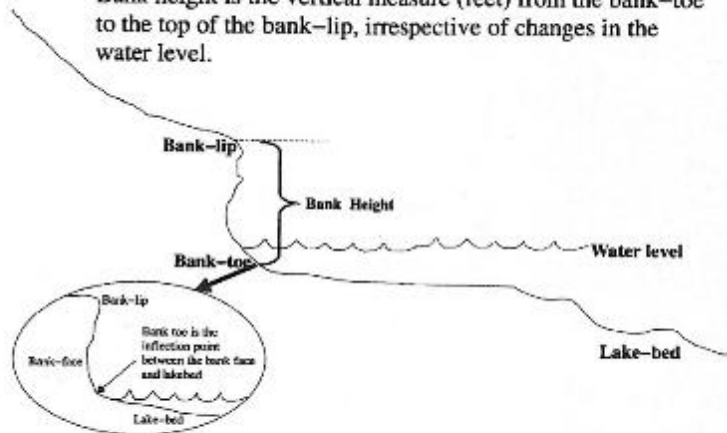
**NR 328.08**

<sup>1</sup> Average fetch: The following diagram describes the calculation of average fetch.



<sup>2</sup> Bank height: The following diagram describes the features of the bank for the purpose of accurately measuring bank height

Bank height is the vertical measure (feet) from the bank-toe to the top of the bank-lip, irrespective of changes in the water level.



<sup>3</sup> Aquatic vegetation: Dense or abundant means that on average 50–100% of the bottom is visually obstructed by plants during the growing season, defined by the dates June 1 through September 15. Scattered or patchy means that on average 1–49% of the bottom is visually obstructed by plants during the growing season, defined by the dates June 1 through September 15. Absent means that on average < 1% of the bottom is visually obstructed by plants during the growing season, defined by the dates June 1 through September 15.

Revisit from shore?

NR 328.08

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52

Area 5

Site #5 (Map Sheet 5 of 10)

SSW Wind Light - Medium

Coordinates:

N46.424921

W 90.228208

near Westin side

of the dam  
Fallen trees  
maybe due  
to bank  
movement  
Home dock  
adjacent to  
the site

Table 1

Erosion Intensity (EI) Score Worksheet

Applicants and department staff shall use this worksheet to calculate erosion intensity pursuant to s. NR 328.08 (2).

SHORELINE VARIABLES	DESCRIPTIVE CATEGORIES							ASSIGNED EI
	Erosion Intensity Value is Located in Parenthesis on Left Side of Each Category Box							
AVERAGE FETCH <sup>1</sup> - average distance (miles), across the open water to the opposite shore measure 45° other side of the perpendicular to the shoreline.	(0) <1/10	(2) 1/10 - 1/3	(4) 1/3 - 1	(7) 1 - 3	(10) 3 - 10	(13) 10 - 30	(16) >30	4
DEPTH AT 20 FEET, depth of water (feet) 20 feet from shoreline	(1) <1	(2) 1-3	(3) 3-6	(4) 6-12	(5) >12			4
DEPTH AT 100 FEET, depth of water (feet) 100 feet from shoreline	(1) <1	(2) 1-3	(3) 3-6	(4) 6-12	(5) >12			5
BANK HEIGHT <sup>2</sup> , height of bank (feet), measure from toe of the bank to top of the bank lip	(1) <1	(2) 1-5	(3) 5-10	(4) 10-20	(5) >20			3
BANK COMPOSITION, composition and degree of consolidation of the sediments	(0) rock, marl, tight clay, well cemented sand (dig with a pick)	(7) soft clay, clayey sand, moderately cemented (easily dug with a knife)	(15) uncemented sands or peat (easily dug with your hand)					7
INFLUENCE OF ADJACENT STRUCTURES, likelihood that adjacent structures are causing bank erosion at the site	(0) no hard armoring on either adjacent property	(1) hard armoring on one adjacent property	(2) hard armoring on both adjacent properties	(3) hard armoring on one adjacent property with measurable recession	(4) hard armoring on both adjacent properties with measurable recession adjacent to both structures			1
AQUATIC VEGETATION <sup>3</sup> , type and abundance of vegetation occurring in the water off the shoreline	(0) rocky substrates unable to support vegetation	(1) dense or abundant emergent, floating or submerged vegetation	(4) scattered or patchy emergent, floating or submerged vegetation	(7) lack of emergent, floating or submerged vegetation				4
BANK VEGETATION, type and abundance of the vegetation occurring on the bank face and immediately on top of the bank lip	(0) bank composed of rocky outcroppings unable to support vegetation	(1) dense vegetation, upland trees, shrubs and grasses, including lawns	(4) clumps of vegetation alternating with areas lacking vegetation	(7) lack of vegetation (cleared), crop or agricultural land				1
BANK STABILITY, The degree to which bank and adjacent area (within 10 feet of the bank lip) is stabilized by natural ground, shrub, and canopy vegetation (outside a 10' pile access corridor). Human disturbance is typified by tree removal, brushing, mowing, and lawn establishment.	(0) established lawn with few canopy trees	(1) established lawn with moderate to dense canopy trees	(4) moderate to dense natural ground vegetation and canopy trees with shrub layer substantially reduced; or few canopy trees with moderate to dense natural shrub layer.	(7) moderate to dense canopy trees with moderate to dense natural shrub layer; or other natural features prevents establishment of vegetation.				4
SHORELINE GEOMETRY, general shape of the shoreline at the point of lowest plus 200 yards on either side.	(1) coves or bays		(4) irregular shoreline or straight shoreline	(8) headland, point, or island				4
SHORE ORIENTATION <sup>4</sup> , geographic direction the shoreline faces	(0) < 1/3 mile fetch	(1) north to east to south-south-east (349° - 360° + 2° - 168°)	(4) south to west-southwest (169° - 258°)	(8) west to north-northwest (259° - 349°)				1
BOAT WAKES <sup>5</sup> , proximity to and use of boat channels	(1) no channels within 100 yards, broad open water body, or constricted shallow water body; or channels within no-wake zones	(6) thoroughfare within 100 yards carrying limited traffic, or thoroughfare 100 yards to 1/2 mile offshore carrying intensive traffic	(12) thoroughfare within 100 yards carrying intensive traffic (unregulated boating activity)					1
EROSION INTENSITY SCORE (EI)								39

debatable since small beach and dock lay between site and dam

IMG 1258  
1259  
9 Aug 22

N46.424921  
W 90.228208

Note: Table 1 is adapted from Koutson, P. L., H. H. Allen, and J. W. Webb, 1990. "Guidelines for Vegetative Erosion Control on Wave-Impacted Coastal Dredged Material Sites," Dredging Operations Technical Support Program Technical Report D-90-13, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS 39180, 35 pp.

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Developed small private beach w/ dock. active - Concern is to the left of the property where small birch + aspen have apparently fallen over due to erosion bank

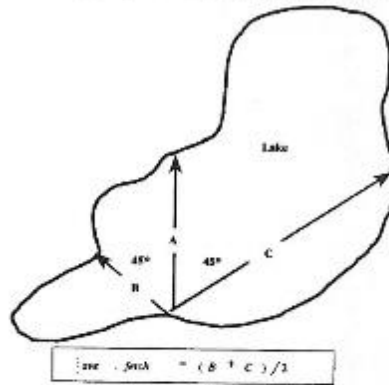
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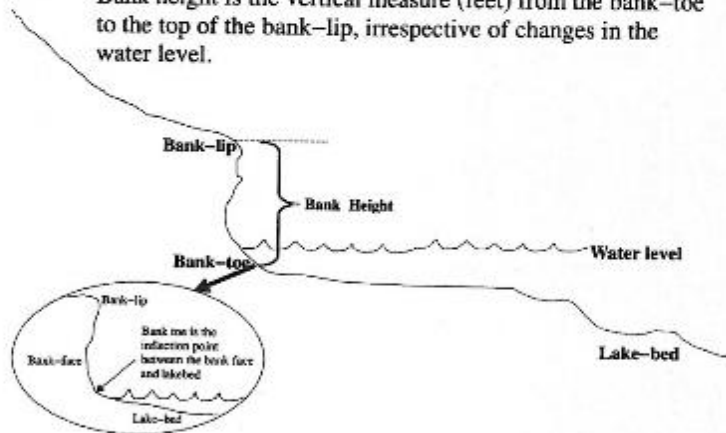
NR 328.09

<sup>1</sup> Average fetch: The following diagram describes the calculation of average fetch.



<sup>2</sup> Bank height: The following diagram describes the features of the bank for the purpose of accurately measuring bank height

Bank height is the vertical measure (feet) from the bank-toe to the top of the bank-lip, irrespective of changes in the water level.



<sup>3</sup> Aquatic vegetation: Dense or abundant means that on average 50-100% of the bottom is visually obstructed by plants during the growing season, defined by the dates June 1 through September 15. Scattered or patchy means that on average 1-49% of the bottom is visually obstructed by plants during the growing season, defined by the dates June 1 through September 15. Absent means that on average < 1% of the bottom is visually obstructed by plants during the growing season, defined by the dates June 1 through September 15.

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Map Sheet 4  
Area 4  
Site # 6  
Small Isl  
IMG 1262  
9 Aug 22

NR 328.08

WISCONSIN ADMINISTRATIVE CODE

calculated  
decimal degrees

52

N 46° 24.913  
W 90° 13.863  
N 46.415217  
W 90.217717

Table 1

Erosion Intensity (EI) Score Worksheet

Applicants and department staff shall use this worksheet to calculate erosion intensity pursuant to s. NR 328.08 (2).

SHORELINE VARIABLES	DESCRIPTIVE CATEGORIES							ASSIGNED EI
	Erosion Intensity Value is Located in Parenthesis on Left Side of Each Category Box							
AVERAGE FETCH <sup>1</sup> - average distance (miles), across the open water to the opposite shore measure 45° either side of the perpendicular to the shoreline.	(0) <1/10	(2) 1/10 - 1/3	(4) 1/3 - 1	(7) 1 - 3	(10) 3 - 10	(13) 10 - 30	(16) >30	7
DEPTH AT 20 FEET, depth of water (feet) 20 feet from shoreline	(1) <1	(2) 1-3	(3) 3-6	(4) 6-12	(5) >12			2
DEPTH AT 100 FEET, depth of water (feet) 100 feet from shoreline	(1) <1	(2) 1-3	(3) 3-6	(4) 6-12	(5) >12			3
BANK HEIGHT <sup>2</sup> , height of bank (feet), measure from toe of the bank to top of the bank lip.	(1) <1	(2) 1-5	(3) 5-10	(4) 10-20	(5) >20			3
BANK COMPOSITION composition and degree of cementation of the sediments	(0) rock, marl, tight clay, well cemented sand (dig with a pick)	(7) soft clay, clayey sand, moderately cemented (easily dug with a knife)	(15) uncemented sands or peat (easily dug with your hand)					7
INFLUENCE OF ADJACENT STRUCTURES likelihood that adjacent structures are causing bank recession at the site	(0) no hard armoring on either adjacent property	(1) hard armoring on one adjacent property	(2) hard armoring on both adjacent properties	(3) hard armoring on one adjacent property with measurable recession	(4) hard armoring on both adjacent properties with measurable recession adjacent to both structures			8
AQUATIC VEGETATION <sup>3</sup> type and abundance of vegetation occurring in the water off the shoreline	(0) rocky substrates unable to support vegetation	(1) dense or abundant emergent, floating or submerged vegetation	(4) scattered or patchy emergent, floating or submerged vegetation	(7) lack of emergent, floating or submerged vegetation				8
BANK VEGETATION, type and abundance of the vegetation occurring on the bank face and immediately on top of the bank lip	(0) bank composed of rocky outcropping unable to support vegetation	(1) dense vegetation, upland trees, shrubs and grasses, including lawns	(4) clumps of vegetation alternating with areas lacking vegetation	(7) lack of vegetation (cleared), crop or agricultural land				8
BANK STABILITY, The degree to which bank and adjacent area (within 20 feet of the bank lip) is stabilized by natural ground, shrub, and canopy vegetation (exclude a 10' pier across channel). Human disturbance is typified by tree removal, berthing, mooring, and lawn establishment.	(0) established lawn with few canopy trees	(1) established lawn with moderate to dense canopy trees	(4) moderate to dense natural vegetation and canopy trees with shrub layer substantially reduced; or few canopy trees with moderate to dense natural shrub layer.	(7) moderate to dense canopy trees with moderate to dense natural shrub layer; or other natural features prevents establishment of vegetation.				4
SHORELINE GEOMETRY general slope of the shoreline at the point of interest plus 200 yards on either side.	(1) coves or bays		(4) irregular shoreline or straight shoreline	(8) headland, point, or island				8
SHORE ORIENTATION <sup>4</sup> geographic direction the shoreline faces	(0) < 1/3 mile fetch	(1) north to east to south-south-east (349°-360°, 1°-168°)	(4) south to west-southwest (169°-258°)	(8) west to north-northwest (259°-349°)				4
BOAT WAKES <sup>5</sup> proximity to and use of boat channels	(1) no channels within 100 yards, broad open water body, or constricted shallow water body; or channels within no-wake zones	(6) thoroughfare within 100 yards carrying limited traffic, or thoroughfare 100 yards to 1/2 mile offshore carrying intensive traffic	(12) thoroughfare within 100 yards carrying intensive traffic (unregulated boating activity)					1
<b>EROSION INTENSITY SCORE (EI)</b>								39

Note: Table 1 is adapted from Knutson, F. L., H. H. Allen, and J. W. Webb, 1990. "Guidelines for Vegetative Erosion Control on Wave-Impacted Coastal Dredged Material Sites," Dredging Operations Technical Support Program Technical Report D-90-13, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS 39180, 35 pp.

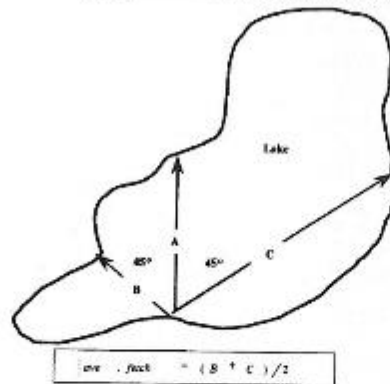
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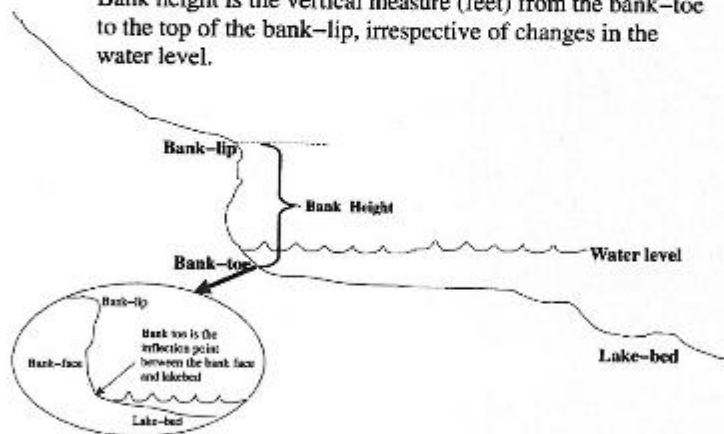
NR 328.08

<sup>1</sup> Average fetch: The following diagram describes the calculation of average fetch.



<sup>2</sup> Bank height: The following diagram describes the features of the bank for the purpose of accurately measuring bank height

Bank height is the vertical measure (feet) from the bank-toe to the top of the bank-lip, irrespective of changes in the water level.



<sup>3</sup> Aquatic vegetation: Dense or abundant means that on average 50–100% of the bottom is visually obstructed by plants during the growing season, defined by the dates June 1 through September 15. Scattered or patchy means that on average 1–49% of the bottom is visually obstructed by plants during the growing season, defined by the dates June 1 through September 15. Absent means that on average < 1% of the bottom is visually obstructed by plants during the growing season, defined by the dates June 1 through September 15.

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Map 7 of 10  
 NR 328.08  
 Garmin Site # 261  
 Site #1 (Island)

WISCONSIN ADMINISTRATIVE CODE  
 9 Aug 22  
 D.M. Danley  
 Table 1

52

Erosion Intensity (EI) Score Worksheet

Applicants and department staff shall use this worksheet to calculate erosion intensity pursuant to s. NR 328.08 (2).

N 46.41403  
 W 90.22038  
 Elev. 453m  
 Images  
 IMG. 1240  
 1241  
 1242  
 1260

SHORELINE VARIABLES	DESCRIPTIVE CATEGORIES						ASSIGNED EI	
	Erosion Intensity Value is Located in Parenthesis on Left Side of Each Category Box							
AVERAGE FETCH <sup>1</sup> - average distance (miles), across the open water to the opposite shore measure 45° other side of the perpendicular to the shoreline.	(0) <1/10	(2) 1/10 - 1/3	(4) 1/3 - 1	(7) 1 - 3	(10) 3 - 10	(13) 10 - 30	(16) >30	4
DEPTH AT 20 FEET, depth of water (feet) 20 feet from shoreline	(1) <1	(2) 1-3	(3) 3-6	(4) 6-12	(5) >12			2
DEPTH AT 100 FEET, depth of water (feet) 100 feet from shoreline	(1) <1	(2) 1-3	(3) 3-6	(4) 6-12	(5) >12			3
BANK HEIGHT <sup>2</sup> , height of bank (feet), measure from toe of the bank to top of the bank-top	(1) <1	(2) 1-5	(3) 5-10	(4) 10-20	(5) >20			2
BANK COMPOSITION composition and degree of cementation of the sediments	(0) rock, marl, tight clay, well cemented sand (dig with a pick)	(7) soft clay, clayey sand, moderately cemented (easily dug with a knife)	(15) uncemented sands or peat (easily dug with your hand)					7
INFLUENCE OF ADJACENT STRUCTURES likelihood that adjacent structures are causing bank erosion at the site	(0) no hard armoring on either adjacent property	(1) hard armoring on one adjacent property	(2) hard armoring on both adjacent properties	(3) hard armoring on one adjacent property with measurable recession	(4) hard armoring on both adjacent properties with measurable recession adjacent to both structures			0
AQUATIC VEGETATION <sup>3</sup> type and abundance of vegetation occurring in the water off the shoreline	(0) rocky substrates unable to support vegetation	(1) dense or abundant emergent, floating or submerged vegetation	(4) scattered or patchy emergent, floating or submerged vegetation	(7) lack of emergent, floating or submerged vegetation				0
BANK VEGETATION, type and abundance of the vegetation occurring on the bank face and laterally on top of the bank top	(0) bank composed of rocky outcropping unable to support vegetation	(1) dense vegetation, upland trees, shrubs and grasses, including lawns	(4) clumps of vegetation alternating with areas lacking vegetation	(7) lack of vegetation (cleared), crop or agricultural land				1
BANK STABILITY, The degree to which bank and adjacent area (within 10 feet of the bank-top) is stabilized by natural ground, shrub, and canopy vegetation (outside a 10' gear access corridor). Human disturbance is typified by tree removal, brushing, mowing, and lawn establishment.	(0) established lawn with few canopy trees	(1) established lawn with moderate to dense canopy trees	(4) moderate to dense natural ground vegetation and canopy trees with shrub layer substantially reduced; or few canopy trees with moderate to dense natural shrub layer.	(7) moderate to dense canopy trees with moderate to dense natural shrub layer; or other natural features prevents establishment of vegetation.				4
SHORELINE GEOMETRY general shape of the shoreline at the point of interest plus 200 yards on either side.	(1) coves or bays	(4) irregular shoreline or straight shoreline	(8) headland, point, or island					8
SHORE ORIENTATION <sup>4</sup> geographic direction the shoreline faces	(0) < 1/3 mile fetch	(1) north to east to south-south-east (349°-360°, 1°-168°)	(4) south to west-southwest (169°-258°)	(8) west to north-northwest (259°-349°)				4
BOAT WAKES <sup>5</sup> proximity to and use of boat channels	(1) no channels within 100 yards, broad open water body, or constricted shallow water body; or channels within no-wake zones	(6) thoroughfare within 100 yards carrying limited traffic, or thoroughfare 100 yards to 1/2 mile offshore carrying intensive traffic	(12) thoroughfare within 100 yards carrying intensive traffic (unregulated boating activity)					1
<b>EROSION INTENSITY SCORE (EI)</b>								<b>36</b>

Note: Table 1 is adapted from Knutson, P.L., H.H. Allen, and J. W. Webb, 1990. "Guidelines for Vegetative Erosion Control on Wave-Impacted Coastal Dredged Material Sites," Dredging Operations Technical Support Program Technical Report D-90-13, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS 39180, 35 pp.



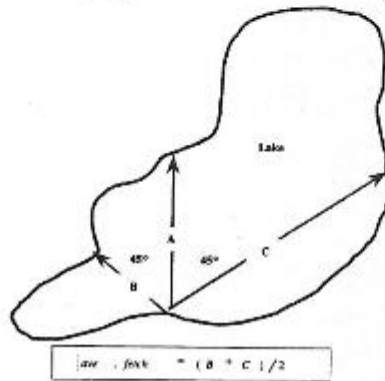
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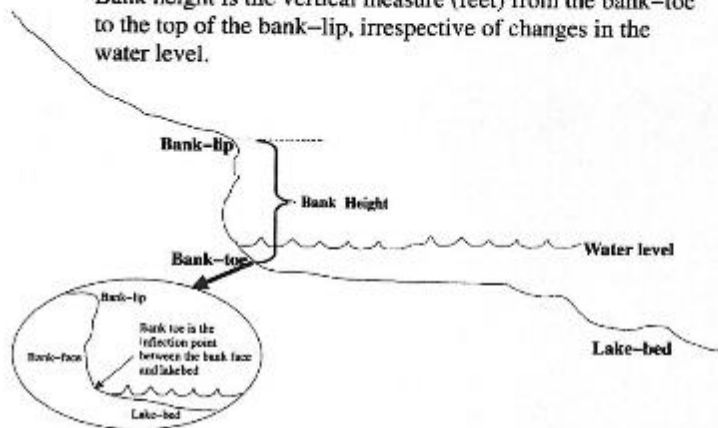
NR 328.08

<sup>1</sup> Average fetch: The following diagram describes the calculation of average fetch.



<sup>2</sup> Bank height: The following diagram describes the features of the bank for the purpose of accurately measuring bank height.

Bank height is the vertical measure (feet) from the bank-toe to the top of the bank-lip, irrespective of changes in the water level.



<sup>3</sup> Aquatic vegetation: Dense or abundant means that on average 50–100% of the bottom is visually obstructed by plants during the growing season, defined by the dates June 1 through September 15. Scattered or patchy means that on average 1–49% of the bottom is visually obstructed by plants during the growing season, defined by the dates June 1 through September 15. Absent means that on average < 1% of the bottom is visually obstructed by plants during the growing season, defined by the dates June 1 through September 15.

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Map sheet 7 of 10 NR 328.08

WISCONSIN ADMINISTRATIVE CODE

52

Site # 2  
(Island)

9 Aug 22  
DM Conley

Table 1

Erosion Intensity (EI) Score Worksheet

Applicants and department staff shall use this worksheet to calculate erosion intensity pursuant to s. NR 328.08 (2).

N46° 24.798  
W90° 13.273

46.4133  
90.22055  
(Calculated)

IMG 1243  
1244  
1261

SHORELINE VARIABLES	DESCRIPTIVE CATEGORIES							ASSIGNED EI
	Erosion Intensity Value is Located in Parenthesis on Left Side of Each Category Box							
AVERAGE FETCH <sup>1</sup> , average distance (miles), across the open water to the opposite shore measure 45° other side of the perpendicular to the shoreline.	(0) <1/10	(2) 1/10 - 1/3	(4) 1/3 - 1	(7) 1 - 3	(10) 3 - 10	(13) 10 - 30	(16) >30	4
DEPTH AT 20 FEET, depth of water (feet) 20 feet from shoreline	(1) <1	(2) 1 - 3	(3) 3 - 6	(4) 6 - 12	(5) >12			2
DEPTH AT 100 FEET, depth of water (feet) 100 feet from shoreline	(1) <1	(2) 1 - 3	(3) 3 - 6	(4) 6 - 12	(5) >12			3
BANK HEIGHT <sup>2</sup> , height of bank (feet), measure from toe of the bank to top of the bank-lip.	(1) <1	(2) 1 - 5	(3) 5 - 10	(4) 10 - 20	(5) >20			2
BANK COMPOSITION, composition and degree of cementation of the sediments	(0) rock, marl, tight clay, well cemented sand (dig with a pick)	(7) soft clay, clayey sand, moderately cemented (easily dug with a knife)	(15) uncemented sands or peat (easily dug with your hand)					7
INFLUENCE OF ADJACENT STRUCTURES, likelihood that adjacent structures are causing bank erosion at the site	(0) no hard armoring on either adjacent property	(1) hard armoring on one adjacent property	(2) hard armoring on both adjacent properties	(3) hard armoring on one adjacent property with measurable recession	(4) hard armoring on both adjacent properties with measurable recession adjacent to both structures			0
AQUATIC VEGETATION <sup>3</sup> , type and abundance of vegetation occurring in the water off the shoreline	(0) rocky substrates unable to support vegetation	(1) dense or abundant emergent, floating or submerged vegetation	(4) scattered or patchy emergent, floating or submerged vegetation	(7) lack of emergent, floating or submerged vegetation				0
BANK VEGETATION, type and abundance of the vegetation occurring on the bank face and immediately on top of the bank lip	(0) bank composed of rocky outcroppings unable to support vegetation	(1) dense vegetation, upland trees, shrubs and grasses, including lawns	(4) clumps of vegetation alternating with areas lacking vegetation	(7) lack of vegetation (cleared), crop or agricultural land				1
BANK STABILITY, The degree to which bank and adjacent area (within 10 feet of the bank-lip) is stabilized by natural ground, shrub, and canopy vegetation (within a 10' par access corridor). Human disturbance is typified by tree removal, breaking, mowing, and lawn establishment.	(0) established lawn with few canopy trees	(1) established lawn with moderate to dense canopy trees	(4) moderate to dense natural ground vegetation and canopy trees with shrub layer substantially reduced; or few canopy trees with moderate to dense natural shrub layer.	(7) moderate to dense canopy trees with moderate to dense natural shrub layer, or other natural features prevents establishment of vegetation.				4
SHORELINE GEOMETRY, general shape of the shoreline at the point of interest plus 200 yards on either side.	(1) coves or bays	(4) irregular shoreline or straight shoreline	(8) headland, point, or island					8
SHORE ORIENTATION <sup>4</sup> , geographic direction the shoreline faces	(0) < 1/3 mile fetch	(1) north to east (349° - 360°, 1° - 168°)	(4) south to west-southwest (169° - 258°)	(8) west to north-northwest (259° - 349°)				4
BOAT WAKES <sup>5</sup> , proximity to and use of boat channels	(1) no channels within 100 yards, broad open water body, or constricted shallow water body; or channels within no-wake zones	(6) thoroughfare within 100 yards carrying limited traffic, or thoroughfare 100 yards to 1/2 mile offshore carrying intensive traffic	(12) thoroughfare within 100 yards carrying intensive traffic (unregulated boating activity)					1
<b>EROSION INTENSITY SCORE (EI)</b>								<b>26</b>

Note: Table 1 is adapted from Krutson, P. L., H. H. Allen, and J. W. Webb, 1990. "Guidelines for Vegetative Erosion Control on Wave-Impacted Coastal Dredged Material Sites," Dredging Operations Technical Support Program Technical Report D-90-13, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS 39180, 35 pp.

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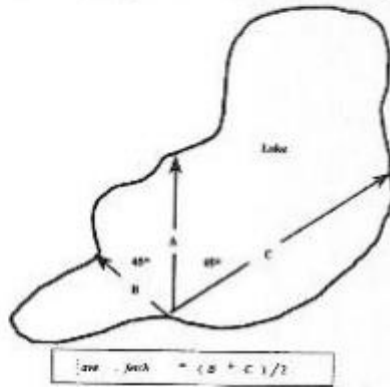
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DEPARTMENT OF NATURAL RESOURCES

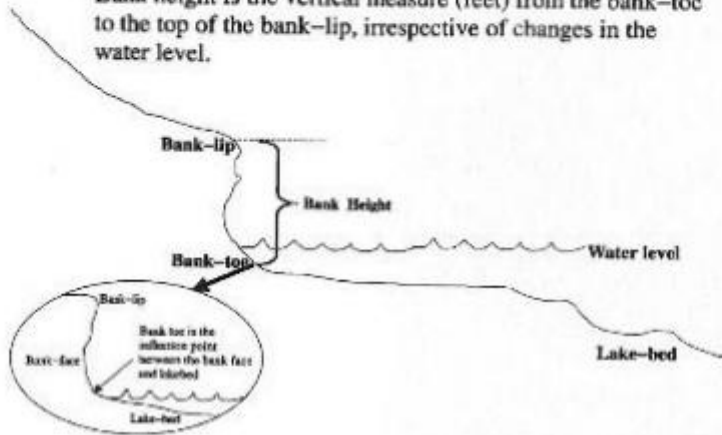
NR 328.08

<sup>1</sup> Average fetch: The following diagram describes the calculation of average fetch.



<sup>2</sup> Bank height: The following diagram describes the features of the bank for the purpose of accurately measuring bank height.

Bank height is the vertical measure (feet) from the bank-toe to the top of the bank-lip, irrespective of changes in the water level.



<sup>3</sup> Aquatic vegetation: Dense or abundant means that on average 50-100% of the bottom is visually obstructed by plants during the growing season, defined by the dates June 1 through September 15. Scattered or patchy means that on average 1-49% of the bottom is visually obstructed by plants during the growing season, defined by the dates June 1 through September 15. Absent means that on average < 1% of the bottom is visually obstructed by plants during the growing season, defined by the dates June 1 through September 15.

N 46.369216  
W 90.244506

Map Sheet 10.510

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NR 328.08

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\* Does this worksheet work out for non-impacted sites? \*

IMG 1251  
9 Aug 22  
Site # 3  
Area 10

~~N 44.22 11348~~  
~~W 90.41.648~~

~~N 44.36913~~  
~~W 90.24413~~

Table 1

Erosion Intensity (EI) Score Worksheet

Applicants and department staff shall use this worksheet to calculate erosion intensity pursuant to s. NR 328.08 (2).

Home  
Stable shoreline moderate grade  
Boat Dock  
mowed lawn does not extend to water line  
Bank stabilized w/ woody debris and shrubs  
Forested on either side  
Crown 2 story Home  
Herowater of Flowage.

SHORELINE VARIABLES	DESCRIPTIVE CATEGORIES							ASSIGNED EI
	Erosion Intensity Value is Located in Parenthesis on Left Side of Each Category Box							
AVERAGE FETCH <sup>1</sup> , average distance (miles) across the open water to the opposite shore measures 45° other side of the perpendicular to the shoreline.	(0) <1/10	(2) 1/10 - 1/3	(4) 1/3 - 1	(7) 1 - 3	(10) 3 - 10	(13) 10 - 30	(16) >30	0
DEPTH AT 20 FEET, depth of water (feet) 20 feet from shoreline	(1) <1	(2) 1-3	(3) 3-6	(4) 6-12	(5) >12			2
DEPTH AT 100 FEET, depth of water (feet) 100 feet from shoreline	(1) <1	(2) 1-3	(3) 3-6	(4) 6-12	(5) >12			3
BANK HEIGHT <sup>2</sup> , height of bank (feet), measure from toe of the bank to top of the bank lip.	(1) <1	(2) 1-5	(3) 5-10	(4) 10-20	(5) >20			2
BANK COMPOSITION, composition and degree of cementation of the sediments	(0) rock, marl, tight clay, well cemented sand (dig with a pick)	(7) soft clay, clayey sand, moderately cemented (easily dug with a knife)	(15) uncemented sands or peat (easily dug with your hand)					7
INFLUENCE OF ADJACENT STRUCTURES, likelihood that adjacent structures are causing flank erosion at the site	(0) no hard armoring on either adjacent property	(1) hard armoring on one adjacent property	(2) hard armoring on both adjacent properties	(3) hard armoring on one adjacent property with measurable recession	(4) hard armoring on both adjacent properties with measurable recession adjacent to both structures			2/20 25-M
AQUATIC VEGETATION <sup>5</sup> , type and abundance of vegetation occurring in the water off the shoreline	(0) rocky substrates unable to support vegetation	(1) dense or abundant emergent, floating or submerged vegetation	(4) scattered or patchy emergent, floating or submerged vegetation	(7) lack of emergent, floating or submerged vegetation				7
BANK VEGETATION, type and abundance of the vegetation occurring on the bank face and immediately on top of the bank lip	(0) bank composed of rocky outcropping unable to support vegetation	(1) dense vegetation, upland trees, shrubs and grasses, including lawns	(4) clumps of vegetation alternating with areas lacking vegetation	(7) lack of vegetation (cleared), crop or agricultural land				1
BANK STABILITY, The degree to which bank and adjacent area (within 10 feet of the bank lip) is stabilized by natural ground, shrub, and canopy vegetation (outside a 10' pit across consider). Disturbance is implied by tree removal, brushing, mowing, and lawn establishment.	(0) established lawn with few canopy trees	(1) established lawn with moderate to dense canopy trees	(4) moderate to dense natural ground vegetation and canopy trees with shrub layer substantially reduced; or few canopy trees with moderate to dense natural shrub layer.	(7) moderate to dense canopy trees with moderate to dense natural shrub layer; or other natural features prevents establishment of vegetation.				0
SHORELINE GEOMETRY, general shape of the shoreline at the point of interest plus 200 yards on either side.	(1) coves or bays	(4) irregular shoreline or straight shoreline	(8) headland, point, or island					4
SHORE ORIENTATION <sup>4</sup> , geographic direction the shoreline faces	(0) < 1/3 mile fetch	(1) north to east to south-south-east (349°-360°, 1°-168°)	(4) south to west-southwest (169°-258°)	(8) west to north-north-west (259°-349°)				0
BOAT WAKES <sup>5</sup> , possibility to and use of boat channels	(1) no channels within 100 yards, broad open water body, or constricted shallow water body; or channels within no-wake zones	(6) thoroughfare within 100 yards carrying limited traffic, or thoroughfare 100 yards to 1/2 mile offshore carrying intensive traffic	(12) thoroughfare within 100 yards carrying intensive traffic (unregulated boating activity)					1
<b>EROSION INTENSITY SCORE (EI)</b>								

Notes: Table 1 is adapted from Knutson, P. L., H. H. Allen, and J. W. Webb, 1990. "Guidelines for Vegetative Erosion Control on Wave-Impacted Coastal Dredged Material Sites." Dredging Operations Technical Support Program Technical Report D-90-13, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS 39180, 35 pp.

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not a problem site - example  
sloping shoreline - no erosion

27  
27  
DWM

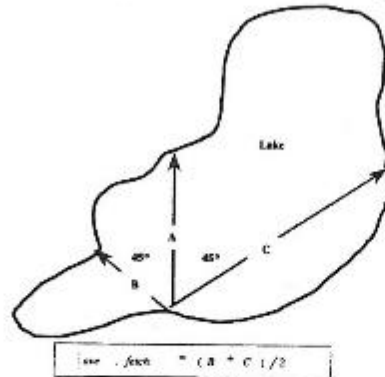
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DEPARTMENT OF NATURAL RESOURCES

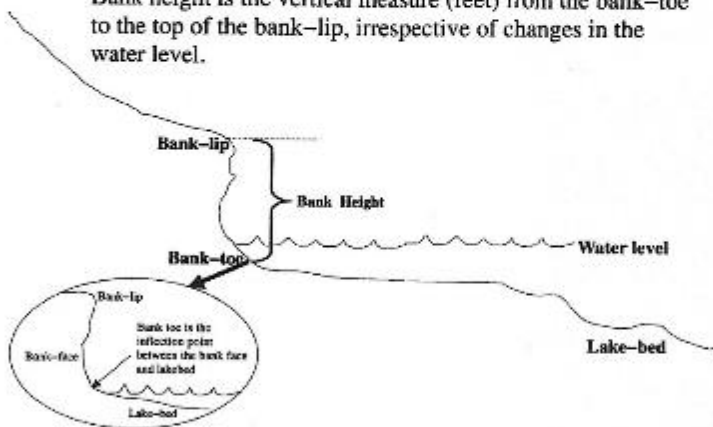
NR 328.08

<sup>1</sup> Average fetch: The following diagram describes the calculation of average fetch.



<sup>2</sup> Bank height: The following diagram describes the features of the bank for the purpose of accurately measuring bank height

Bank height is the vertical measure (feet) from the bank-toe to the top of the bank-lip, irrespective of changes in the water level.



<sup>3</sup> Aquatic vegetation: Dense or abundant means that on average 50–100% of the bottom is visually obstructed by plants during the growing season, defined by the dates June 1 through September 15. Scattered or patchy means that on average 1–49% of the bottom is visually obstructed by plants during the growing season, defined by the dates June 1 through September 15. Absent means that on average < 1% of the bottom is visually obstructed by plants during the growing season, defined by the dates June 1 through September 15.

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NR 328.08

WISCONSIN ADMINISTRATIVE CODE

52

9/6/2022  
Site # 7

W46.41184  
W-90. 22258

9/6/2022

Table 1

Erosion Intensity (EI) Score Worksheet

Applicants and department staff shall use this worksheet to calculate erosion intensity pursuant to s. NR 328.08 (2).

SHORELINE VARIABLES	DESCRIPTIVE CATEGORIES						ASSIGNED EI	
	Erosion Intensity Value is Located in Parenthesis on Left Side of Each Category Box							
<b>AVERAGE FETCH<sup>1</sup></b> , average distance (miles), across the open water to the opposite shore measured 45° either side of the perpendicular to the shoreline.	(0) <1/10	(2) 1/10 - 1/3	(4) 1/3 - 1	(7) 1 - 3	(10) 3 - 10	(13) 10 - 30	(16) >30	2
<b>DEPTH AT 20 FEET<sup>2</sup></b> , depth of water (ft); 20 feet from shoreline	(1) <1	(2) 1-3	(3) 3-6	(4) 6-12	(5) >12			2
<b>DEPTH AT 100 FEET<sup>2</sup></b> , depth of water (ft); 100 feet from shoreline	(1) <1	(2) 1-3	(3) 3-6	(4) 6-12	(5) >12			2
<b>BANK HEIGHT<sup>2</sup></b> , height of bank (ft); measured from toe of the bank to top of the bank-top	(1) <1	(2) 1-5	(3) 5-10	(4) 10-20	(5) >20			3
<b>BANK COMPOSITION</b> , composition and degree of cementation of the sediments	(0) rock, mail, light clay, well cemented sand (dig with a pick)	(7) soft clay, clayey sand, moderately cemented (easily dug with a knife)	(15) uncemented sands or loam (easily dug with your hand)					1
<b>INFLUENCE OF ADJACENT STRUCTURES</b> , how good the adjacent structures are causing flow erosion on the site	(0) no hard structure on either adjacent property	(1) hard armoring on one adjacent property	(2) hard armoring on both adjacent properties	(3) hard armoring on one adjacent property with measurable recession	(4) hard armoring on both adjacent properties with measurable recession adjacent to both structures			0
<b>AQUATIC VEGETATION<sup>3</sup></b> , type and abundance of vegetation occurring in the water off the shoreline	(0) rocky substrates unable to support vegetation	(1) decaying or abundant emergent, floating or submergent vegetation	(4) scattered or patchy emergent, floating or submergent vegetation	(7) lack of emergent, floating or submergent vegetation				0
<b>BANK VEGETATION</b> , type and abundance of the vegetation occurring on the bank face and immediately on top of the bank top	(0) bank composed of rocky outcropping unable to support vegetation	(1) decaying vegetation, upland trees, shrubs and grasses, including lawns	(4) clumps of vegetation alternating with areas lacking vegetation	(7) lack of vegetation (cleared), crop or agricultural land				0
<b>BANK STABILITY</b> , the degree to which bank and adjacent area (within 10 feet of the bank-top) is stabilized by natural point, shrub, and canopy vegetation (within a 10 year average period). Human disturbance is reported by the owner, boater, mariner, and area establishment.	(0) established lawn with few canopy trees	(1) established lawn with moderate to dense canopy trees	(4) moderate to dense natural ground vegetation and canopy trees with shrub layer substantially reduced; or low canopy trees with moderate to dense natural shrub layer.	(7) moderate to dense canopy trees with moderate to dense natural shrub layer; or other natural features prevents establishment of vegetation.				4
<b>SHORELINE GEOMETRY</b> , general shape of the shoreline at the point or channel plus 200 yards on either side.	(1) curves or bays		(4) irregular shoreline or straight shoreline	(8) headland, point, or island				8
<b>SHORE ORIENTATION<sup>4</sup></b> , geographic direction for shoreline faces	(0) < 1/3 mile fetch	(1) north to east to south-south-east (349°-360°, 1°-168°)	(4) south to west-southwest (169°-258°)	(8) west to north-northwest (259°-349°)				4
<b>BOAT WAKES<sup>5</sup></b> , proximity to and use of boat channels	(1) no channels within 100 yards, broad open water body, or channels within no-wake zones	(6) thoroughfare within 100 yards carrying limited traffic, or thoroughfare 100 yards to 1/2 mile offshore carrying intensive traffic	(12) thoroughfare within 100 yards carrying intensive traffic (unregulated boating activity)					1
<b>EROSION INTENSITY SCORE (EI)</b>								36

Note: Table 1 is adapted from Krutson, P. L., E. H. Allen, and J. W. Webb, 1990. "Guidelines for Vegetative Erosion Control on Wave Impacted Coastal Dredging Material Sites," Dredging Operations Technical Support Program Technical Report D-90-13, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS 39180, 55 pp.

**APPENDIX B – HABITAT DATA SHEETS**

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**Wadable Stream Quantitative Habitat Evaluation**  
Form 3800-228 (R 6/07) Page 5 of 5

Transect Data				
Stream Name	Waterbody ID Code	Date (MMDDYYYY)	Transect No.	
W. Fork Montreal	X	08 30 2012	A-1	
Distance from Start (m)	Stream Width (m)	Habitat Type:	Bankfull Depth (m) (optional)	Bankfull Width (m) (optional)
2.5	12.5	<input type="checkbox"/> Riffle <input type="checkbox"/> Pool <input checked="" type="checkbox"/> Run	0.65	Test flow 12

	Deepest Point	Channel Position (Fifths of Current Stream Width)			
		1/5	2/5	3/5	4/5
Water Depth (m)	0.65	0.36	0.36	0.65	0.60
Depth of Fines and Water (m)		0.36	0.36	0.60	0.60
Embeddedness (nearest 10%) of Course Gravel and Rubble/Cobble		50	20	25	10

Percent (nearest 5%) of Stream Bottom Covered					Section Total Must = 100%
Bedrock (solid slab)					
Boulder (281 mm - 4.1 m)			40	20	
Rubble / Cobble (65 - 280 mm)		80	80	40	70
Gravel (2 - 64 mm)		10	20	26	10
Sand (0.062 - 1.9 mm)		10			
Silt (0.004 - 0.061 mm)					
Clay					
Detritus					
Other - Specify: <u>VELOCITY cm/s</u>		0	36.9	37.5	30.4

Percent (nearest 10%) of Stream Bottom Covered				
Algae (attached & fla.)				
Macrophytes		30		
Canopy / Shading (circle one)		60	5	30

Cover for Adult Gamefish: Length (nearest 0.01 m) of transect within 0.15 m upstream or downstream in water at least 0.20 m in depth							
Undercut Banks	Overhanging Vegetation at least 0.20 m overhang	Woody Debris	Other Debris	Boulder	Submerged Macrophytes	Emergent Macrophytes at least 0.20 m deep	Other - Specify:
	1.5m			4M			

Bank Erosion: Length of Continuous Bare Soil (nearest 0.01 m) within 1 m of stream				% of Eroded Bank to the crest or within 5 m of stream edge	
Left	Right	Left (%)	Right (%)		
0	0	0	0		

Riparian Land Use: Percent (nearest 10%) of Bank within 5 m of stream edge, along transect									Section Total Must = 100%
Cropland	Pasture	Barnyard	Developed	Meadow	Shrubs	Woodlands	Wetland	Exposed Rock	Other - Specify:
0	0	0	0	0	70	0	0	0	30 Lawn/Park

Riparian Buffer Width: Length (nearest 1.0 m) of Undisturbed Land Uses along transect, within 10 m of stream		
Left	Right	
2	5	

descending



**Wadable Stream Quantitative Habitat Evaluation**

Form 5820-228 (R 8/07)

Page 5 of 6

**Transect Data**

Stream Name <i>West Branch Montreal River</i>		Waterbody ID Code <i>WB Montreal</i>	Date (MMDDYYYY) <i>08302022</i>	Transect No. <i>A2</i>
Distance from Start (m) <i>145</i>	Stream Width (m) <i>50.2</i>	Habitat Type: <input type="checkbox"/> Riffle <input type="checkbox"/> Pool <input type="checkbox"/> Run		Bankfull Width (m) (optional) <i>Study Flow Ref</i>

	Deepest Point	Channel Position (Fifths of Current Stream Width)			
		1/5	2/5	3/5	4/5
Water Depth (m)	<i>0.14</i>	<i>0.29</i>	<i>0.38</i>	<i>0.28</i>	<i>0.18</i>
Depth of Finest Water (m)		<i>0.29</i>	<i>0.38</i>	<i>0.28</i>	<i>0.18</i>
Embeddedness (nearest 10%) of Course Gravel and Rubble/Cobble		<i>30</i>	<i>40</i>	<i>30</i>	<i>40</i>

**Percent (nearest 5%) of Stream Bottom Covered** Section Total Must = 100%

Bedrock (solid slab)	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Boulder (261 mm - 4.1 m)	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Rubble / Cobble (65 - 260 mm)	<i>90</i>	<i>85</i>	<i>80</i>	<i>60</i>
Gravel (2 - 64 mm)	<i>10</i>	<i>15</i>	<i>20</i>	<i>30</i>
Sand (0.062 - 1.9 mm)	<i>/</i>	<i>/</i>	<i>/</i>	<i>10</i>
Silt (0.004 - 0.061 mm)	<i>/</i>	<i>/</i>	<i>/</i>	<i>/</i>
Clay	<i>/</i>	<i>/</i>	<i>/</i>	<i>/</i>
Detritus	<i>/</i>	<i>/</i>	<i>/</i>	<i>/</i>
Other - Specify: <i>Velocity m/s</i>	<i>44.9</i>	<i>76.0</i>	<i>54.3</i>	<i>20.8</i>

**Percent (nearest 10%) of Stream Bottom Covered**

Algae (attached & fls.)	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Macrophytes	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Canopy / Shading (circle one)	<i>50</i>	<i>0</i>	<i>0</i>	<i>30</i>

**Cover for Adult Gamefish:** Length (nearest 0.01 m) of transect within 0.15 m upstream or downstream in water at least 0.20 m in depth

Undercut Banks	Overhanging Vegetation at least 0.20 m overhang	Woody Debris	Other Debris	Boulder	Submerged Macrophytes	Emergent Macrophytes at least 0.20 m deep	Other - Specify:
<i>0</i>	<i>0.5</i>	<i>0.2</i>		<i>0.5</i>	<i>0</i>	<i>0</i>	

**Bank Erosion:** Length of Continuous Bare Soil (nearest 0.01 m) within 1 m of stream

Left: <i>0</i> (m)	Right: <i>0</i> (m)	% of Eroded Bank to the crest or within 5 m of stream edge
		Left: <i>0</i> (%) Right: <i>0</i> (%)

**Riparian Land Use:** Percent (nearest 10%) of Bank within 5 m of stream edge, along transect Section Total Must = 100%

Cropland	Pasture	Barnyard	Developed	Meadow	Shrubs	Woodland	Wetland	Exposed Rock	Other - Specify:
<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>70</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>SOLAR</i>

**Riparian Buffer Width:** Length (nearest 1.0 m) of Undisturbed Land Uses along transect, within 10 m of stream

Left: <i>10</i> (m)	Right: <i>5</i> (m)
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Wadable Stream Quantitative Habitat Evaluation  
Form 3800-228 (R 6/07)

3 b  
12/25

Transect Data									
Stream Name <i>W. Monteval River</i>			Watershed ID Code	Date (MMDDYYYY) <i>08/30/2022</i>	Transect No. <i>A3</i>				
Distance from Start (m) <i>790</i>	Stream Width (m) <i>15.5</i>	Habitat Type: <input checked="" type="checkbox"/> Riffle <input type="checkbox"/> Pool <input type="checkbox"/> Run		Bankfull Depth (m) (optional)	Bankfull Width (m) (optional)				
	Deepest Point	Channel Position (Fifths of Current Stream Width)							
		1/5	2/5	3/5	4/5				
Water Depth (m)	<i>0.38</i>	<i>0.09</i>	<i>0.24</i>	<i>0.19</i>	<i>0.25</i>				
Depth of Fines and Water (m)		<i>0.09</i>	<i>0.24</i>	<i>0.19</i>	<i>0.35</i>				
Embeddedness (nearest 10%) of Course Gravel and Rubble/Cobble		<i>50</i>	<i>40</i>	<i>30</i>	<i>30</i>				
Percent (nearest 5%) of Stream Bottom Covered		Section Total Must = 100%							
Bedrock (solid slab)		<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>				
Boulder (261 mm - 4.1 m)		<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>				
Rubble / Cobble (65 - 260 mm)		<i>60</i>	<i>70</i>	<i>70</i>	<i>80</i>				
Gravel (2 - 64 mm)		<i>40</i>	<i>30</i>	<i>30</i>	<i>20</i>				
Sand (0.062 - 1.9 mm)		<i>/</i>	<i>/</i>	<i>/</i>	<i>/</i>				
Silt (0.004 - 0.061 mm)		<i>/</i>	<i>/</i>	<i>/</i>	<i>/</i>				
Clay		<i>/</i>	<i>/</i>	<i>/</i>	<i>/</i>				
Detritus		<i>/</i>	<i>/</i>	<i>/</i>	<i>/</i>				
Other - Specify <i>Velvet c/m/s</i>		<i>46.8</i>	<i>40.2</i>	<i>55.2</i>	<i>36.6</i>				
Percent (nearest 10%) of Stream Bottom Covered		Section Total Must = 100%							
Algae (attached & fila.)		<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>				
Macrophytes		<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>				
Canopy / Shading (circle one)		<i>40</i>	<i>40</i>	<i>50</i>	<i>100 90</i>				
Cover for Adult Gametfish: Length (nearest 0.01 m) of transect within 0.15 m upstream or downstream in water at least 0.20 m in depth									
Uncut Banks	Overhanging Vegetation at least 0.20 m overhang	Woody Debris	Other Debris	Boulder	Submerged Macrophytes	Emergent Macrophytes at least 0.20 m deep	Other - Specify		
<i>0.9</i>	<i>0</i>	<i>0.1</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>			
Bank Erosion: Length of Continuous Bare Soil (nearest 0.01 m) within 1 m of stream				% of eroded bank to the crest or will in 5 m of stream edge					
Left: <i>0</i> (m)		Right: <i>0</i> (m)		Left: <i>0</i> (%)		Right: <i>0</i> (%)			
Riparian Land Use: Percent (nearest 10%) of Bank within 5 m of stream edge, along transect		Section Total Must = 100%							
Cropland	Pasture	Barrenland	Developed	Meadow	Shrubs	Woodland	Wetland	Exposed Rock	Other - Specify
<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>80</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>20 Lamin</i>
Riparian Buffer Width: Length (nearest 1.0 m) of Undisturbed Land Uses along transect, within 10 m of stream									
Left: <i>10</i> (m)		Right: <i>10</i> (m)							

Wadable Stream Quantitative Habitat Evaluation  
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12015

Transect Data				
Stream Name <u>WB Montreal River</u>	Waterbody ID Code	Date (MMDDYYYY) <u>08/30/12</u>	Transect No. <u>114</u>	
Distance from Start (m) <u>135</u>	Stream Width (m) <u>9.9 m</u>	Habitat Type: <input type="checkbox"/> Riffle <input type="checkbox"/> Pool <input checked="" type="checkbox"/> Run	Bankfull Depth (m) (optional)	Bankfull Width (m) (optional)

	Deepest Point	Channel Position (Fifths of Current Stream Width)			
		1/5	2/5	3/5	4/5
Water Depth (m)	<u>0.70</u>	<u>0.36</u>	<u>0.59</u>	<u>0.60</u>	<u>0.19</u>
Depth of Fines and Water (m)		<u>0.36</u>	<u>0.59</u>	<u>0.60</u>	<u>0.19</u>
Embeddedness (nearest 10%) of Course Gravel and Rubble/Cobble		<u>50</u>	<u>30</u>	<u>50</u>	<u>60</u>

Percent (nearest 5%) of Stream Bottom Covered					Section Total Must = 100%
Bedrock (solid slab)	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	
Boulder (251 mm - 4.1 m)	<u>20</u>	<u>20</u>	<u>0</u>	<u>0</u>	
Rubble / Cobble (65 - 250 mm)	<u>60</u>	<u>60</u>	<u>70</u>	<u>50</u>	
Gravel (2 - 64 mm)	<u>20</u>	<u>20</u>	<u>30</u>	<u>30</u>	
Sand (0.052 - 1.9 mm)	<u>/</u>	<u>/</u>	<u>/</u>	<u>20</u>	
Silt (0.004 - 0.061 mm)	<u>/</u>	<u>/</u>	<u>/</u>	<u>/</u>	
Clay	<u>/</u>	<u>/</u>	<u>/</u>	<u>/</u>	
Detritus	<u>/</u>	<u>/</u>	<u>/</u>	<u>/</u>	
Other - Specify: <u>Velocity cm/s</u>	<u>24.4</u>	<u>67.4</u>	<u>41.0</u>	<u>6.3</u>	

Percent (nearest 10%) of Stream Bottom Covered				
Algae (attached & fila.)	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Macrophytes	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Canopy / Shading (circle one)	<u>80</u>	<u>30</u>	<u>70</u>	<u>60</u>

Cover for Adult Gamefish: Length (nearest 0.01 m) of transect within 0.15 m upstream or downstream in water at least 0.20 m in depth							
Undercut Banks	Overhanging Vegetation at least 0.20 m overhang	Woody Debris	Other Debris	Boulder	Submerged Macrophytes	Emergent Macrophytes at least 0.20 m deep	Other - Specify
<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1 m</u>	<u>0</u>	<u>0</u>	<u>0</u>

Bank Erosion: Length of Continuous Bare Soil (nearest 0.01 m) within 1 m of stream: % of Eroded Bank to the crest or within 5 m of stream edge

Left: 0 (m) Right: 0 (m) Left: 0 (%) Right: 0 (%)

Riparian Land Use: Percent (nearest 10%) of Bank within 5 m of stream edge, along transect										Section Total Must = 100%
Cropland	Pasture	Barnyard	Developed	Meadow	Shrubs	Woodland	Wetland	Exposed Rock	Other - Specify	
<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>50</u>	<u>10</u>	<u>0</u>	<u>0</u>	<u>0</u>	

Riparian Buffer Width: Length (nearest 1.0 m) of Undisturbed Land Uses along transect, within 10 m of stream

Left: 10 (m) Right: 10 (m)

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1208

**Wadable Stream Quantitative Habitat Evaluation**

Farm 3630-226 (R 8/07)

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<b>Transect Data</b>										
Stream Name <u>W B M Run</u>					Waterbody ID Code <u>EXCEL ENERGY</u>		Date (MMDDYYYY) <u>08/30/22</u>		Transect No. <u>A5</u>	
Distance from Start (m) <u>+180</u>		Stream Width (m) <u>15.6</u>		Habitat Type: <input checked="" type="checkbox"/> Riffle <input type="checkbox"/> Pool <input type="checkbox"/> Run			Bankfull Depth (m) (optional)		Bankfull Width (m) (optional)	
		Deepest Point	Channel Position (Fifths of Current Stream Width)							
			1/5	2/5	3/5	4/5				
Water Depth (m)		<u>0.45</u>	<u>0.45</u>	<u>0.40</u>	<u>0.19</u>	<u>0.10</u>				
Depth of Fines and Water (m)			<u>0.45</u>	<u>0.40</u>	<u>0.19</u>	<u>0.10</u>				
Embeddedness (nearest 10%) of Course Gravel and Rubble/Cobble			<u>20</u>	<u>20</u>	<u>30</u>	<u>40</u>				
<b>Percent (nearest 5%) of Stream Bottom Covered</b> <span style="float: right;">Section Total Must = 100%</span>										
Bedrock (solid slab)			<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>				
Boulder (261 mm - 4.1 m)			<u>40</u>	<u>30</u>	<u>40</u>	<u>0</u>				
Rubble / Cobble (65 - 250 mm)			<u>40</u>	<u>50</u>	<u>40</u>	<u>70</u>				
Gravel (2 - 64 mm)			<u>20</u>	<u>20</u>	<u>20</u>	<u>30</u>				
Sand (0.062 - 1.9 mm)			<u>/</u>	<u>0</u>	<u>/</u>	<u>/</u>				
Silt (0.004 - 0.061 mm)			<u>/</u>	<u>/</u>	<u>/</u>	<u>/</u>				
Clay			<u>/</u>	<u>/</u>	<u>/</u>	<u>/</u>				
Detritus			<u>/</u>	<u>/</u>	<u>/</u>	<u>/</u>				
Other - Specify: <u>Algae cm/s</u>			<u>56.8</u>	<u>59.6</u>	<u>32.5</u>	<u>25.6</u>				
<b>Percent (nearest 10%) of Stream Bottom Covered</b>										
Algae (attached & fla.)			<u>10</u>	<u>0</u>	<u>0</u>	<u>0</u>				
Macrophytes			<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>				
Canopy / Shading (circle one)			<u>40</u>	<u>26</u>	<u>20</u>	<u>60</u>				
<b>Cover for Adult Gamefish:</b> Length (nearest 0.01 m) of transect within 0.15 m upstream or downstream in water at least 0.20 m in depth										
Undercut Banks	Overhanging Vegetation at least 0.20 m overhang	Woody Debris	Other Debris	Boulder	Submerged Macrophytes	Emergent Macrophytes at least 0.20 m deep	Other - Specify:			
<u>0</u>	<u>4m</u>	<u>1m</u>	<u>0</u>	<u>3m</u>	<u>0</u>	<u>0</u>	<u>0</u>			
<b>Bank Erosion:</b> Length of Continuous Bare Soil (nearest 0.01 m) within 1 m of stream					% of Eroded Bank to the crest or within 5 m of stream edge					
Left: <u>0</u> (m)		Right: <u>0</u> (m)		Left: <u>0</u> (%)		Right: <u>0</u> (%)				
<b>Riparian Land Use:</b> Percent (nearest 10%) of Bank within 5 m of stream edge, along transect <span style="float: right;">Section Total Must = 100%</span>										
Cropland	Pasture	Barren/yard	Developed	Meadow	Shrubs	Woodland	Wetland	Exposed Rock	Other - Specify:	
<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>50</u>	<u>50</u>	<u>0</u>	<u>0</u>		
<b>Riparian Buffer Width:</b> Length (nearest 1.0 m) of Undisturbed Land Uses along transect, within 10 m of stream										
Left: <u>6</u> (m)		Right: <u>10</u> (m)								

36  
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**Wadable Stream Quantitative Habitat Evaluation**  
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Transect Data				
Stream Name <u>W B Natural River</u>	Waterbody ID Code	Date (MMDDYYYY) <u>08/30/22</u>	Transect No. <u>A6</u>	
Distance from Start (m) <u>1225</u>	Stream Width (m) <u>16.5</u>	Habitat Type: <input type="checkbox"/> R/Fla <input type="checkbox"/> Pool <input checked="" type="checkbox"/> Run	Bankfull Depth (m) (optional)	Bankfull Width (m) (optional)

	Deepest Point	Channel Position (Fifths of Current Stream Width)			
		1/5	2/5	3/5	4/5
Water Depth (m)	<u>0.55</u>	<u>0.51</u>	<u>0.39</u>	<u>0.21</u>	<u>0.16</u>
Depth of Fines and Water (m)		<u>0.51</u>	<u>0.39</u>	<u>0.21</u>	<u>0.16</u>
Embeddedness (nearest 10%) of Course Gravel and Rubble/Cobble		<u>40</u>	<u>40</u>	<u>50</u>	<u>50</u>

Percent (nearest 5%) of Stream Bottom Covered					Section Total Must = 100%
Bedrock (solid slab)	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	
Boulder (251 mm - 4.1 m)	<u>40</u>	<u>20</u>	<u>0</u>	<u>0</u>	
Rubble / Cobble (65 - 250 mm)	<u>40</u>	<u>60</u>	<u>80</u>	<u>70</u>	
Gravel (2 - 64 mm)	<u>20</u>	<u>20</u>	<u>20</u>	<u>30</u>	
Sand (0.062 - 1.9 mm)	<u>/</u>	<u>/</u>	<u>/</u>	<u>/</u>	
Silt (0.004 - 0.061 mm)	<u>/</u>	<u>/</u>	<u>/</u>	<u>/</u>	
Clay	<u>/</u>	<u>/</u>	<u>/</u>	<u>/</u>	
Detritus	<u>/</u>	<u>/</u>	<u>/</u>	<u>/</u>	
Other - Specify: <u>Velocity cm/s</u>	<u>27.3</u>	<u>41.3</u>	<u>38.5</u>	<u>25.9</u>	

Percent (nearest 10%) of Stream Bottom Covered				
Algae (attached & fila.)	<u>30</u>	<u>0</u>	<u>0</u>	<u>0</u>
Macrophytes	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Canopy / Shading (circle one)	<u>20</u>	<u>20</u>	<u>50</u>	<u>80</u>

Cover for Adult Gamefish: Length (nearest 0.01 m) of transect within 0.15 m upstream or downstream in water at least 0.20 m in depth							
Undercut Banks	Overhanging Vegetation at least 0.20 m overhang	Woody Debris	Other Debris	Boulder	Submerged Macrophytes	Emergent Macrophytes at least 0.20 m deep	Other - Specify:
<u>0</u>	<u>1m</u>	<u>0.5</u>	<u>0</u>	<u>3m</u>	<u>0</u>	<u>0</u>	<u>0</u>

Bank Erosion: Length of Continuous Bare Soil (nearest 0.01 m) within 1 m of stream

Left: 0 (m) Right: 0 (m)

% of Eroded Bank to the crest or within 5 m of stream edge

Left: 0 (%) Right: 0 (%)

Riparian Land Use: Percent (nearest 10%) of Bank within 5 m of stream edge, along transect										Section Total Must = 100%
Cropland	Pasture	Bermyard	Developed	Meadow	Shrubs	Woodland	Wetland	Exposed Rock	Other - Specify:	
<u>/</u>	<u>/</u>	<u>/</u>	<u>/</u>	<u>/</u>	<u>/</u>	<u>50</u>	<u>/</u>	<u>10%</u>	<u>Lawn</u>	<u>40</u>

Riparian Buffer Width: Length (nearest 1.0 m) of Undisturbed Land Uses along transect, within 10 m of stream

Left: 5 (m) Right: 40 (m)

ascending

Wadable Stream Quantitative Habitat Evaluation

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**Transect Data**

Stream Name: A) B North River Waterbody ID Code: \_\_\_\_\_ Date (MMDDYYYY): 08/30/2002 Transect No.: A7

Distance from Start (m): ±270 Stream Width (m): 13.6 Habitat Type:  Riffle  Pool  Run Bankfull Depth (m) (optional): \_\_\_\_\_ Bankfull Width (m) (optional): \_\_\_\_\_

	Deepest Point	Channel Position (Fifths of Current Stream Width)			
		1/5	2/5	3/5	4/5
Water Depth (m)	<u>0.36</u>	<u>0.34</u>	<u>0.25</u>	<u>0.30</u>	<u>0.25</u>
Depth of Fines and Water (m)		<u>0.34</u>	<u>0.25</u>	<u>0.30</u>	<u>0.25</u>
Embeddedness (nearest 10%) of Course Gravel and Rubble/Cobble		<u>40</u>	<u>30</u>	<u>40</u>	<u>40</u>

**Percent (nearest 5%) of Stream Bottom Covered** Section Total Must = 100%

Bedrock (solid slab)	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Boulder (261 mm - 4.1 m)	<u>10</u>	<u>10</u>	<u>10</u>	<u>0</u>
Rubble / Cobble (65 - 260 mm)	<u>70</u>	<u>70</u>	<u>70</u>	<u>70</u>
Gravel (2 - 64 mm)	<u>20</u>	<u>20</u>	<u>20</u>	<u>30</u>
Sand (0.062 - 1.9 mm)	<u>/</u>	<u>/</u>	<u>/</u>	<u>/</u>
Silt (0.004 - 0.061 mm)	<u>/</u>	<u>/</u>	<u>/</u>	<u>/</u>
Clay	<u>/</u>	<u>/</u>	<u>/</u>	<u>/</u>
Delritus	<u>/</u>	<u>/</u>	<u>/</u>	<u>/</u>
Other - Specify: <u>Velocity cm/s</u>	<u>42.5</u>	<u>49.7</u>	<u>62.1</u>	<u>50.3</u>

**Percent (nearest 10%) of Stream Bottom Covered**

Algae (attached & fila.)	<u>20</u>	<u>0</u>	<u>0</u>	<u>0</u>
Macrophytes	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Canopy / Shading (circle one)	<u>10</u>	<u>0</u>	<u>10</u>	<u>10</u>

**Cover for Adult Gamefish:** Length (nearest 0.01 m) of transect within 0.15 m upstream or downstream in water at least 0.20 m in depth

Undercut Banks	Overhanging Vegetation at least 0.20 m overhang	Woody Debris	Other Debris	Boulder	Submerged Macrophytes	Emergent Macrophytes at least 0.20 m deep	Other - Specify:
<u>0</u>	<u>1.0</u>			<u>0.5</u>	<u>0</u>	<u>0</u>	

**Bank Erosion:** Length of Continuous Bare Soil (nearest 0.01 m) within 1 m of stream

Left: 0 (m) Right: 0 (m) % of Eroded Bank to the crest or within 5 m of stream edge Left: 0 (%) Right: 0 (%)

**Riparian Land Use:** Percent (nearest 10%) of Bank within 5 m of stream edge, along transect Section Total Must = 100%

Cropland	Pasture	Bamyard	Developed	Meadow	Shrubs	Woodland	Wetland	Exposed Rock	Other - Specify:
<u>0</u>	<u>0</u>	<u>0</u>	<u>10</u>	<u>0</u>	<u>50</u>	<u>10</u>	<u>0</u>		<u>40 Lawn</u>

**Riparian Buffer Width:** Length (nearest 1.0 m) of Undisturbed Land Uses along transect, within 10 m of stream

Left: 5 (m) Right: ±16 (m)

**Wadable Stream Quantitative Habitat Evaluation**  
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*D. McCauley, A. Turner, D. Brown*

Transect Data				
Stream Name	Waterbody ID Code	Date (MDDYYYY)	Transect No.	
<i>WB Montpelier River</i>		<i>08/19/2022</i>	<i>18</i>	
Distance from Start (m)	Stream Width (m)	Habitat Type:	Bankfull Depth (m) (optional)	Bankfull Width (m) (optional)
	<i>13.0</i>	<input type="checkbox"/> Riffle <input type="checkbox"/> Pool <input checked="" type="checkbox"/> Run		

	Deepest Point	Channel Position (Fifths of Current Stream Width)			
		1/5	2/5	3/5	4/5
Water Depth (m)	<i>0.70</i>	<i>0.34</i>	<i>0.49</i>	<i>0.63</i>	<i>0.63</i>
Depth of Fines and Water (m)		<i>0.34</i>	<i>0.49</i>	<i>0.63</i>	<i>0.63</i>
Embeddedness (nearest 10%) of Course Gravel and Rubble/Cobble		<i>50</i>	<i>50</i>	<i>40</i>	<i>40</i>

Percent (nearest 5%) of Stream Bottom Covered					Section Total Must = 100%
Bedrock (solid slab)	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	
Boulder (281 mm - 4.1 m)	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	
Rubble / Cobble (65 - 280 mm)	<i>50</i>	<i>70</i>	<i>70</i>	<i>70</i>	
Gravel (2 - 64 mm)	<i>40</i>	<i>20</i>	<i>30</i>	<i>30</i>	
Sand (0.062 - 1.9 mm)	<i>10</i>	<i>10</i>	<i>10</i>	<i>10</i>	
Silt (0.004 - 0.061 mm)	<i>10</i>	<i>10</i>	<i>10</i>	<i>10</i>	
Clay	<i>10</i>	<i>10</i>	<i>10</i>	<i>10</i>	
Detritus	<i>10</i>	<i>10</i>	<i>10</i>	<i>10</i>	
Other - Specify: <i>Volcanic cinders</i>	<i>20.4</i>	<i>27.1</i>	<i>24.2</i>	<i>24.6</i>	

Percent (nearest 10%) of Stream Bottom Covered				
Algae (attached & fla.)	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Macrophytes	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Canopy / Shading (circle one)	<i>10</i>	<i>10</i>	<i>20</i>	<i>50</i>

Cover for Adult Gamefish: Length (nearest 0.01 m) of transect within 0.15 m upstream or downstream in water at least 0.20 m in depth							
Undercut Banks	Overhanging Vegetation at least 0.20 m overhang	Woody Debris	Other Debris	Boulder	Submerged Macrophytes	Emergent Macrophytes at least 0.20 m deep	Other - Specify:
	<i>1.0</i>	<i>0.2</i>		<i>0.5</i>			

Bank Erosion: Length of Continuous Bare Soil (nearest 0.01 m) within 1 m of stream				% of Eroded Bank to the crest or within 5 m of stream edge			
Left	(m)	Right	(m)	Left	(%)	Right	(%)
<i>0</i>		<i>0</i>		<i>0</i>		<i>0</i>	

Riparian Land Use: Percent (nearest 10%) of Bank within 5 m of stream edge, along transect									Section Total Must = 100%
Cropland	Pasture	Hayyard	Developed	Meadow	Shrubs	Woodland	Wetland	Exposed Bank	Other - Specify:
<i>0</i>	<i>0</i>				<i>60</i>	<i>30</i>	<i>10</i>		

Riparian Buffer Width: Length (nearest 1.0 m) of Undisturbed Land Uses along transect, within 10 m of stream  
Left: *10* (m) Right: *10* (m)

Wadable Stream Quantitative Habitat Evaluation  
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**Transect Data**

Stream Name	WB Mantual River			Waterbody ID Code	Date (MMDDYYYY)	Transect No.
Distance from Start (m)	Stream Width (m)	Habitat Type:		Bankfull Depth (m) (optional)	Bankfull Width (m) (optional)	
	18.0	<input checked="" type="checkbox"/> Riffle <input type="checkbox"/> Pool <input type="checkbox"/> Run				

	Deepest Point	Channel Position (Fifths of Current Stream Width)			
		1/5	2/5	3/5	4/5
Water Depth (m)	0.37	0.39	0.23	0.35	0.27
Depth of Fines and Water (m)		0.39	0.23	0.35	0.27
Embeddedness (nearest 10%) of Course Gravel and Rubble/Cobble		50	40	40	50

Percent (nearest 5%) of Stream Bottom Covered					Section Total Must = 100%
Bedrock (solid slab)		0	0	0	0
Boulder (251 mm - 4.1 m)		0	0	0	0
Rubble / Cobble (65 - 250 mm)		60	70	70	80
Gravel (2 - 64 mm)		30	30	30	20
Sand (0.062 - 1.9 mm)		10	/	/	/
Silt (0.004 - 0.061 mm)		0	/	/	/
Clay		/	/	/	/
Detritus		/	/	/	/
Other - Specify: <u>Velocity cm/s</u>		15.6	41.9	55.5	41.1

Percent (nearest 10%) of Stream Bottom Covered					
Algae (attached & fila.)		10	5	0	0
Macrophytes		0	0	0	0
Canopy / Shading (circle one)		40	20	10	20

**Cover for Adult Gamefish:** Length (nearest 0.01 m) of transect within 0.15 m upstream or downstream in water at least 0.20 m in depth

Undercut Banks	Overhanging Vegetation at least 0.23 m overhang	Woody Debris	Other Debris	Boulder	Submerged Macrophytes	Emergent Macrophytes at least 0.20 m deep	Other - Specify:
0	4.0	0.2		0.3	0	0	

**Bank Erosion:** Length of Continuous Bare Soil (nearest 0.01 m) within 1 m of stream: % of Eroded Bank to the crest or within 5 m of stream edge

Left: 0 (m) Right: 0 (m) Left: 0 (%) Right: 0 (%)

**Riparian Land Use:** Percent (nearest 10%) of Bank within 5 m of stream edge, along transect

Section Total Must = 100%								Other - Specify:
Cropland	Pasture	Barnyard	Developed	Meadow	Shrubs	Woodland	Wetland	Exposed Rock
					10	100		

**Riparian Buffer Width:** Length (nearest 1.0 m) of Undisturbed Land Uses along transect, within 10 m of stream

Left: +10 (m) Right: +10 (m)



**Wadable Stream Quantitative Habitat Evaluation**  
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12/15

McDowen Turner Creek

**Transect Data**

Stream Name <u>W B Montreal River</u>	Waterbody ID Code	Date (MMDDYYYY) <u>08/20/2022</u>	Transect No. <u>110</u>
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Distance from Start (m)	Stream Width (m) <u>15.2</u>	Habitat Type: <input type="checkbox"/> Riffle <input type="checkbox"/> Pool <input checked="" type="checkbox"/> Run	Bankfull Depth (m) (optional)	Bankfull Width (m) (optional)
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	Deepest Point	Channel Position (Fifths of Current Stream Width)			
		1/5	2/5	3/5	4/5
Water Depth (m)	<u>0.82</u>	<u>0.50</u>	<u>0.80</u>	<u>0.61</u>	<u>0.21</u>
Depth of Fines and Water (m)		<u>0.50</u>	<u>0.80</u>	<u>0.61</u>	<u>0.21</u>
Embeddedness (nearest 10% of Course Gravel and Rubble/Cobble)		<u>20</u>	<u>40</u>	<u>60</u>	<u>80</u>

**Percent (nearest 5%) of Stream Bottom Covered** Section Total Must = 100%

Bedrock (solid slab)	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Boulder (281 mm - 4.1 m)	<u>60</u>	<u>20</u>	<u>0</u>	<u>0</u>
Rubble / Cobble (65 - 280 mm)	<u>20</u>	<u>70</u>	<u>60</u>	<u>10</u>
Gravel (2 - 64 mm)	<u>10</u>	<u>10</u>	<u>30</u>	<u>40</u>
Sand (0.062 - 1.9 mm)	<u>10</u>	<u>1</u>	<u>10</u>	<u>20</u>
Silt (0.004 - 0.061 mm)	<u>1</u>	<u>1</u>	<u>1</u>	<u>20</u>
Clay	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>
Detritus	<u>1</u>	<u>1</u>	<u>1</u>	<u>10</u>
Other - Specify: <u>Velocids, cm/s</u>	<u>23.3</u>	<u>23.0</u>	<u>18.4</u>	<u>7.0</u>

**Percent (nearest 10%) of Stream Bottom Covered**

Algae (attached & fila.)	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Macrophytes	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Canopy / Shading (circle one)	<u>40</u>	<u>20</u>	<u>20</u>	<u>40</u>

**Cover for Adult Gamefish:** Length (nearest 0.01 m) of transect within 0.15 m upstream or downstream in water at least 0.20 m in depth

Undercut Banks	Overhanging Vegetation at least 0.20 m overhang	Woody Debris	Other Debris	Boulder	Submerged Macrophytes	Emergent Macrophytes at least 0.20 m deep	Other - Specify:
<u>0.5</u>	<u>2.0</u>	<u>1.0</u>		<u>3.0</u>			

**Bank Erosion:** Length of Continuous Bare Soil (nearest 0.01 m) within 1 m of stream

Left: 0 (m) Right: 0 (m)

% of Eroded Bank to the crest or within 5 m of stream edge  
Left: 0 (%) Right: 0 (%)

**Riparian Land Use:** Percent (nearest 10%) of Bank within 5 m of stream edge, along transect Section Total Must = 100%

Cropland	Pasture	Barrenland	Developed	Meadow	Shrubs	Woodland	Wetland	Exposed Rock	Other - Specify:
					<u>40</u>	<u>60</u>			

**Riparian Buffer Width:** Length (nearest 1.0 m) of Undisturbed Land Uses along transect, within 10 m of stream

Left: 110 (m) Right: 110 (m)

lots of Beaver Activity

Wadable Stream Quantitative Habitat Evaluation  
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WCFB

**Transect Data**

Stream Name: W.O. Montreal River Waterbody ID Code: \_\_\_\_\_ Date (MMDDYYYY): 08/01/22 Transect No.: 1911

Distance from Start (m): \_\_\_\_\_ Stream Width (m): 19.3 Habitat Type:  Riffle  Pool  Run Bankfull Depth (m) (optional): \_\_\_\_\_ Bankfull Width (m) (optional): \_\_\_\_\_

	Deepest Point	Channel Position (Fifths of Current Stream Width)			
		1/5	2/5	3/5	4/5
Water Depth (m)	<u>0.223</u>	<u>0.19</u>	<u>0.12</u>	<u>0.05</u>	<u>0.30</u>
Depth of Fines and Water (m)		<u>0.19</u>	<u>0.12</u>	<u>0.05</u>	<u>0.30</u>
Embeddedness (nearest 10%) of Course Gravel and Rubble/Cobble		<u>20</u>	<u>20</u>	<u>70</u>	<u>60</u>

**Percent (nearest 5%) of Stream Bottom Covered** Section Total Must = 100%

Bedrock (solid slab)	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Boulder (261 mm - 4.1 m)	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Rubble / Cobble (65 - 260 mm)	<u>90</u>	<u>60</u>	<u>30</u>	<u>40</u>
Gravel (2 - 64 mm)	<u>10</u>	<u>30</u>	<u>50</u>	<u>40</u>
Sand (0.062 - 1.9 mm)	<u>/</u>	<u>10</u>	<u>10</u>	<u>20</u>
Silt (0.004 - 0.061 mm)	<u>/</u>	<u>/</u>	<u>10</u>	<u>/</u>
Clay	<u>/</u>	<u>/</u>	<u>/</u>	<u>/</u>
Detritus	<u>/</u>	<u>/</u>	<u>/</u>	<u>/</u>
Other - Specify: <u>Waterbody cover</u>	<u>50.0</u>	<u>57.6</u>	<u>0.5</u>	<u>63.9</u>

**Percent (nearest 10%) of Stream Bottom Covered**

Algae (attached & fila.)	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Macrophytes	<u>0</u>	<u>0</u>	<u>0</u>	<u>50</u>
Canopy / Shading (circle one)	<u>90</u>	<u>50</u>	<u>30</u>	<u>50</u>

**Cover for Adult Gamefish:** Length (nearest 0.01 m) of transect within 0.15 m upstream or downstream in water at least 0.20 m in depth

Undercut Banks	Overhanging Vegetation at least 0.20 m overhang	Woody Debris	Other Debris	Boulder	Submerged Macrophytes	Emergent Macrophytes at least 0.20 m deep	Other - Specify:
<u>1.0</u>	<u>0.5</u>	<u>1.1</u>		<u>0</u>	<u>3.0</u>	<u>0</u>	

**Bank Erosion:** Length of Continuous Bare Soil (nearest 0.01 m) within 1 m of stream

Left: 0 (m) Right: 0 (m) % of Eroded Bank to the crest or within 5 m of stream edge: Left: 0 (%) Right: 0 (%)

**Riparian Land Use:** Percent (nearest 10%) of Bank within 5 m of stream edge, along transect Section Total Must = 100%

Cropland	Pasture	Barnyard	Developed	Meadow	Shrubs	Woodland	Wetland	Exposed Rock	Other - Specify:
					<u>50</u>	<u>50</u>			

**Riparian Buffer Width:** Length (nearest 1.0 m) of Undisturbed Land Uses along transect, within 10 m of stream

Left: 110 (m) Right: 110 (m)

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**Wadable Stream Quantitative Habitat Evaluation**  
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M. Cawley Tanager Stream

Transect Data									
Stream Name		Waterbody ID Code	Date (MMDDYYYY)	Transect No.					
W. O. Montreal River			08/30/2022	A12					
Distance from Start (m)	Stream Width (m)	Habitat Type:		Bankfull Depth (m) (optional)	Bankfull Width (m) (optional)				
	11.7	<input type="checkbox"/> Riffle <input type="checkbox"/> Pool <input checked="" type="checkbox"/> Run							
Water Depth (m)	Deepest Point	Channel Position (Fifths of Current Stream Width)							
		1/5	2/5	3/5	4/5				
0.60	0.60	0.36	0.48	0.60	0.42				
Depth of Fines and Water (m)		0.36	0.48	0.60	0.42				
Embeddedness (nearest 10%) of Course Gravel and Rubble/Cobble		50	60	40	50				
Percent (nearest 5%) of Stream Bottom Covered									
Section Total Must = 100%									
Bedrock (solid slab)		0	0	0	0				
Boulder (281 mm - 4.1 m)		0	0	10	0				
Rubble / Cobble (65 - 250 mm)		50	80	60	80				
Gravel (2 - 64 mm)		30	20	10	30				
Sand (0.062 - 1.9 mm)		20	1	10	10				
Silt (0.004 - 0.061 mm)		1	1	1	1				
Clay		1	1	1	1				
Detritus		1	1	10	1				
Other - Specify: <u>Delaware cufs</u>		19.8	27.4	42.2	37.8				
Percent (nearest 10%) of Stream Bottom Covered									
Algae (attached & fila.)		0	0	0	0				
Macrophytes		0	0	0	0				
Canopy / Shading (circle one)		80	50	20	40				
Cover for Adult Gamefish: Length (nearest 0.01 m) of transect within 0.15 m upstream or downstream in water at least 0.20 m in depth									
Undercut Banks	Overhanging Vegetation at least 0.20 m overhang	Woody Debris	Other Debris	Boulder	Submergent Macrophytes	Emergent Macrophytes at least 0.20 m deep	Other - Specify:		
0	5.0	1	1	0.4	1	1			
Bank Erosion: Length of Continuous Bare Soil (nearest 0.01 m) within 1 m of stream									
Left: 0 (m)			Right: 0 (m)						
% of Eroded Bank to the crest or within 5 m of stream edge									
Left: 0 (%)			Right: 0 (%)						
Riparian Land Use: Percent (nearest 10%) of Bank within 5 m of stream edge, along transect									
Section Total Must = 100%									
Cropland	Pasture	Barriaryd	Developed	Meadow	Shrubs	Woodland	Wetland	Exposed Rock	Other - Specify:
0	0	0	0	0	40	60	0	0	
Riparian Buffer Width: Length (nearest 1.0 m) of Undisturbed Land Uses along transect, within 10 m of stream									
Left: +10 (m)			Right: +10 (m)						

Wadable Stream Quantitative Habitat Evaluation

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Briem, Turner, McDaniel

South Road

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08/30/2022  
B1

Transect Data				
Stream Name <i>West Branch Montross River</i>	Waterbody ID Code	Date (MMDDYYYY) <i>08/30/2022</i>	Transect No. <i>B1</i>	
Distance from Start (m)	Stream Width (m) <i>12.8</i>	Habitat Type: <input checked="" type="checkbox"/> Riffle <input type="checkbox"/> Pool <input type="checkbox"/> Run	Bankfull Depth (m) (optional)	Bankfull Width (m) (optional)

	Deepest Point	Channel Position (Fifths of Current Stream Width)			
		1/5	2/5	3/5	4/5
Water Depth (m)	<i>0.60</i>	<i>0.51</i>	<i>0.58</i>	<i>0.43</i>	<i>0.31</i>
Depth of Fines and Water (m)		<i>0.51</i>	<i>0.58</i>	<i>0.43</i>	<i>0.31</i>
Embeddedness (nearest 10%) of Course Gravel and Rubble/Cobble		<i>60</i>	<i>40</i>	<i>36</i>	<i>30</i>

Percent (nearest 5%) of Stream Bottom Covered					Section Total Must = 100%
Bedrock (solid slab)	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	
Boulder (261 mm - 4.1 m)	<i>30</i>	<i>20</i>	<i>0</i>	<i>10</i>	
Rubble / Cobble (65 - 260 mm)	<i>40</i>	<i>70</i>	<i>80</i>	<i>70</i>	
Gravel (2 - 64 mm)	<i>20</i>	<i>10</i>	<i>10</i>	<i>10</i>	
Sand (0.062 - 1.9 mm)	<i>10</i>	<i>-</i>	<i>10</i>	<i>10</i>	
Silt (0.004 - 0.061 mm)	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	
Clay	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	
Detritus	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	
Other - Specify: <i>Velocity cm/s</i>	<i>2.6</i>	<i>33.0</i>	<i>63.6</i>	<i>27.9</i>	

Percent (nearest 10%) of Stream Bottom Covered				
Algae (attached & fls.)	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Macrophytes	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Canopy / Shading (circle one)	<i>40</i>	<i>10</i>	<i>20</i>	<i>50</i>

Cover for Adult Gamefish: Length (nearest 0.01 m) of transect within 0.15 m upstream or downstream in water at least 0.20 m in depth							
Undercut Banks	Overhanging Vegetation at least 0.20 m overhang	Woody Debris	Other Debris	Boulder	Submerged Macrophytes	Emergent Macrophytes at least 0.20 m deep	Other - Specify:
<i>0</i>	<i>3.0m</i>	<i>/</i>	<i>/</i>	<i>2.0m</i>	<i>/</i>	<i>/</i>	

Bank Erosion: Length of Continuous Bare Soil (nearest 0.01 m) within 1 m of stream

Left: *0* (m) Right: *0* (m)

% of Eroded Bank to the crest or within 5 m of stream edge

Left: *0* (%) Right: *0* (%)

Riparian Land Use: Percent (nearest 10%) of Bank within 5 m of stream edge, along transect										Section Total Must = 100%
Cropland	Pasture	Barnyard	Developed	Meadow	Shrubs	Woodland	Wetland	Exposed Rock	Other - Specify:	
<i>/</i>	<i>/</i>	<i>/</i>	<i>/</i>	<i>/</i>	<i>10</i>	<i>90</i>	<i>/</i>	<i>/</i>		

Riparian Buffer Width: Length (nearest 1.0 m) of Undisturbed Land Uses along transect, within 10 m of stream

Left: *+16* (m) Right: *+10* (m)

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Tucuman, Brian, McCawley

**Transect Data**

Stream Name <i>WB Montreal R.</i>	Watershed ID Code	Date (MMDDYYYY) <i>08/30/2008</i>	Transect No. <i>152</i>
Distance from Start (m)	Stream Width (m) <i>15.8</i>	Habitat Type: <input type="checkbox"/> R/Flt <input type="checkbox"/> Pool <input checked="" type="checkbox"/> Run	Bankfull Depth (m) (optional) <i>/</i>
			Bankfull Width (m) (optional) <i>/</i>

	Deepest Point	Channel Position (Fifths of Current Stream Width)			
		1/5	2/5	3/5	4/5
Water Depth (m)	<i>0.46</i>	<i>0.34</i>	<i>0.38</i>	<i>0.34</i>	<i>0.35</i>
Depth of Fines and Water (m)		<i>0.34</i>	<i>0.38</i>	<i>0.34</i>	<i>0.35</i>
Embeddedness (nearest 10%) of Course Gravel and Rubble/Cobble		<i>20</i>	<i>30</i>	<i>30</i>	<i>50</i>

**Percent (nearest 5%) of Stream Bottom Covered** Section Total Must = 100%

Bedrock (solid slab)	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Boulder (251 mm - 4.1 m)	<i>10</i>	<i>0</i>	<i>20</i>	<i>0</i>
Rubble / Cobble (65 - 250 mm)	<i>60</i>	<i>80</i>	<i>60</i>	<i>70</i>
Gravel (2 - 64 mm)	<i>20</i>	<i>20</i>	<i>10</i>	<i>10</i>
Sand (0.062 - 1.9 mm)	<i>10</i>	<i>/</i>	<i>10</i>	<i>20</i>
Silt (0.004 - 0.061 mm)	<i>/</i>	<i>/</i>	<i>/</i>	<i>/</i>
Clay	<i>/</i>	<i>/</i>	<i>/</i>	<i>/</i>
Detritus	<i>/</i>	<i>/</i>	<i>/</i>	<i>/</i>
Other - Specify: <i>Velocity cm/s</i>	<i>20.4</i>	<i>56.2</i>	<i>24.4</i>	<i>24.2</i>

**Percent (nearest 10%) of Stream Bottom Covered**

Algae (attached & fla.)	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Macrophytes	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Canopy / Shading (circle one)	<i>40</i>	<i>40</i>	<i>20</i>	<i>20</i>

**Cover for Adult Gamefish:** Length (nearest 0.01 m) of transect within 0.15 m upstream or downstream in water at least 0.20 m in depth

Undercut Banks	Overhanging Vegetation at least 0.20 m overhang	Woody Debris	Other Debris	Boulder	Submerged Macrophytes	Emergent Macrophytes at least 0.20 m deep	Other - Specify:
<i>/</i>	<i>1.0</i>	<i>1.0</i>		<i>1.0m</i>			

**Bank Erosion:** Length of Continuous Bare Soil (nearest 0.01 m) within 1 m of stream edge

Left: *0* (m) Right: *0* (m) % of Eroded Bank to the crest or within 5 m of stream edge  
 Left: *0* (%) Right: *0* (%)

**Riparian Land Use:** Percent (nearest 10%) of Bank within 5 m of stream edge, along transect Section Total Must = 100%

Cropland	Pasture	Bamyard	Developed	Meadow	Shrubs	Woodland	Wetland	Exposed Rock	Other - Specify:
					<i>20</i>	<i>80</i>			

**Riparian Buffer Width:** Length (nearest 1.0 m) of Undisturbed Land Uses along transect, within 10 m of stream

Left: *110* (m) Right: *+10* (m)

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**Wadable Stream Quantitative Habitat Evaluation**

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*Green, Turner, McAuley*

*South Run*

*12/21*

Transect Data									
Stream Name <i>W.D. Montpelier River</i>			Waterbody ID Code	Date (MMDDYYYY) <i>01/30/2022</i>	Transect No. <i>153</i>				
Distance from Start (m)	Stream Width (m) <i>15.0</i>	Habitat Type: <input checked="" type="checkbox"/> Riffle <input type="checkbox"/> Pool <input type="checkbox"/> Run		Bankfull Depth (m) (optional)	Bankfull Width (m) (optional)				
	Deepest Point	Channel Position (Fifths of Current Stream Width)							
		1/5	2/5	3/5	4/5				
Water Depth (m)	<i>0.37</i>	<i>0.31</i>	<i>0.35</i>	<i>0.24</i>	<del>0.22</del> <i>0.22</i>				
Depth of Fines and Water (m)		<i>0.31</i>	<i>0.35</i>	<i>0.24</i>	<del>0.22</del> <i>0.22</i>				
Embeddedness (nearest 10%) of Course Gravel and Rubble/Cobble		<i>30</i>	<i>50</i>	<i>30</i>	<i>30</i>				
Percent (nearest 5%) of Stream Bottom Covered		Section Total Must = 100%							
Bedrock (solid slab)		<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>				
Boulder (261 mm - 4.1 m)		<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>				
Rubble / Cobble (65 - 260 mm)		<i>80</i>	<i>80</i>	<i>30</i>	<i>50</i>				
Gravel (2 - 64 mm)		<i>10</i>	<i>10</i>	<i>10</i>	<i>30</i>				
Sand (0.062 - 1.9 mm)		<i>10</i>	<i>10</i>	<i>10</i>	<i>20</i>				
Silt (0.004 - 0.061 mm)		<i>/</i>	<i>/</i>	<i>/</i>	<i>/</i>				
Clay		<i>/</i>	<i>/</i>	<i>/</i>	<i>/</i>				
Detritus		<i>/</i>	<i>/</i>	<i>/</i>	<i>/</i>				
Other - Specify: <i>Velocity cm/s</i>		<i>61.8</i>	<i>60.1</i>	<i>55.5</i>	<i>17.5</i>				
Percent (nearest 10%) of Stream Bottom Covered		Section Total Must = 100%							
Algae (attached & fla.)		<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>				
Macrophytes		<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>				
Canopy / Shading (circle one)		<i>70</i>	<i>50</i>	<i>30</i>	<i>40</i>				
Cover for Adult Gamefish: Length (nearest 0.01 m) of transect within 0.15 m upstream or downstream in water at least 0.20 m in depth									
Undercut Banks	Overhanging Vegetation at least 0.20 m overhang	Woody Debris	Other Debris	Boulder	Submerged Macrophytes	Emergent Macrophytes at least 0.20 m deep	Other - Specify:		
<i>0.4m</i>	<i>1.0</i>								
Bank Erosion: Length of Continuous Bare Soil (nearest 0.01 m) within 1 m of stream				% of Eroded Bank to the crest or within 5 m of stream edge					
Left: <i>0</i> (m)		Right: <i>0</i> (m)		Left: <i>0</i> (%)		Right: <i>0</i> (%)			
Riparian Land Use: Percent (nearest 10%) of Bank within 5 m of stream edge, along transect						Section Total Must = 100%			
Cropland	Pasture	Barnyard	Developed	Meadow	Shrubs	Woodland	Wetland	Exposed Rock	Other - Specify:
<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>10</i>	<i>90</i>	<i>-</i>	<i>-</i>	<i>-</i>
Riparian Buffer Width: Length (nearest 1.0 m) of Undisturbed Land Uses along transect, within 10 m of stream									
Left: <i>+10</i> (m)		Right: <i>+10</i> (m)							

Wadable Stream Quantitative Habitat Evaluation

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South Road

1208

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Transect Data

Stream Name <u>W. B. Montreal River</u>	Waterbody ID Code	Date (MDDYYYY) <u>08/30/2022</u>	Transect No. <u>159</u>
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Distance from Start (m)	Stream Width (m) <u>17.2</u>	Habitat Type: <input checked="" type="checkbox"/> Riffle <input type="checkbox"/> Pool <input type="checkbox"/> Run	Bankfull Depth (m) (optional) <u>/</u>	Bankfull Width (m) (optional) <u>/</u>
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	Deepest Point	Channel Position (Fifths of Current Stream Width)			
		1/5	2/5	3/5	4/5
Water Depth (m)	<u>0.42</u>	<u>0.42</u>	<u>0.32</u>	<u>0.22</u>	<u>0.05</u>
Depth of Fines and Water (m)		<u>0.42</u>	<u>0.32</u>	<u>0.22</u>	<u>0.05 (0.06)</u>
Embeddedness (nearest 10%) of Course Gravel and Rubble/Cobble		<u>40</u>	<u>30</u>	<u>40</u>	<u>80</u>

Percent (nearest 5%) of Stream Bottom Covered Section Total Must = 100%

Bedrock (solid slab)	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Boulder (251 mm - 4.1 m)	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Rubble / Cobble (65 - 250 mm)	<u>80</u>	<u>70</u>	<u>70</u>	<u>20</u>
Gravel (2 - 64 mm)	<u>20</u>	<u>20</u>	<u>20</u>	<u>10</u>
Sand (0.062 - 1.9 mm)	<u>/</u>	<u>10</u>	<u>10</u>	<u>60</u>
Silt (0.004 - 0.061 mm)	<u>/</u>	<u>/</u>	<u>/</u>	<u>10</u>
Clay	<u>/</u>	<u>/</u>	<u>/</u>	<u>/</u>
Debris	<u>/</u>	<u>/</u>	<u>/</u>	<u>/</u>
Other - Specify: <u>Velocity, cm/s</u>	<u>58.9</u>	<u>45.8</u>	<u>24.7</u>	<u>6.4</u>

Percent (nearest 10%) of Stream Bottom Covered

Algae (attached & fla.)	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Macrophytes	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Canopy / Shading (circle one)	<u>60</u>	<u>20</u>	<u>30</u>	<u>50</u>

Cover for Adult Gamefish: Length (nearest 0.01 m) of transect within 0.15 m upstream or downstream in water at least 0.20 m in depth

Undercut Banks	Overhanging Vegetation at least 0.20 m overhang	Woody Debris	Other Debris	Boulder	Submerged Macrophytes	Emergent Macrophytes at least 0.20 m deep	Other - Specify:
<u>0.3</u>	<u>2.0 m</u>			<u>0.3</u>			

Bank Erosion: Length of Continuous Bare Soil (nearest 0.01 m) within 1 m of stream: Left: 0 (m) Right: 0 (m) % of Eroded Bank to the crest or within 5 m of stream edge: Left: 0 (%) Right: 0 (%)

Riparian Land Use: Percent (nearest 10%) of Bank within 5 m of stream edge, along transect Section Total Must = 100%

Cropland	Pasture	Barrenland	Developed	Meadow	Shrubs	Woodland	Wetland	Exposed Rock	Other - Specify:
					<u>10</u>	<u>90</u>			

Riparian Buffer Width: Length (nearest 1.0 m) of Undisturbed Land Uses along transect, within 10 m of stream  
Left: 110 (m) Right: 110 (m)

Wadable Stream Quantitative Habitat Evaluation

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Turner Brook Meadow

South Road

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12/25

**Transect Data**

Stream Name: WB Montreal River Waterbody ID Code: \_\_\_\_\_ Date (MMDDYYYY): 08/30/2021 Transect No.: B5

Distance from Start (m): \_\_\_\_\_ Stream Width (m): 12.5 Habitat Type:  Riffle  Pool  Run Bankful Depth (m) (optional): \_\_\_\_\_ Bankful Width (m) (optional): \_\_\_\_\_

	Deepest Point	Channel Position (Fifths of Current Stream Width)			
		1/5	2/5	3/5	4/5
Water Depth (m)	<u>0.6</u> <u>0.62</u>	<u>0.20</u>	<u>0.56</u>	<u>0.63</u>	<u>0.34</u>
Depth of Fines and Water (m)		<u>0.20</u>	<u>0.56</u>	<u>0.63</u>	<u>0.34</u>
Embeddedness (nearest 10%) of Course Gravel and Rubble/Cobble		<u>20</u>	<u>30</u>	<u>30</u>	<u>40</u>

**Percent (nearest 5%) of Stream Bottom Covered** Section Total Must = 100%

Bedrock (solid slab)	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Boulder (201 mm - 4.1 m)	<u>0</u>	<u>0</u>	<u>30</u>	<u>20</u>
Rubble / Cobble (65 - 250 mm)	<u>30</u>	<u>80</u>	<u>60</u>	<u>60</u>
Gravel (2 - 64 mm)	<u>20</u>	<u>20</u>	<u>10</u>	<u>20</u>
Sand (0.062 - 1.9 mm)	<u>10</u>	<u>/</u>	<u>/</u>	<u>/</u>
Silt (0.004 - 0.051 mm)	<u>/</u>	<u>/</u>	<u>/</u>	<u>/</u>
Clay	<u>/</u>	<u>/</u>	<u>/</u>	<u>/</u>
Detritus	<u>/</u>	<u>/</u>	<u>/</u>	<u>/</u>
Other - Specify: <u>Velocity 2 m/s</u>	<u>17.1</u>	<u>41.0</u>	<u>18.1</u>	<u>41.0</u>

**Percent (nearest 10%) of Stream Bottom Covered**

Algae (attached & fla.)	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Macrophytes	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Canopy / Shading (circle one)	<u>80</u>	<u>60</u>	<u>40</u>	<u>60</u>

**Cover for Adult Gametophyte:** Length (nearest 0.01 m) of transect within 0.15 m upstream or downstream in water at least 0.20 m in depth

Undercut Banks	Overhanging Vegetation at least 0.20 m overhang	Woody Debris	Other Debris	Boulder	Submerged Macrophytes	Emergent Macrophytes at least 0.20 m deep	Other - Specify:
<u>0</u>	<u>1.0</u>			<u>6.0</u>			

**Bank Erosion:** Length of Continuous Bare Soil (nearest 0.01 m) within 1 m of stream

Left: 0 (m) Right: 0 (m) % of Eroded Bank to the crest or within 5 m of stream edge Left: 0 (%) Right: 0 (%)

**Riparian Land Use:** Percent (nearest 10%) of Bank within 5 m of stream edge, along transect Section Total Must = 100%

Cropland	Pasture	Barnyard	Developed	Meadow	Shrubs	Woodland	Wetland	Exposed Rock	Other - Specify:
<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>20</u>	<u>80</u>	<u>0</u>	<u>0</u>	

**Riparian Buffer Width:** Length (nearest 1.0 m) of Undisturbed Land Uses along transect, within 10 m of stream

Left: +10 (m) Right: +10 (m)



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**Wadable Stream Quantitative Habitat Evaluation**  
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Transect Data									
Stream Name <i>W. B. Montreal River</i>			Waterbody ID Code	Date (MMDDYYYY) <i>08/30/2022</i>	Transect No. <i>B6</i>				
Distance from Start (m)	Stream Width (m) <i>14.8</i>	Habitat Type: <input type="checkbox"/> Riffle <input type="checkbox"/> Pool <input checked="" type="checkbox"/> Run		Bankfull Depth (m) (optional)	Bankfull Width (m) (optional)				
	Deepest Point	Channel Position (Fifths of Current Stream Width)							
		1/5	2/5	3/5	4/5				
Water Depth (m)	<i>0.38</i>	<i>0.35</i>	<i>0.35</i>	<i>0.29</i>	<i>0.32</i>				
Depth of Fines and Water (m)		<i>0.35</i>	<i>0.35</i>	<i>0.29</i>	<i>0.32</i>				
Embeddedness (nearest 10%) of Course Gravel and Rubble/Cobble		<i>50</i>	<i>20</i>	<i>30</i>	<i>40</i>				
Percent (nearest 5%) of Stream Bottom Covered <span style="float:right">Section Total Must = 100%</span>									
Bedrock (solid slab)		<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>				
Boulder (261 mm - 4.1 m)		<i>0</i>	<i>30</i>	<i>30</i>	<i>10</i>				
Rubble / Cobble (65 - 260 mm)		<i>70</i>	<i>40</i>	<i>60</i>	<i>60</i>				
Gravel (2 - 64 mm)		<i>20</i>	<i>20</i>	<i>10</i>	<i>20</i>				
Sand (0.062 - 1.9 mm)		<i>10</i>	<i>/</i>	<i>/</i>	<i>10</i>				
Silt (0.004 - 0.061 mm)		<i>/</i>	<i>/</i>	<i>/</i>	<i>/</i>				
Clay		<i>/</i>	<i>/</i>	<i>/</i>	<i>/</i>				
Detritus		<i>/</i>	<i>10</i>	<i>/</i>	<i>/</i>				
Other - Specify: <i>Voluntary c/s</i>		<i>24.5</i>	<i>29.1</i>	<i>37.6</i>	<i>40.9</i>				
Percent (nearest 10%) of Stream Bottom Covered									
Algae (attached & filis.)		<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>				
Macrophytes		<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>				
Canopy / Shading (circle one)		<i>20</i>	<i>0</i>	<i>10</i>	<i>30</i>				
Cover for Adult Gamefish: Length (nearest 0.01 m) of transect within 0.15 m upstream or downstream in water at least 0.20 m in depth									
Undercut Banks	Overhanging Vegetation at least 0.20 m overhang	Woody Debris	Other Debris	Boulder	Submerged Macrophytes	Emergent Macrophytes at least 0.20 m deep	Other - Specify:		
<i>0</i>	<i>3.0m</i>	<i>1.5</i>		<i>3.0</i>	<i>0</i>	<i>0</i>			
Bank Erosion: Length of Continuous Bare Soil (nearest 0.01 m) within 1 m of stream				% of Eroded Bank to the crest or within 5 m of stream edge					
Left: <i>0</i> (m)		Right: <i>0</i> (m)		Left: <i>0</i> (%)		Right: <i>0</i> (%)			
Riparian Land Use: Percent (nearest 10%) of Bank within 5 m of stream edge, along transect <span style="float:right">Section Total Must = 100%</span>									
Cropland	Pasture	Barnyard	Developed	Meadow	Shrubs	Woodland	Wetland	Exposed Rock	Other - Specify:
<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>10</i>	<i>90</i>	<i>/</i>	<i>/</i>	
Riparian Buffer Width: Length (nearest 1.0 m) of Undisturbed Land Uses along transect, within 10 m of stream									
Left: <i>+10</i> (m)		Right: <i>+10</i> (m)							

Wadable Stream Quantitative Habitat Evaluation  
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4/6/22

Tanner Brown McCarter

Transect Data				
Stream Name <i>West Branch Montreal</i>	Wade body ID Code	Date (MMDDYYYY) <i>08/30/2022</i>	Transect No. <i>B7</i>	
Distance from Start (m)	Stream Width (m) <i>16.0</i>	Habitat Type: <input type="checkbox"/> R/ife <input type="checkbox"/> Pool <input checked="" type="checkbox"/> Run	Bankfull Depth (m) (optional)	Bankfull Width (m) (optional)

	Deepest Point	Channel Position (Fifths of Current Stream Width)			
		1/5	2/5	3/5	4/5
Water Depth (m)	<i>0.53</i>	<i>0.51</i>	<i>0.41</i>	<i>0.50</i>	<i>0.38</i>
Depth of Fines and Water (m)		<i>0.51</i>	<i>0.41</i>	<i>0.50</i>	<i>0.38</i>
Embeddedness (nearest 10%) of Course Gravel and Rubble/Cobble		<i>20</i>	<i>40</i>	<i>40</i>	<i>30</i>

Percent (nearest 5%) of Stream Bottom Covered					Section Total Must = 100%
Bedrock (solid slab)	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	
Boulder (281 mm - 4.1 m)	<i>0</i>	<i>10</i>	<i>10</i>	<i>0</i>	
Rubble / Cobble (65 - 250 mm)	<i>80</i>	<i>60</i>	<i>60</i>	<i>80</i>	
Gravel (2 - 64 mm)	<i>10</i>	<i>20</i>	<i>20</i>	<i>10</i>	
Sand (0.062 - 1.9 mm)	<i>10</i>	<i>10</i>	<i>10</i>	<i>10</i>	
Silt (0.004 - 0.061 mm)	<i>/</i>	<i>/</i>	<i>/</i>	<i>/</i>	
Clay	<i>/</i>	<i>/</i>	<i>/</i>	<i>/</i>	
Detritus	<i>/</i>	<i>/</i>	<i>/</i>	<i>/</i>	
Other - Specify: <i>Velocity emb</i>	<i>27.4</i>	<i>24.2</i>	<i>20.7</i>	<i>18.5</i>	

Percent (nearest 10%) of Stream Bottom Covered				
Algae (attached & fila.)	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Macrophytes	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Canopy / Shading (circle one)	<i>30</i>	<i>10</i>	<i>20</i>	<i>40</i>

Cover for Adult Gamefish: Length (nearest 0.01 m) of transect within 0.15 m upstream or downstream in water at least 0.20 m in depth							
Undercut Banks	Overhanging Vegetation at least 0.20 m overhang	Woody Debris	Other Debris	Boulder	Submerged Macrophytes	Emergent Macrophytes at least 0.20 m deep	Other - Specify
<i>0.2</i>	<i>3.0</i>	<i>/</i>	<i>/</i>	<i>1.2m</i>	<i>/</i>	<i>/</i>	<i>/</i>

Bank Erosion: Length of Continuous Bare Soil (nearest 0.01 m) within 1 m of stream: Left: *0* (m) Right: *0* (m) % of Eroded Bank to the crest or within 5 m of stream edge: Left: *0* (%) Right: *0* (%)

Riparian Land Use: Percent (nearest 10%) of Bank within 5 m of stream edge, along transect									Section Total Must = 100%
Cropland	Pasture	Hobbyard	Developed	Meadow	Shrubs	Woodland	Wetland	Exposed Rock	Other - Specify
<i>/</i>	<i>/</i>	<i>/</i>	<i>/</i>	<i>/</i>	<i>50</i>	<i>50</i>	<i>/</i>	<i>/</i>	

Riparian Buffer Width: Length (nearest 1.0 m) of Undisturbed Land Uses along transect, within 10 m of stream  
Left: *+10* (m) Right: *+10* (m)

Wadable Stream Quantitative Habitat Evaluation

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Teresa Ann McAuley

South Road

12/08

Transect Data

Stream Name <i>West Branch Montreal River</i>	Waterbody ID Code	Date (MMDDYYYY) <i>08/30/2022</i>	Transect No. <i>158</i>
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Distance from Start (m)	Stream Width (m) <i>19.0</i>	Habitat Type: <input type="checkbox"/> Riffle <input type="checkbox"/> Pool <input checked="" type="checkbox"/> Run	Bankfull Depth (m) (optional) <i>/</i>	Bankfull Width (m) (optional) <i>/</i>
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	Deepest Point	Channel Position (Fifths of Current Stream Width)			
		1/5	2/5	3/5	4/5
Water Depth (m)	<i>0.41</i>	<i>0.34</i>	<i>0.40</i>	<i>0.30</i>	<i>0.33</i>
Depth of Fines and Water (m)		<i>0.34</i>	<i>0.40</i>	<i>0.30</i>	<i>0.33</i>
Embeddedness (nearest 10%) of Course Gravel and Rubble/Cobble		<i>50</i>	<i>80</i>	<i>40</i>	<i>30</i>

Percent (nearest 5%) of Stream Bottom Covered Section Total Must = 100%

Bedrock (solid slab)	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Boulder (261 mm - 4.1 m)	<i>10</i>	<i>0</i>	<i>0</i>	<i>20</i>
Rubble / Cobble (65 - 250 mm)	<i>60</i>	<i>30</i>	<i>70</i>	<i>70</i>
Gravel (2 - 64 mm)	<i>20</i>	<i>60</i>	<i>20</i>	<i>10</i>
Sand (0.062 - 1.9 mm)	<i>10</i>	<i>10</i>	<i>10</i>	<i>/</i>
Silt (0.004 - 0.061 mm)	<i>/</i>	<i>/</i>	<i>/</i>	<i>/</i>
Clay	<i>/</i>	<i>/</i>	<i>/</i>	<i>/</i>
Detritus	<i>/</i>	<i>/</i>	<i>/</i>	<i>/</i>
Other - Specify: <i>Volcanic Cms</i>	<i>22.7</i>	<i>52.8</i>	<i>15.8</i>	<i>29.7</i>

Percent (nearest 10%) of Stream Bottom Covered

Algae (attached & fila.)	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Macrophytes	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Canopy / Shading (circle one)	<i>20</i>	<i>0</i>	<i>10</i>	<i>30</i>

Cover for Adult Gamefish: Length (nearest 0.01 m) of transect within 0.15 m upstream or downstream in water at least 0.20 m in depth

Undercut Banks	Over-hanging Vegetation at least 0.20 m overhang	Woody Debris	Other Debris	Boulder	Submerged Macrophytes	Emergent Macrophytes at least 0.20 m deep	Other - Specify:
<i>/</i>	<i>4.0 m</i>	<i>0.5</i>	<i>/</i>	<i>1.5</i>	<i>/</i>	<i>/</i>	<i>/</i>

Bank Erosion: Length of Continuous Bare Soil (nearest 0.01 m) within 1 m of stream

Left: <i>0</i> (m)	Right: <i>0</i> (m)	Left: <i>0</i> (%)	Right: <i>0</i> (%)
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Riparian Land Use: Percent (nearest 10%) of Bank within 5 m of stream edge, along transect Section Total Must = 100%

Cropland	Pasture	Barnyard	Developed	Meadow	Shrubs	Woodland	Wetland	Exposed Rock	Other - Specify:
<i>/</i>	<i>/</i>	<i>/</i>	<i>/</i>	<i>/</i>	<i>5</i>	<i>45</i>	<i>/</i>	<i>/</i>	<i>lawn 50%</i>

Riparian Buffer Width: Length (nearest 1.0 m) of Undisturbed Land Uses along transect, within 10 m of stream

Left: <i>1</i> (m)	Right: <i>10</i> (m)
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decaying

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**Wadable Stream Quantitative Habitat Evaluation**

Form 3800-228 (R 6/07)

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Brown Turner McCawley

South Road

1205

**Transect Data**

Stream Name <i>West Branch Montreal River</i>	Waterbody ID Code	Date (MMDDYYYY) <i>08/30/22</i>	Transect No. <i>159</i>
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Distance from Start (m)	Stream Width (m) <i>19.9</i>	Habitat Type: <input type="checkbox"/> Riffle <input type="checkbox"/> Pool <input checked="" type="checkbox"/> Run	Bankfull Depth (m) (optional)	Bankfull Width (m) (optional)
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	Deepest Point	Channel Position (Fifths of Current Stream Width)			
		1/5	2/5	3/5	4/5
Water Depth (m)	<i>0.40</i>	<i>0.30</i>	<i>0.39</i>	<i>0.24</i>	<i>0.29</i>
Depth of Fines and Water (m)		<i>0.30</i>	<i>0.39</i>	<i>0.24</i>	<i>0.29</i>
Embeddedness (nearest 10%) of Course Gravel and Rubble/Cobble		<i>50</i>	<i>10</i>	<i>50</i>	<i>40</i>

**Percent (nearest 5%) of Stream Bottom Covered** Section Total Must = 100%

Bedrock (solid slab)	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Boulder (251 mm - 4.1 m)	<i>30</i>	<i>80</i>	<i>0</i>	<i>0</i>
Rubble / Cobble (65 - 250 mm)	<i>30</i>	<i>10</i>	<i>60</i>	<i>40</i>
Gravel (2 - 64 mm)	<i>30</i>	<i>10</i>	<i>30</i>	<i>40</i>
Sand (0.062 - 1.9 mm)	<i>10</i>	<i>/</i>	<i>10</i>	<i>20</i>
Silt (0.004 - 0.061 mm)	<i>/</i>	<i>/</i>	<i>/</i>	<i>/</i>
Clay	<i>/</i>	<i>/</i>	<i>/</i>	<i>/</i>
Detritus	<i>/</i>	<i>/</i>	<i>/</i>	<i>/</i>
Other - Specify: <i>Velocity cm/s</i>	<i>39.1</i>	<i>18.9</i>	<i>34.7</i>	<i>22.4</i>

**Percent (nearest 10%) of Stream Bottom Covered**

Algae (attached & fila.)	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Macrophytes	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Canopy / Shading (circle one)	<i>20</i>	<i>0</i>	<i>10</i>	<i>30</i>

**Cover for Adult Gamefish:** Length (nearest 0.01 m) of transect within 0.15 m upstream or downstream in water at least 0.20 m in depth

Undercut Banks	Overhanging Vegetation at least 0.20 m overhang	Woody Debris	Other Debris	Boulder	Submerged Macrophytes	Emergent Macrophytes at least 0.20 m deep	Other - Specify:
<i>0</i>	<i>3.0</i>	<i>0</i>		<i>0.5</i>	<i>0</i>	<i>0</i>	<i>-</i>

Bank Erosion: Length of Continuous Bare Soil (nearest 0.01 m) within 1 m of stream	% of Eroded Bank to the crest or within 5 m of stream edge
Left: <i>0</i> (m) Right: <i>0</i> (m)	Left: <i>0</i> (%) Right: <i>0</i> (%)

**Riparian Land Use:** Percent (nearest 10%) of Bank within 5 m of stream edge, along transect Section Total Must = 100%

Cropland	Pasture	Barnyard	Developed	Meadow	Shrubs	Woodland	Wetland	Exposed Rock	Other - Specify:
<i>/</i>	<i>/</i>	<i>/</i>	<i>/</i>	<i>/</i>	<i>5</i>	<i>50</i>	<i>/</i>	<i>/</i>	<i>Lawn 45</i>

**Riparian Buffer Width:** Length (nearest 1.0 m) of Undisturbed Land Uses along transect, within 10 m of stream

Left: *1* (m) Right: *+10* (m)

*according*

Wadable Stream Quantitative Habitat Evaluation

Form 5600-228 (R 6/07)

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Tanner, Brian McAuley

South Road

36  
12/21/22

Transect Data

Stream Name West Branch Montreal River	Waterbody ID Code	Date (MMDDYYYY) 08/30/2022	Transect No. B10
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Distance from Start (m)	Stream Width (m) 17.5	Habitat Type: <input checked="" type="checkbox"/> Riffle <input type="checkbox"/> Pool <input type="checkbox"/> Run	Bankfull Depth (m) (optional)	Bankfull Width (m) (optional)
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	Deepest Point	Channel Position (Fillets of Current Stream Width)			
		1/5	2/5	3/5	4/5
Water Depth (m)	0.38	0.21	0.35	0.38	0.30
Depth of Fines and Water (m)		0.21	0.35	0.38	0.30
Embeddedness (nearest 10%) of Course Gravel and Rubble/Cobble		40	30	30	50

Percent (nearest 5%) of Stream Bottom Covered Section Total Must = 100%

Bedrock (solid slab)	0	0	0	0
Boulder (261 mm - 4.1 m)	0	0	0	0
Rubble / Cobble (65 - 260 mm)	60	70	80	60
Gravel (2 - 64 mm)	30	30	20	30
Sand (0.062 - 1.9 mm)	10	/	/	10
Silt (0.004 - 0.061 mm)	/	/	/	/
Clay	/	/	/	/
Detritus	/	/	/	/
Other - Specify: <u>Woody cm/4</u>	18.1	36.9	28.3	29.4

Percent (nearest 10%) of Stream Bottom Covered

Algae (attached & fila.)	0	0	0	0
Macrophytes	0	0	0	0
Canopy / Shading (circle one)	10	0	10	30

Cover for Adult Gamefish: Length (nearest 0.01 m) of transect within 0.15 m upstream or downstream in water at least 0.20 m in depth

Undercut Banks	Overhanging Vegetation at least 0.20 m overhang	Woody Debris	Other Debris	Boulder	Submerged Macrophytes	Emergent Macrophytes at least 0.20 m deep	Other - Specify:
0	3.0 m	/	/	2.0m	✓	/	/

Bank Erosion: Length of Continuous Bare Soil (nearest 0.01 m) within 1 m of stream

Left: <u>0</u> (m)	Right: <u>0</u> (m)	Left: <u>0</u> (%)	Right: <u>0</u> (%)
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Riparian Land Use: Percent (nearest 10%) of Bank within 5 m of stream edge, along transect Section Total Must = 100%

Cropland	Pasture	Barnyard	Developed	Meadow	Shrubs	Woodland	Wetland	Exposed Rock	Other - Specify:
/	/	/	/	/	10	50	/		Mowed Pathway 40

Riparian Buffer Width: Length (nearest 1.0 m) of Undisturbed Land Uses along transect, within 10 m of stream

Left: <u>3</u> (m)	Right: <u>+10</u> (m)
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Wadable Stream Quantitative Habitat Evaluation  
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McAuley, Turner, Brem

South Rose

12/05

Transect Data				
Stream Name	Waterbody ID Code	Date (MMDDYYYY)	Transect No.	
West Branch Montreal River		08/30/2012	B11	
Distance from Start (m)	Stream Width (m)	Habitat Type:	Bankfull Depth (m) (optional)	Bankfull Width (m) (optional)
	16.9	<input type="checkbox"/> Riffle <input type="checkbox"/> Pool <input checked="" type="checkbox"/> Run		

Deepest Point	Channel Position (F-fths of Current Stream Width)				
	1/5	2/5	3/5	4/5	
Water Depth (m)	40	0.38	0.39	0.35	0.37
Depth of Fines and Water (m)		0.38	0.39	0.35	0.37
Embeddedness (nearest 10%) of Course Gravel and Rubble/Cobble		40	30	46	40

Percent (nearest 5%) of Stream Bottom Covered					Section Total Must = 100%
Bedrock (solid slab)		0	0	0	0
Boulder (261 mm - 4.1 m)		0	30	0	20
Rubble / Cobble (65 - 260 mm)		70	50	80	50
Gravel (2 - 64 mm)		20	20	20	20
Sand (0.052 - 1.9 mm)		10	/	/	10
Silt (0.004 - 0.061 mm)		/	/	/	/
Clay		/	/	/	/
Detritus		/	/	/	/
Other - Specify: <u>Velonite cm/s</u>		29.7	32.3	34.5	15.4

Percent (nearest 10%) of Stream Bottom Covered					
Algae (attached & fila.)		0	0	0	0
Macrophytes		0	0	0	0
Canopy / Shading (circle one)		60	10	10	20

Cover for Adult Gamefish: Length (nearest 0.01 m) of transect within 0.15 m upstream or downstream in water at least 0.20 m in depth							
Undercut Banks	Overhanging Vegetation at least 0.20 m overhang	Woody Debris	Other Debris	Boulder	Submerged Macrophytes	Emergent Macrophytes at least 0.20 m deep	Other - Specify:
/	3.5	/	/	1.0m	0	0	/

Bank Erosion: Length of Continuous Bare Soil (nearest 0.01 m) within 1 m of stream				% of Eroded Bank to the crest or within 5 m of stream edge			
Left: (m)	Right: (m)	Left: (%)	Right: (%)	Left: (%)	Right: (%)	Left: (%)	Right: (%)
0	0	0	0	0	0	0	0

Riparian Land Use: Percent (nearest 10%) of Bank within 5 m of stream edge, along transect									Section Total Must = 100%
Cropland	Pasture	Barnyard	Developed	Meadow	Shrubs	Woodland	Wetland	Exposed Rock	Other - Specify:
/	/	/	/	/	10	80	/	/	/

Riparian Buffer Width: Length (nearest 1.0 m) of Undisturbed Land Uses along transect, within 10 m of stream	
Left: (m)	Right: (m)
+10	+10

Wadable Stream Quantitative Habitat Evaluation

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Brian McAuley Turner

South Road

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Transect Data

Stream Name <i>West Branch Montreal River</i>	Waterbody ID Code	Date (MMDDYYYY) <i>08/30/2022</i>	Transect No. <i>B12</i>
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Distance from Start (m)	Stream Width (m) <i>17.3</i>	Habitat Type: <input type="checkbox"/> Riffle <input type="checkbox"/> Pool <input checked="" type="checkbox"/> Run	Bankfull Depth (m) (optional)	Bankfull Width (m) (optional)
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	Deepest Point	Channel Position (Fifths of Current Stream Width)			
		1/5	2/5	3/5	4/5
Water Depth (m)	<i>0.55</i>	<i>0.37</i>	<i>0.50</i>	<i>0.46</i>	<i>0.86</i>
Depth of Fines and Water (m)		<i>0.37</i>	<i>0.55</i>	<i>0.46</i>	<i>0.46</i>
Embeddedness (nearest 10%) of Course Gravel and Rubble/Cobble		<i>50</i>	<i>50</i>	<i>40</i>	<i>50</i>

Percent (nearest 5%) of Stream Bottom Covered Section Total Must = 100%

Bedrock (solid slab)	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Boulder (261 mm - 4.1 m)	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Rubble / Cobble (65 - 260 mm)	<i>70</i>	<i>70</i>	<i>60</i>	<i>70</i>
Gravel (2 - 64 mm)	<i>20</i>	<i>20</i>	<i>30</i>	<i>20</i>
Sand (0.062 - 1.9 mm)	<i>10</i>	<i>10</i>	<i>10</i>	<i>10</i>
Silt (0.004 - 0.061 mm)	<i>/</i>	<i>/</i>	<i>/</i>	<i>/</i>
Clay	<i>/</i>	<i>/</i>	<i>/</i>	<i>/</i>
Detritus	<i>/</i>	<i>/</i>	<i>/</i>	<i>/</i>
Other - Specify: <i>Velocity cm/s</i>	<i>13.8</i>	<i>11.3</i>	<i>15.3</i>	<i>29.8</i>

Percent (nearest 10%) of Stream Bottom Covered

Algae (attached & fila.)	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Macrophytes	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Canopy / Shading (circle one)	<i>30</i>	<i>10</i>	<i>20</i>	<i>40</i>

Cover for Adult Gametfish: Length (nearest 0.01 m) of transect within 0.15 m upstream or downstream in water at least 0.20 m in depth

Undercut Banks	Overhanging Vegetation at least 0.20 m overhang	Woody Debris	Other Debris	Boulder	Submerged Macrophytes	Emergent Macrophytes at least 0.20 m deep	Other - Specify:
<i>/</i>	<i>2.0m</i>	<i>/</i>		<i>0.5</i>	<i>/</i>	<i>/</i>	<i>/</i>

Bank Erosion: Length of Continuous Bare Soil (nearest 0.01 m) within 1 m of stream

Left: <i>0</i> (m)	Right: <i>0</i> (m)	% of Eroded Bank to the crest or within 5 m of stream edge
		Left: <i>0</i> (%) Right: <i>0</i> (%)

Riparian Land Use: Percent (nearest 10%) of Bank within 5 m of stream edge, along transect Section Total Must = 100%

Cropland	Pasture	Barriard	Developed	Meadow	Shrubs	Woodland	Wetland	Exposed Rock	Other - Specify:
		<i>/</i>	<i>/</i>	<i>20</i>	<i>40</i>	<i>40</i>	<i>/</i>	<i>/</i>	<i>/</i>

Riparian Buffer Width: Length (nearest 1.0 m) of Undisturbed Land Uses along transect, within 10 m of stream

Left: <i>+10</i> (m)	Right: <i>+10</i> (m)
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