



Pre-Restoration Stream Assessment for Schoolhouse Branch

Lower Fish River Watershed

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Submitted to

Mobile Bay National Estuary Program
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1.0 INTRODUCTION

The Mobile Bay National Estuary Program funded the project entitled “Lower Fish River Watershed Restoration” through a grant provided by the National Fish and Wildlife Foundation Gulf Environmental Benefit Fund, to address sediment and nutrient issues in a coastal watershed discharging into Weeks Bay. As part of the project, Thompson Engineering, Inc. performed a pre-restoration baseline assessment at Schoolhouse Branch, a tributary of the Magnolia River. The site is located south of U.S. Highway 98 in Baldwin County (**Figure 1**). This drainage system has been experiencing heavy erosion between Highway 98 and the Magnolia River. The restoration project will include the rehabilitation of approximately 3,300 linear feet of stream channel and floodplain. This pre-restoration stream assessment was performed in November 2023. Its purpose is to provide baseline ecological information on stream and riparian habitats for comparison with future post-restoration conditions.

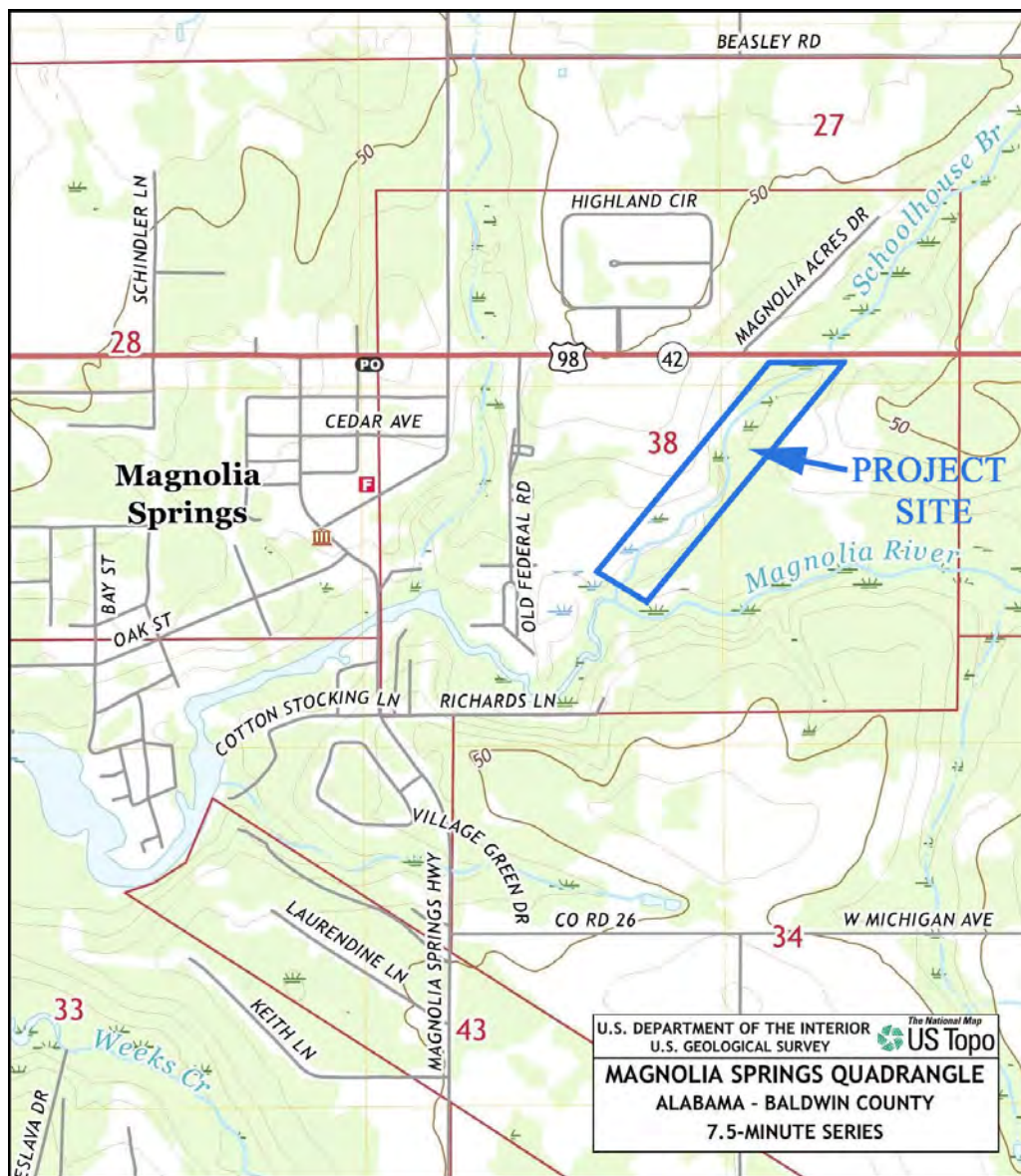


Figure 1. Location of the Schoolhouse Branch baseline stream assessment.

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2.0 METHODS

This study used the rapid stream assessment (RSA) method as outlined in the report, *D'Olive Watershed Monitoring Study and Development of a Watershed Condition Framework* (Barry A. Vittor & Associates, Inc., 2019) to assess stream and riparian buffer condition. The RSA combines elements of stream habitat assessment (HAS), wetland rapid assessment procedure (WRAP), and field observations of stream macroinvertebrates. **Table 1** presents each of the RSA metrics and scoring criteria.

Table 1. Rapid stream assessment (RSA) metrics and scoring criteria.

Metric	Score Criteria		
Riparian Zone Width	Poor (0-9 m) +0	Moderate (9-18 m) +2	Good (>18 m) +4
Riparian Vegetative Quality	Poor (0-25% Native) +0	Moderate (25-75% Native) +2	Good (>75% Native) +4
Canopy Cover	Poor (<30%, 89-100%) +0	Moderate (30-50%) +2	Good (51-88%) +4
Local Watershed Erosion	Heavy +0	Moderate +2	Light +4
Sediment Deposition	Poor (>75% of bottom affected) +0	Moderate (25-75% of bottom affected) +2	Good (<25% of bottom affected) +4
Habitat Availability	Poor (<10% stable habitat) +0	Moderate (10-50% stable habitat) +2	Good (>50% stable habitat) +4
Habitat Smothering	Poor (>75% of habitat affected) +0	Moderate (25-75% of habitat affected) +2	Good (<25% of habitat affected) +4
Channel Alteration	Poor (Extensive channelization evident) +0	Moderate (Some channelization evident) +2	Good (No channelization evident) +4
Channel Sinuosity	Poor (Straight channel) +0	Moderate (Some bends in channel) +2	Good (Extensive bends in channel) +4
Bank Stability	Poor (>60% of banks unstable/eroding) +0	Moderate (30-60% of banks unstable/eroding) +2	Good (<30% of banks unstable/eroding) +4
Bank Vegetative Protection	Poor (<50% of streambank with vegetation) +0	Moderate (50-75% of streambank with vegetation) +2	Good (>75% of streambank with vegetation) +4
Macroinvertebrates Present	No +0	Yes +2	Yes +2
Identified Taxa*	Pollution-Tolerant Taxa -2	Moderately Pollution-Sensitive Taxa +2	Pollution-Sensitive Taxa +4
*Taxa Examples	Midge Larvae Midge Pupae Black Fly Rat-tailed Maggot	Caddisfly Damsel fly Dragonfly Amphipods	Water Penny Stonefly Mayfly Riffle Beetle Dobson Fly

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Two 100-m transects were surveyed on November 9, 2023. The upstream transect (RSA1) was located in the upper portion of the project site, approximately 800 ft downstream of U.S. Highway 98 (**Figure 2**). The second survey transect (RSA2) was located 950 ft downstream from the end of RSA1. At each assessed stream reach, standard rapid bioassessment (RBA) methods were used to collect macroinvertebrates (e.g., using D-frame net sweeps), and the following parameters were noted:

- Presence/absence of macroinvertebrates
- List of any pollution sensitive organisms
- List of any moderately pollution sensitive organisms
- List of pollution-tolerant organisms

Macroinvertebrate attributes were score based on presence (+2) or absence (+0), and if present scored as Poor (-2), Moderate (+2), or Good (+4) based on sensitivity to pollution (**Table 1**). In addition to the RSA, the Alabama Department of Environmental Management (ADEM) stream habitat assessment (HAS) was performed.

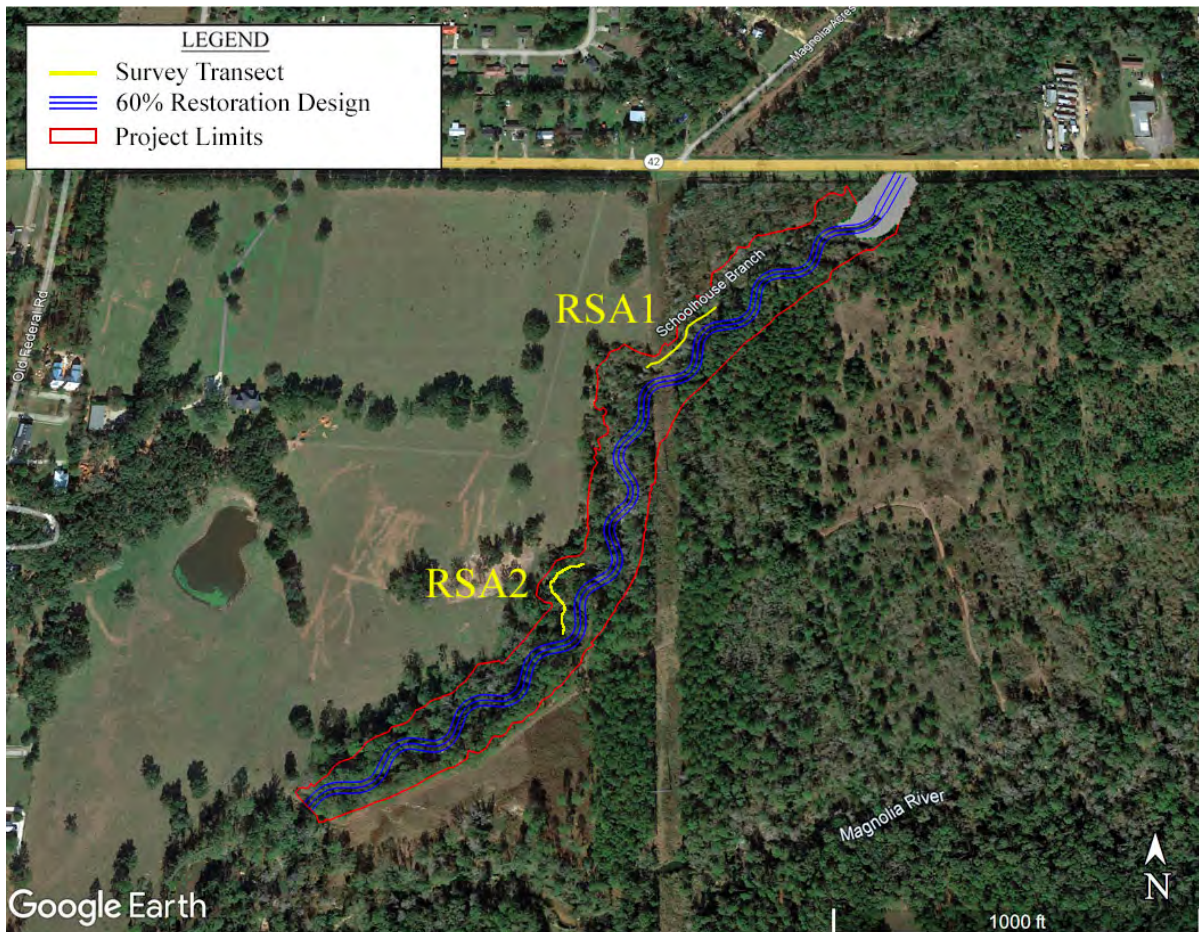


Figure 2. Location of RSA transects at Schoolhouse Branch

The RSA results were compared to the ADEM habitat assessment (HAS) method, which was simultaneously performed at each stream assessment location. RSA and HAS field data sheets are

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included in **Appendix A**. Site photographs are included in **Appendix B**. Plant species lists are provided in **Appendix C**.

3.0 RESULTS

RSA results are presented in **Table 2**. The RSA1 transect generally scored “moderate” to “good”, except for canopy cover, riparian vegetative quality, and local watershed erosion, which all scored as “poor”. In-stream habitat availability and channel alteration both scored as “good”. The remainder of the metrics scored as “moderate”, including sediment deposition, habitat smothering, bank stability and vegetative protection. Macroinvertebrates were present at RSA1, which was scored as “moderate”. Pollution-tolerant black fly (Diptera) was collected, but its negative score was offset and improved by the presence of damselfly (Odonata) and dragonfly (Odonata) nymphs, both considered moderately pollution-sensitive.

Similar to the upstream survey transect, RSA2 received “poor” scores for canopy cover and local watershed erosion. RSA2 did have better riparian vegetation quality than RSA 1, with less prevalent invasive plant occurrence. The remainder of the metrics scored as “moderate”, including sediment deposition, habitat availability, habitat smothering, channel sinuosity, and vegetative protection. RSA2 bank stability was scored as “poor”. The RSA2 reach yielded two taxa each in pollution-tolerant and moderately pollution-sensitive categories, which cancelled each other out in the identified taxa scoring (**Table 2**).

Total points were 24 and 20 points, respectively, for RSA 1 and RSA 2. Scaled to the maximum achievable 50 points, RSA 1 scored 0.48 and RSA 2 scored 0.40, with these values indicative of a degraded, poor-quality system (i.e., ≤ 0.50).

Table 2. RSA scores for the Schoolhouse Branch baseline survey.

Metric	RSA1	RSA2
Riparian Zone Width	2	2
Riparian Vegetative Quality	0	2
Canopy Cover	0	0
Local Watershed Erosion	0	0
Sediment Deposition	2	2
Habitat Availability	4	2
Habitat Smothering	2	2
Channel Alteration	4	4
Channel Sinuosity	2	2
Bank Stability	2	0
Bank Vegetative Protection	2	2
Macroinvertebrates Present	2	2
Identified Taxa*	2	0
*Specific Taxa	Damselfly (+2) Dragonfly (+2) Black Fly (-2)	Damselfly (+2) Dragonfly (+2) Midge (-2) Black Fly (-2)
Total	24	20
Scaled based on 50-pt Max.	0.48	0.40

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Table 3 presents the HAS scores. For both transects, the condition of the stream banks and the riparian vegetative zone width received the lowest scores, proportionate to the highest achievable values. In addition, channel flow status, which is the degree to which the channel is filled with water, received relatively low scores along both transects. RSA2 generally received lower scores related to its banks, including for bank vegetative protection and riparian vegetative zone width along the left (east) bank. RSA2 also received a lower score for pool substrate characterization, which is based on the range of substrate types, due to more uniformly sandy bottom along the length of the reach. Some sediment deposition was apparent along both survey reaches, but was generally isolated and minor.

Table 3. Habitat assessment scores for the Schoolhouse Branch baseline survey.

Habitat Parameter	Max Score	RSA1	RSA2
Instream Cover	20	15	14
Pool Substrate Characterization	20	13	11
Pool Variability	20	14	15
Channel Alteration	20	19	19
Sediment Deposition	20	15	15
Channel Sinuosity	20	16	19
Channel Flow Status	20	11	12
Condition of Banks	20	6	5
Bank Vegetative Protection (Left Bank)	10	8	5
Bank Vegetative Protection (Right Bank)	10	7	4
Grazing or Other Disruptive Pressure (Left Bank)	10	7	6
Grazing or Other Disruptive Pressure (Right Bank)	10	8	9
Riparian Vegetative Zone Width (Left Bank)	10	5	1
Riparian Vegetative Zone Width (Right Bank)	10	9	10
Total	220	153	145

A list of plant species observed along the RSA transects is provided in **Appendix C**. No wetlands were delineated within the project limits, but Schoolhouse Branch does have small, isolated pockets of wetland vegetation at some locations. Invasive plants are prevalent throughout the project area, with the most widespread species including Japanese climbing fern (*Lygodium japonicum*), cogongrass (*Imperata cylindrica*), torpedo grass (*Panicum repens*), Chinese tallow tree (*Triadica sebifera*), Chinese privet (*Ligustrum sinense*), and Japanese honeysuckle (*Lonicera japonica*).

Conclusions

The baseline survey at the Schoolhouse Branch site is intended to establish a background set of habitat assessment data for comparison with post-restoration conditions. The system overall had good water clarity at the time of the survey. Stream banks in the uppermost portion of the system generally have good vegetative protection and scored well from a habitat standpoint (Photograph B1, **Appendix B**). Despite several areas of erosion and bank instability (Photographs B2, B3, and B5), there was no substantial instream habitat smothering along the RSA1 reach. Portions of RSA2 have good stream sinuosity and bank vegetative protection, as well, despite areas of bare sand.

Overall, the Schoolhouse Branch restoration site has substantial issues with bank stability, bank vegetative protection, canopy cover, and invasive plant infestation. The stream condition metrics most

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likely to improve after restoration are those related to erosion and sediment deposition, bank vegetation and bank stability, riparian zone width, and coverage of invasive plants.

5.0 REFERENCES CITED

Barry A. Vittor & Associates, Inc., 2019. *D'Olive Watershed Monitoring Study and Development of a Watershed Condition Framework*. Report prepared for the Mobile Bay National Estuary Program. 29 pp. + appendices.

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Appendix A – Rapid Stream Assessment and Habitat Assessment Data Sheets

Lower Fish River Watershed Data Sheet

Station Name/Number Schoolhouse 1 Date 11/9/23

Field Personnel J. O'Neil, M. Stowe, H. Horne Weather Sunny, warm 75°

Riparian Buffer Zone Width: Poor (0-9m) _____ Moderate (9-18m) X Good (>18m) _____

Riparian Veg. Quality: Poor (0-25% Native) X Moderate (25-75% Native) _____ Good (>75% Native) _____

Water Quality: Water Temp (°C) _____ Cond. (µmohs/cm) _____ Sal. (ppt) _____ pH _____

DO (mg/L) _____ DO (%) _____ Turbidity (NTU) _____

Dominant Watershed Land Use: Forest X ^{Right Bank} Field/Pasture X ^{Left Bank} Agriculture _____ Residential _____

Commercial _____ Industrial _____ Other _____

Canopy Cover: Poor (<30%, 89-100%) X Moderate (30-50%) X Good (51-88%) _____

Local Watershed Erosion: None _____ Light _____ Moderate X Heavy X

Sediment Deposition: Poor _____ Moderate X Good _____

Habitat Availability: Poor _____ Moderate _____ Good X

Habitat Smothering: Poor _____ Moderate X Good _____

Channel Alteration (Artificial Channelization): Poor _____ Moderate _____ Good X

Channel Sinuosity: Poor _____ Moderate X Good _____

Bank Stability: Poor _____ Moderate X Good _____

Bank Veg. Protection: Poor _____ Moderate X Good _____

Macroinvertebrates Present: Yes X No _____

Circle Identified Taxa (refer to attached ID guide)

Pollution Sensitive
Water Penny
Stonefly
Mayfly
Riffle Beetle
Dobson fly

Mod. Pollution Sensitive
Caddisfly
<u>Damselfly</u>
<u>Dragonfly</u>
Amphipods

Pollution Tolerant
Midge Larvae
Midge Pupae
<u>Black Fly</u>
Rat-tailed Maggot

Notes: _____

Appendix K. ADEM - Field Operations Division Glide/Pool habitat assessment field data sheet

School house - 1
12/11/9/23

Habitat Parameter	Category			
	Optimal	Suboptimal	Marginal	Poor
1 Instream Cover	> 50% mix of snags, submerged logs, undercut banks, or other stable habitat; rubble, gravel may be present.	50-30% mix of stable habitat; adequate habitat for maintenance of populations.	30-10% mix of stable habitat; habitat availability less than desirable.	<10% stable habitat; lack of habitat is obvious.
Score 15	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2 Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
Score 13	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3 Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
Score 14	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4 Man-made Channel Alteration	No Channelization or dredging present.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization (>20 years) may be present, but not recent.	New embankments present on both banks; channelization may be extensive, usually in urban or agriculture lands; and > 80% of stream reach is channelized and disrupted.	Extensive channelization; banks shored with gabion or cement; heavily urbanized areas; instream habitat greatly altered or removed entirely.
Score 19	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5 Sediment Deposition	<20% of bottom affected; minor accumulation of fine and coarse material at snags and submerged vegetation; little or no enlargement of islands or point bars.	20-50% affected; moderate accumulation; substantial sediment movement only during major storm event; some new increase in bar formation.	50-80% affected; major stream length 2 to 1 times longer than if it was in a straight line; heavily silted; embankments may be present on both banks; frequent and substantial sediment movement during storm events.	Channelized; mud, silt, and/or sand in braided or non-braided channels; pools almost absent due to deposition.
Score 15	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
6 Channel Sinuosity	Bends in stream increase stream length 3 to 4 times longer than if it was in a straight line.	Bends in stream increase stream length 2 to 3 times longer than if it was in a straight line.	Bends in stream increase the stream length 2 to 1 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
Score 16	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7 Channel flow Status	Water reaches base of both lower banks and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel.	Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
Score 11	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8 Condition of Banks	Banks stable; no evidence of erosion or bank failure; <5% affected.	Moderately stable; infrequent, small areas of erosion mostly healed over; 5-30% affected.	Moderately unstable; 30-60% of banks in reach have areas of erosion.	Unstable; many eroded areas; "raw" areas frequent along straight section and bends; on side slopes, 60-100% of bank has erosional scars.
Score 6	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
9 Bank Vegetative Protection (each bank)	> 90% of the stream bank surfaces covered by vegetation.	90-70% of the streambank surfaces covered by vegetation.	70-50% of the stream bank surfaces covered by vegetation.	<50% of the streambank surfaces covered by vegetation.
Score (LB) 8	10 9 8	7 6	5 4 3	2 1 0
Score (RB) 7	10 9 8	7 6	5 4 3	2 1 0
10 Grazing or other disruptive pressure (each bank)	Vegetative disruption, through grazing or mowing, minimal or not evident; almost all plants allowed to grow naturally.	Disruption evident but not affecting full plant growth potential to any great extent; >1/2 of the potential plant stubble height remaining.	Disruption obvious; patches of bare soil or closely cropped vegetation common; <1/2 of the potential plant stubble height remaining.	Disruption of stream bank vegetation is very high; vegetation has been removed to ≤ 2 inches average stubble height.
Score (LB) 7	10 9 8	7 6	5 4 3	2 1 0
Score (RB) 8	10 9 8	7 6	5 4 3	2 1 0
11 Riparian vegetative zone Width (each bank)	Width of riparian zone >60 feet; human activities (i.e., parking lots, roadbeds, clearcuts, lawns, or crops) have not impacted zone.	Width of riparian zone 60 - 40 feet; human activities have impacted zone only minimally.	Width of riparian zone 40 - 20 feet; human activities have impacted zone a great deal.	Width of riparian zone <20 feet; little or no riparian vegetation due to human activities.
Score (LB) 8.5	10 9 8	7 6	5 4 3	2 1 0
Score (RB) 9	10 9 8	7 6	5 4 3	2 1 0

Lower Fish River Watershed Data Sheet

Station Name/Number Schoolhouse 2 Date 11/9/23

Field Personnel J.O. M.S. Hill Weather sunny, warm 78°

Riparian Buffer Zone Width: Poor (0-9m) ^{left} Moderate (9-18m) _____ Good (>18m) ^{right}

Riparian Veg. Quality: Poor (0-25% Native) Moderate (25-75% Native) Good (>75% Native) _____

Water Quality: Water Temp (°C) 21.9 Cond. (µmohs/cm) 58 Sal. (ppt) 0.03 pH 6.91

DO (mg/L) 7.62 DO (%) 86.9 Turbidity (NTU) _____

Dominant Watershed Land Use: Forest ^{right} Field/Pasture ^{left} Agriculture _____ Residential _____
Commercial _____ Industrial _____ Other _____

Canopy Cover: Poor (<30%, 89-100%) Moderate (30-50%) _____ Good (51-88%) _____

Local Watershed Erosion: None _____ Light _____ Moderate _____ Heavy

Sediment Deposition: Poor _____ Moderate Good _____

Habitat Availability: Poor _____ Moderate Good _____

Habitat Smothering: Poor _____ Moderate Good _____

Channel Alteration (Artificial Channelization): Poor _____ Moderate _____ Good

Channel Sinuosity: Poor _____ Moderate Good _____

Bank Stability: Poor Moderate _____ Good _____

Bank Veg. Protection: Poor _____ Moderate Good _____

Macroinvertebrates Present: Yes _____ No _____

Circle Identified Taxa (refer to attached ID guide)

Pollution Sensitive
Water Penny
Stonefly
Mayfly
Riffle Beetle
Dobson fly

Mod. Pollution Sensitive
Caddisfly
<u>Damselfly</u>
<u>Dragonfly</u>
Amphipods

Pollution Tolerant
<u>Midge Larvae</u>
Midge Pupae
<u>Black Fly</u>
Rat-tailed Maggot

Notes: _____

Appendix K. ADEM - Field Operations Division Glide/Pool habitat assessment field data sheet

Schoolhouse - 2
11/9/23

Habitat Parameter	Category			
	Optimal	Suboptimal	Marginal	Poor
1 Instream Cover	> 50% mix of snags, submerged logs, undercut banks, or other stable habitat; rubble, gravel may be present.	50-30% mix of stable habitat; adequate habitat for maintenance of populations.	30-10% mix of stable habitat; habitat availability less than desirable.	<10% stable habitat; lack of habitat is obvious.
Score	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2 Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
Score	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3 Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep, very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
Score	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4 Man-made Channel Alteration	No Channelization or dredging present.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization (>20 years) may be present, but not recent.	New embankments present on both banks; channelization may be extensive, usually in urban or agriculture lands; and > 80% of stream reach is channelized and disrupted.	Extensive channelization; banks shored with gabion or cement; heavily urbanized areas; instream habitat greatly altered or removed entirely.
Score	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5 Sediment Deposition	<20% of bottom affected; minor accumulation of fine and coarse material at snags and submerged vegetation; little or no enlargement of islands or point bars.	20-50% affected; moderate accumulation; substantial sediment movement only during major storm event; some new increase in bar formation.	50-80% affected; major deposition; pools shallow, heavily silted; embankments may be present on both banks; frequent and substantial sediment movement during storm events.	Channelized; mud, silt, and/or sand in braided or non-braided channels; pools almost absent due to deposition.
Score	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
6 Channel Sinuosity	Bends in stream increase stream length 3 to 4 times longer than if it was in a straight line.	Bends in stream increase stream length 2 to 3 times longer than if it was in a straight line.	Bends in stream increase the stream length 2 to 1 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
Score	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7 Channel flow Status	Water reaches base of both lower banks and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel.	Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
Score	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8 Condition of Banks	Banks stable; no evidence of erosion or bank failure; <5% affected.	Moderately stable; infrequent, small areas of erosion mostly healed over; 5-30% affected.	Moderately unstable; 30-60% of banks in reach have areas of erosion.	Unstable; many eroded areas; "raw" areas frequent along straight section and bends; on side slopes, 60-100% of bank has erosional scars.
Score	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
9 Bank Vegetative Protection (each bank)	> 90% of the stream bank surfaces covered by vegetation.	90-70% of the streambank surfaces covered by vegetation.	70-50% of the stream bank surfaces covered by vegetation.	<50% of the streambank surfaces covered by vegetation.
Score (LB)	10 9 8	7 6	5 4 3	2 1 0
Score (RB)	10 9 8	7 6	5 4 3	2 1 0
10 Grazing or other disruptive pressure (each bank)	Vegetative disruption, through grazing or mowing, minimal or not evident; almost all plants allowed to grow naturally.	Disruption evident but not affecting full plant growth potential to any great extent; >1/2 of the potential plant stubble height remaining.	Disruption obvious; patches of bare soil or closely cropped vegetation common; <1/2 of the potential plant stubble height remaining.	Disruption of stream bank vegetation is very high; vegetation has been removed to ≤ 2 inches average stubble height.
Score (LB)	10 9 8	7 6	5 4 3	2 1 0
Score (RB)	10 9 8	7 6	5 4 3	2 1 0
11 Riparian vegetative zone Width (each bank)	Width of riparian zone >60 feet; human activities (i.e., parking lots, roadbeds, clearcuts, lawns, or crops) have not impacted zone.	Width of riparian zone 60 - 40 feet; human activities have impacted zone only minimally.	Width of riparian zone 40 - 20 feet; human activities have impacted zone a great deal.	Width of riparian zone <20 feet; little or no riparian vegetation due to human activities.
Score (LB)	10 9 8	7 6	5 4 3	2 1 0
Score (RB)	10 9 8	7 6	5 4 3	2 1 0

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Appendix B – Photographs

***SCHOOLHOUSE BRANCH PRE-RESTORATION STREAM ASSESSMENT
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Photo B1. RSA1, upstream view near the top of the reach.



Photo B2. RSA1, downstream view, mid-transect.

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Photo B3. RSA1, downstream portion of the survey transect.



Photo B4. RSA2, uppermost portion of the survey transect.

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Photo B5. RSA2, approximate mid-point of the survey transect.



Photo B6. RSA2, downstream end of the survey transect.

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Appendix C – Plant Species Lists

**SCHOOLHOUSE BRANCH PRE-RESTORATION STREAM ASSESSMENT
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Transect RSA1 - Plant Species List († = non-native)

Order	Family	Species Name	Common Name
Schizaeales	Lygodiaceae	<i>Lygodium japonicum</i> †	Japanese climbing fern
Polypodiales	Athyriaceae	<i>Athyrium asplenoides</i>	Southern lady fern
Polypodiales	Athyriaceae	<i>Deparia petersenii</i> †	Japanese lady fern
Laurales	Lauraceae	<i>Camphora officinarum</i> †	Camphor tree
Liliales	Smilacaceae	<i>Smilax bona-nox</i>	Saw greenbrier
Commelinales	Commelinaceae	<i>Commelina diffusa</i> †	Creeping dayflower
Poales	Typhaceae	<i>Sparganium americanum</i>	American burreed
Poales	Cyperaceae	<i>Cyperus haspan</i>	Sheathed flatsedge
Poales	Cyperaceae	<i>Cyperus virens</i>	Green flatsedge
Poales	Poaceae	<i>Dichanthelium scoparium</i>	Velvety panic grass
Poales	Poaceae	<i>Dichanthelium sphaerocarpon</i>	Round-fruited witch grass
Poales	Poaceae	<i>Imperata cylindrica</i> †	Cogon grass
Poales	Poaceae	<i>Panicum repens</i> †	Torpedo grass
Poales	Poaceae	<i>Sacciolepis striata</i>	American cupscale
Vitales	Vitaceae	<i>Muscadinia rotundifolia</i>	Muscadine
Vitales	Vitaceae	<i>Nekemias arborea</i>	Peppervine
Fabales	Fabaceae	<i>Wisteria ×formosa</i> †	Hybrid Asian wysteria
Rosales	Rosaceae	<i>Rubus pensilvanicus</i>	Pennsylvania blackberry
Rosales	Rosaceae	<i>Rubus trivialis</i>	Southern dewberry
Fagales	Fagaceae	<i>Quercus nigra</i>	Water oak
Oxalidales	Oxalidaceae	<i>Oxalis debilis</i> †	Pink wood sorrel
Magpighiales	Euphorbiaceae	<i>Triadica sebifera</i> †	Chinese tallow tree
Myrtales	Onagraceae	<i>Ludwigia decurrens</i>	Primrose willow
Myrtales	Onagraceae	<i>Ludwigia octovalvis</i>	Mexican primrose willow
Myrtales	Onagraceae	<i>Ludwigia palustris</i>	Marsh seedbox
Malvales	Malvaceae	<i>Melochia corchorifolia</i> †	Chocolate weed
Caryophyllales	Polygonaceae	<i>Persicaria punctate</i>	Dotted smartweed
Caryophyllales	Caryophyllaceae	<i>Drymaria cordata</i> †	West Indian chickweed
Ericales	Cyrtillaceae	<i>Cyrtilla racemiflora</i>	Swamp titi
Gentianales	Rubiaceae	<i>Cephalanthus occidentalis</i>	Common buttonbush
Solanales	Convolvulaceae	<i>Ipomoea hederifolia</i> †	Scarlet creeper
Solanales	Convolvulaceae	<i>Ipomoea trilobal</i> †	Little bell
Lamiales	Oleaceae	<i>Ligustrum sinense</i> †	Chinese privet
Lamiales	Verbenaceae	<i>Verbena brasiliensis</i> †	Brazilian verbena
Lamiales	Lamiaceae	<i>Callicarpa americana</i>	American beautyberry
Lamiales	Lamiaceae	<i>Cantinoa mutabilis</i> †	Tropical bushmint
Lamiales	Lamiaceae	<i>Stachys floridana</i> †	Florida betony
Asterales	Asteraceae	<i>Bidens alba</i> †	Romerillo
Asterales	Asteraceae	<i>Conoclinium coelestinum</i>	Blue mistflower
Asterales	Asteraceae	<i>Erigeron pusillus</i>	Southern horseweed
Asterales	Asteraceae	<i>Eupatorium capillifolium</i>	Common dog fennel
Asterales	Asteraceae	<i>Mikania scandens</i>	Climbing hempvine

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Asterales	Asteraceae	<i>Solidago altissima</i>	Tall goldenrod
Asterales	Asteraceae	<i>Solidago gigantea</i>	Giant goldenrod
Dipsacales	Viburnaceae	<i>Sambucus canadensis</i>	Common elderberry
Dipsacales	Caprifoliaceae	<i>Lonicera japonica</i> †	Japanese honeysuckle
Apiales	Araliaceae	<i>Hydrocotyle</i> sp.	Water pennywort species

Transect RSA2 - Plant Species List († = non-native)

Order	Family	Species Name	Common Name
Schizaeles	Lygodiaceae	<i>Lygodium japonicum</i> †	Japanese climbing fern
Polypodiales	Athyriaceae	<i>Deparia petersenii</i> †	Japanese lady fern
Pinales	Pinaceae	<i>Pinus taeda</i>	Loblolly pine
Magnoliales	Magnoliaceae	<i>Magnolia virginiana</i> var. <i>australis</i>	Southern sweet bay
Laurales	Lauraceae	<i>Camphora officinarum</i> †	Camphor tree
Liliales	Smilacaceae	<i>Smilax bona-nox</i>	Saw greenbrier
Liliales	Smilacaceae	<i>Smilax rotundifolia</i>	Round-leaf greenbrier
Liliales	Smilacaceae	<i>Smilax smallii</i>	Jackson vine
Commelinales	Commelinaceae	<i>Commelina diffusa</i> †	Creeping dayflower
Poales	Typhaceae	<i>Sparganium americanum</i>	American burreed
Poales	Poaceae	<i>Chasmanthium laxum</i>	Slender wood oats
Poales	Poaceae	<i>Dichanthelium scoparium</i>	Velvety panic grass
Poales	Poaceae	<i>Imperata cylindrica</i> †	Cogon grass
Poales	Poaceae	<i>Kelloggloa verrucosa</i>	Warty panic grass
Poales	Poaceae	<i>Panicum repens</i> †	Torpedo grass
Poales	Poaceae	<i>Paspalum urvillei</i> †	Vasey's grass
Poales	Poaceae	<i>Sacciolepis striata</i>	American cupscale
Vitales	Vitaceae	<i>Muscadinia rotundifolia</i>	Muscadine
Vitales	Vitaceae	<i>Nekemias arborea</i>	Peppervine
Rosales	Rosaceae	<i>Rosa laevigata</i> †	Cherokee rose
Rosales	Rosaceae	<i>Rubus cuneifolius</i>	Sand blackberry
Rosales	Rosaceae	<i>Rubus pensilvanicus</i>	Pennsylvania blackberry
Rosales	Rosaceae	<i>Rubus trivialis</i>	Southern dewberry
Fagales	Fagaceae	<i>Quercus nigra</i>	Water oak
Oxalidales	Oxalidaceae	<i>Oxalis debilis</i> †	Pink wood sorrel
Magpighiales	Euphorbiaceae	<i>Triadica sebifera</i> †	Chinese tallow tree
Magpighiales	Phyllanthaceae	<i>Embllica urinaria</i> †	Pee flower, chamber bitter
Myrtales	Onagraceae	<i>Ludwigia octovalvis</i>	Mexican primrose willow
Sapindales	Anacardiaceae	<i>Rhus copallinum</i>	Winged sumac
Sapindales	Sapindaceae	<i>Acer rubrum</i>	Red maple
Brassicales	Brassicaceae	<i>Cardamine hirsute</i> †	Hairy bittercress
Caryophyllales	Polygonaceae	<i>Persicaria punctate</i>	Dotted smartweed
Caryophyllales	Caryophyllaceae	<i>Drymaria cordata</i> †	West Indian chickweed
Caryophyllales	Chenopodiaceae	<i>Dysphania ambrosioides</i> †	Mexican tea
Cornales	Nyssaceae	<i>Nyssa biflora</i>	Swamp tupelo
Lamiales	Oleaceae	<i>Ligustrum sinense</i> †	Chinese privet
Lamiales	Plantaginaceae	<i>Scoparia dulcis</i>	Licorice weed
Lamiales	Lamiaceae	<i>Callicarpa americana</i>	American beautyberry
Lamiales	Lamiaceae	<i>Cantinoa mutabilis</i> †	Tropical bushmint

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LOWER FISH RIVER WATERSHED**

Asterales	Campanulaceae	<i>Lobelia rogersii</i>	McVaugh's Lobelia
Asterales	Asteraceae	<i>Bidens alba</i> †	Romerillo
Asterales	Asteraceae	<i>Conoclinium coelestinum</i>	Blue mistflower
Asterales	Asteraceae	<i>Erigeron pusillus</i>	Southern horseweed
Asterales	Asteraceae	<i>Mikania scandens</i>	Climbing hempvine
Asterales	Asteraceae	<i>Youngia japonica</i> †	Asiatic hawk's beard
Dipsacales	Viburnaceae	<i>Sambucus canadensis</i>	Common elderberry
Dipsacales	Caprifoliaceae	<i>Lonicera japonica</i> †	Japanese honeysuckle
Apiales	Araliaceae	<i>Hydrocotyle</i> sp.	Water pennywort species