

Pre-restoration Stream and Wetland Assessments for the Spring Branch System Lower Fish River Watershed Restoration

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 draining into Weeks Bay. As part of the Project, Barry A. Vittor & Associates, Inc. (BVA) performed pre-restoration stream and wetland assessments at the Spring Branch system near the Marlow community. The site is located south of Etta Smith Rd. in Baldwin County (**Figure 1**). This drainage system has been experiencing heavy head cutting and erosion between County Rd. 9 and Fish River. The restoration project includes the rehabilitation of approximately 1,437 linear feet of stream channel and floodplain. The purpose of this assessment is to provide baseline ecological information on stream and wetland habitats for comparison with future post-restoration conditions.

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. In addition to the RSA, the Alabama Department of Environmental Management (ADEM) stream habitat assessment was performed.

The first sampling area (RSA 1) was located just downstream of County Rd. 9, in an area of the drainage that has not experienced extensive head cutting, has a relatively wide riparian zone, and only experiences water flow during rain events (**Figure 2**). The second sampling area (RSA 2) was located in a downstream area of extreme head cutting and erosion, but where seeps/springs provide continuous water flow. Each location was surveyed along a 100-m stream reach. **Table 1** shows each of the RSA metrics and scoring criteria. RSA and HAS data sheets are included in **Appendix A**. Site photographs are included in **Appendix B**.



Figure 1. Location of the Spring Branch pre-restoration baseline habitat assessment.

The boundary of jurisdictional CWA Section 404 wetlands associated with Spring Branch was mapped using the U.S. Army Corps of Engineers three-parameter approach, as outlined in the “Wetland Delineation Manual” (U.S. Army Corps of Engineers, 1987), and updated in 2010. Wetland boundaries were flagged in the field and logged with GPS. The WRAP was used at upstream and downstream

locations to measure wetland quality. WRAP assesses six functional wetland values, including wetland hydrology, water quality input and treatment, wetland vegetation ground cover, wetland overstory/shrub canopy, adjacent upland buffer, and wildlife utilization. Each function is scored based on the field assessment, and a cumulative value for the condition of each wetland assessment area is generated.

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

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

A variable WRAP score of 3 is considered the best a system can function and a 0 is for a system that is severely impacted and is exhibiting negligible attributes. The overall score is expressed as a percentage,

ranging from 0% - 100%. WRAP scores of 0-50% (0.0 to 0.50) are considered Poor (low quality) wetlands; 51-75% (0.51 to 0.75) are Fair (medium quality); and greater than 75% (0.76 to 1.0) are Good (high quality). WRAP data sheets are included in Appendix A.

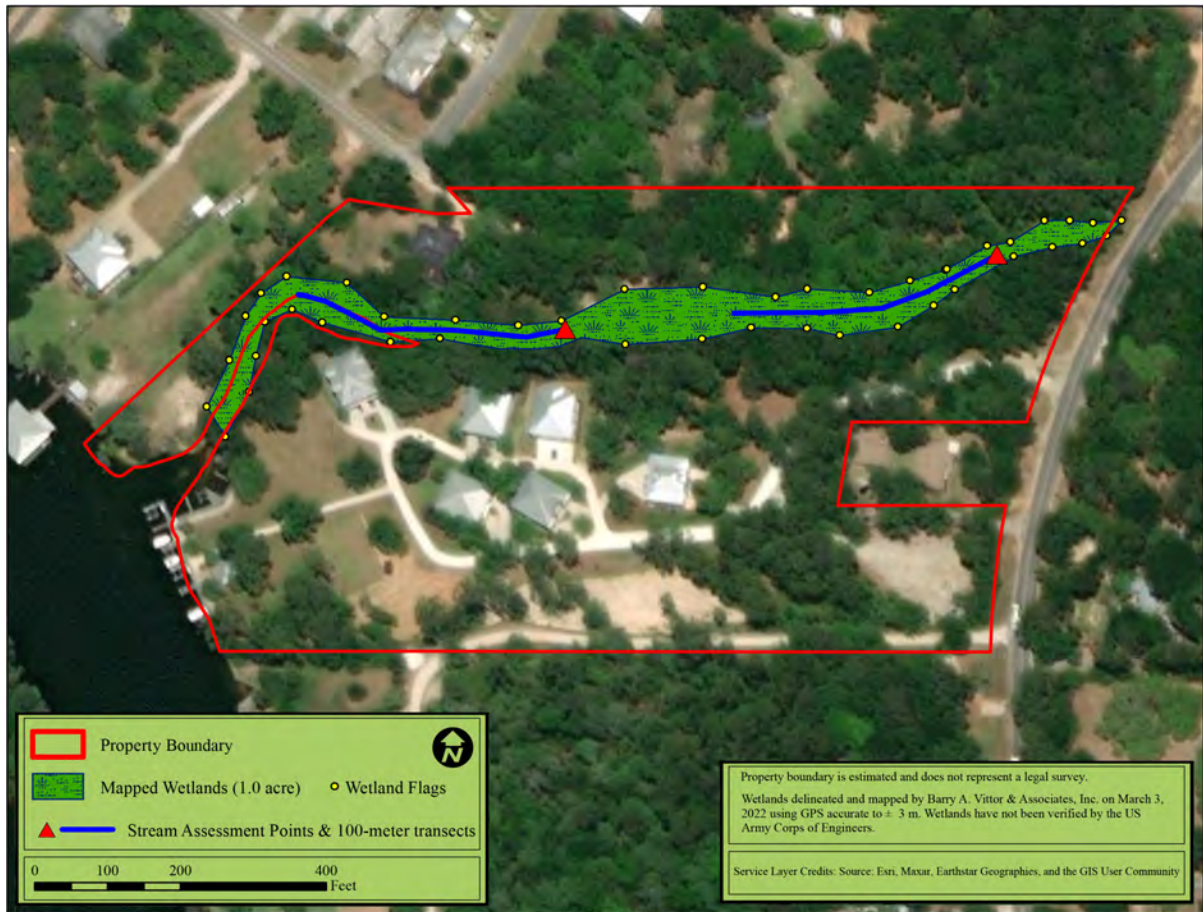


Figure 2. Location of wetlands and stream assessment transects at the Project site.

Results

The RSA results are presented in **Table 2**. The RSA1 reach (upstream of head cutting) generally had moderate to good scores, equal or better to the RSA2 reach (downstream of head cutting) in nearly all metrics. RSA1 had a wider riparian zone, and better canopy cover than RSA2. RSA2 received “poor” scores for riparian zone width, canopy cover, local watershed erosion, sediment deposition, bank stability, and bank vegetative protection. Very few macroinvertebrates were observed during sampling. None were observed in the RSA 1 reach due to a lack of water flow, while in the RSA 2 reach, only pollution-tolerant midge larvae were observed. Total RSA points were 26 and 12 points, respectively, for RSA 1 and RSA 2. Scaled to the maximum achievable 50 points, RSA 1 scored 0.52 and RSA 2 scored 0.24.

Table 3 provides the stream habitat assessment scores for each site. The main differences between the transects were related to the condition of the streambanks and bank vegetative protection, as well as the width of the vegetated riparian buffer, which all scored lower at RSA 2 compared to RSA 1. Sediment deposition was apparent along both survey reaches (See Photographs B2 and B4, **Appendix B**).

Table 2. RSA scores for the Spring Branch restoration baseline survey.

Metric	RSA 1	RSA 2
Riparian Zone Width	2	0
Riparian Vegetative Quality	2	2
Canopy Cover	4	0
Local Watershed Erosion	2	0
Sediment Deposition	2	0
Habitat Availability	2	2
Habitat Smothering	2	2
Channel Alteration	4	4
Channel Sinuosity	2	2
Bank Stability	2	0
Bank Vegetative Protection	2	0
Macroinvertebrates Present	0	2
Identified Taxa*	0	-2
*Specific Taxa		Midge (-2)
Total	26	12
Scaled based on 50-pt Max.	0.52	0.24

Table 3. Habitat assessment scores for the Spring Branch restoration baseline survey.

Habitat Parameter	Max Score	RSA 1	RSA 2
Instream Cover	20	10	13
Pool Substrate Characterization	20	14	11
Pool Variability	20	6	5
Channel Alteration	20	16	16
Sediment Deposition	20	6	6
Channel Sinuosity	20	6	7
Channel Flow Status	20	0	6
Condition of Banks	20	9	1
Bank Vegetative Protection (Left Bank)	10	7	2
Bank Vegetative Protection (Right Bank)	10	7	2
Grazing or Other Disruptive Pressure (Left Bank)	10	10	8
Grazing or Other Disruptive Pressure (Right Bank)	10	10	8
Riparian Vegetative Zone Width (Left Bank)	10	8	2
Riparian Vegetative Zone Width (Right Bank)	10	10	2
Total	220	119	89

Table 4 provides the wetland quality scores for the upstream (WRAP 1) and downstream (WRAP 2) locations. The overall condition score upstream was 0.52, which is near the bottom of the range for a “Fair” condition, and 0.46 downstream, which is considered “Poor”. The main difference between the upstream and downstream areas was a relatively poor canopy condition and adjacent upland buffer condition downstream. The wetland downstream canopy contained 5% semi-mature hardwood mix, with apparent storm damage prevalent, whereas the upstream canopy had 15%. The survey area overall showed minimal evidence of native recruitment, with the canopy containing around 10% exotic shrub

and tree species both upstream and downstream. Prevalent invasive species were Chinese tallowtree (*Triadica sebifera*) and Chinese privet (*Ligustrum sinense*). Wetland ground cover was impacted by large amounts of siltation across the entire area.

Table 4. WRAP scores for the Spring Branch restoration baseline survey.

Wetland Functional Value	WRAP 1 ¹	WRAP 2 ¹
Field Hydrology	1.5	1.5
Water Quality Input and Treatment	1.82	1.78
Wetland Vegetation Ground Cover	1.5	1.5
Wetland Overstory/Shrub Canopy	1.5	1.0
Adjacent Upland Buffer	1.5	1.0
Wildlife Utilization	1.5	1.5
Overall Score²	0.52	0.46

¹Range from 0.0 to 3.0; ²Range from 0.0 to 1.0

Conclusions

The initial survey at the Spring Branch restoration site is intended to establish a background set of habitat assessment data for comparison with post-restoration conditions. Both stream and wetland conditions showed greater degradation downstream of the main headcut than above it, but the entire system has issues with erosion, sedimentation, and plant community composition. The stream parameters most likely to improve in an assessment of post-restoration condition include sediment deposition, habitat smothering, bank vegetation and stability, and channel sinuosity. Improvements in wetland functional values are most likely to include those for plant canopy condition, vegetation ground cover, and the prevalence of invasive plant species.

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.

U.S. Army Corps of Engineers. 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0)*, ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-10-20. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

U.S. Army Corps of Engineers, 1987. *Corps of Engineers Wetlands Delineation Manual*. Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

APPENDIX A

Rapid Stream Assessment, Habitat Assessment, and Wetland Rapid Assessment Procedure Data Sheets

APPENDIX H-1

ADEM-FIELD OPERATIONS-ENVIRONMENTAL INDICATORS SECTION
 GLIDE/POOL HABITAT ASSESSMENT FIELD DATA SHEET

Name of Waterbody
 Station Number

Marlow - Below Headcut

Date: 3/3/22

Investigators J. Powell, M. Stave

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 <u>13</u>	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 <u>11</u>	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 <u>5</u>	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4 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 <u>16</u>	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 <u>6</u>	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 <u>7</u>	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 <u>6</u>	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 <u>1</u>	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) <u>2</u>	10 9 8	7 6	5 4 3	2 1 0
Score (RB) <u>2</u>	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) <u>8</u>	10 9 8	7 6	5 4 3	2 1 0
Score (RB) <u>8</u>	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) <u>2</u>	10 9 8	7 6	5 4 3	2 1 0
Score (RB) <u>2</u>	10 9 8	7 6	5 4 3	2 1 0

Lower Fish River Watershed Data Sheet

Station Name/Number Marlow - Above Head cut Date 3/3/22

Field Personnel J. O'Neil, M. Stowe Weather Sunny, warm

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

Riparian Veg. Quality: Poor (0-25% Native) _____ Moderate (25-75% Native) X 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 _____ Field/Pasture _____ Agriculture _____ Residential X

Commercial _____ Industrial _____ Other _____

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

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

Sediment Deposition: Poor _____ Moderate X Good _____

Habitat Availability: Poor _____ Moderate X Good _____

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 _____ No X

Circle Identified Taxa (refer to attached ID guide)

Pollution Sensitive
Water Penny
Stonefly
Mayfly
Riffle Beetle
Dobson fly

Mod. Pollution Sensitive
Caddisfly
Damselfly
Dragonfly
Amphipods

Pollution Tolerant
Midge Larvae
Midge Pupae
Black Fly
Rat-tailed Maggot

Notes: This area ephemeral in nature. No water at the time of sampling. High water marks and trash show evidence of heavy flow during rain events.

APPENDIX H-1

* Ephemeral - no water at time of sampling

ADEM-FIELD OPERATIONS-ENVIRONMENTAL INDICATORS SECTION
 GLIDE/POOL HABITAT ASSESSMENT FIELD DATA SHEET

Name of Waterbody
 Station Number

Marlow - Above Headcut

Date: 3/3/22

Investigators

J. O'Neil, M. Shaw

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	10			
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	14			
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	6			
4 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	14			
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	6			
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	6			
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	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	9			
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)	7			
Score (RB)	7			
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			
Score (RB)	10			
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			
Score (RB)	10			

Lower Fish River Watershed Data Sheet

Station Name/Number Marlow - Below Heald Date 7/3/22

Field Personnel J. D'Neale, M. Stovinec Weather Sunny, warm

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

Riparian Veg. Quality: Poor (0-25% Native) _____ 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 _____ Field/Pasture _____ 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
Damselfly
Dragonfly
Amphipods

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

Notes: _____

Wetland Rapid Assessment Procedure

Wetland 1 East

Check one
Existing Conditions Proposed Conditions (WRAP)

Application Number	Project Name MB-NEP-Fish River	Date 3/03/22	Evaluator M. Stowe	Wetland Type Forested /Scrub Shrub Acre(s)
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Land Use Drainage / creek floodplain restoration	FLUCCS Code 630 Description: Wetland forested Mixed	
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Wildlife Utilization (WU) 1.5	Wetland Canopy (O/S) 1.5	Wetland Ground Cover (GC) 1.5
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Habitat Support/Buffer				Field Hydrology (HYD)		WQ Input & Treatment (WQ)*	
Buffer type	(Score) X	(% of area)	=Sub Totals	1.5		1.82	
30-300'	2.0	50%	1.0				
<30'	1.0	50%	0.5				
			TOTAL				
			1.5				

Land use Category (LU)				Pretreatment Category (PT)			
Land use Category	(Score) X	(% of area)	=Sub Totals	Pretreatment Category	(Score) X	(% of area)	=Sub Totals
Undeveloped	2.5	50%	1.25	Nat Undeveloped	2.5	50%	1.25
Dirt road	2.0	25%	1.0	Veg. Buffer	1.5	25%	0.38
Single family	1.5	25%	0.75	No Treatment	0.0	25%	0.00
			(LU) TOTAL				PT TOTAL
			2.0				1.63

WRAP Score
0.52

Wildlife Utilization (WU) 1.5	Study area located in middle of drainage that maintains some habitat for wildlife utilization. Site was located next to residential development causing some human disturbance / trash etcetera. Very little water ponding or aquatic habitat was present at the time of the survey. Noteworthy wildlife included crow and hawk sightings.
Wetland Canopy (O/S) 1.5	Wetland canopy contains semi mature hardwood mix. Canopy closer was estimated to be around 15 %. Study area showed minimal evidence of native recruitment. Canopy contained 10% exotic shrub and tree species. Exotic species were Chinese popcorn and Chinese privet.
Wetland Ground Cover (GC) 1.5	Ground cover was extremely impacted by large amounts of siltation. Exotic species has an estimated coverage around 15%. Exotics included Cogon grass, Chinese popcorn, Chinese privet and Japanese climbing fern.
Habitat Support/Buffer 1.5	50% Upland buffer to the north was greater than 30 feet and less than 300 feet in average width and bordered by low volume dirt road. Portion of buffer contained mostly native tree species that are correct for habitat. Previous storm hurricane had damaged 20% of the canopy locate in uplands. This portion of buffer contained 20% nuisance / exotic species. 50% Upland buffer was less than 100 feet in average width and was bordered by a single-family residence. Wetlands are connected to off-site wetland / wildlife corridor to the west.
Field Hydrology (HYD) 1.5	Wetlands exhibit adequate hydro period and drainage patterns. Surrounding subdivision development and past road construction has caused large amounts of siltation in wetlands.

WQ Input & Treatment (WQ) 2.25	Land Use 50% Undeveloped – 2.5 25% Single-family residential to the south – 1.5 25% low volume dirt road to the north – 2.0 Wetland Pre-Treatment 50% Natural undeveloped area 2.5 25% Road no treatment 0.0 25% Vegetated buffer 1.5

Wetland Rapid Assessment Procedure

Wetland 2 West

Check one
Existing Conditions Proposed Conditions (WRAP)

Application Number	Project Name MB-NEP-Fish River	Date 3/03/22	Evaluator M. Stowe	Wetland Type Forested/Scrub Shrub Acre(s)
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Land Use Drainage / creek floodplain restoration	FLUCCS Code 630	Description: Wetland forested Mixed
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Wildlife Utilization (WU) 1.5	Wetland Canopy (O/S) 1.0	Wetland Ground Cover (GC) 1.5
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Habitat Support/Buffer				Field Hydrology (HYD)	WQ Input & Treatment (WQ)*
Buffer type	(Score) X	(% of area)	=Sub Totals	1.5	1.78
30'	1.0	100%	1.0		
TOTAL			1.0		

Land use Category (LU)				(LU) TOTAL
Land use Category	(Score) X	(% of area)	=Sub Totals	
Undeveloped	2.5	40%	1.00	
Dirt road	2.0	10%	0.20	
Single family	1.5	50%	0.75	
TOTAL			1.95	

Pretreatment Category (PT)				PT TOTAL
Pretreatment Category	(Score) X	(% of area)	=Sub Totals	
Nat Undeveloped	2.5	50%	1.25	
Veg. Buffer	1.5	25%	0.37	
No Treatment	0.0	25%	0.00	
TOTAL			1.62	

WRAP Score
0.46

Wildlife Utilization (WU) 1.5	Study area located in middle of stream that maintains some habitat for wildlife utilization. Site was located next to residential development causing some human disturbance / trash and construction debris. Perennial stream provides aquatic habitat for fish, macroinvertebrates, and fish. Noteworthy wildlife included small fish and beaver activity.
Wetland Canopy (O/S) 1.0	Wetland canopy contains 5% semi mature hardwood mix. Most canopy trees in this location were down or damaged by previous hurricanes. Study area showed minimal evidence of native recruitment. Canopy contained 10% exotic shrub and tree species. Exotic species were Chinese popcorn and Chinese privet.
Wetland Ground Cover (GC) 1.5	Ground cover was extremely impacted by large amounts of siltation. Exotic species have an estimated coverage around 20%. Exotics included Cogon grass, Chinese popcorn, Chinese privet and Japanese climbing fern. Location contained approximately 5% native herbaceous species.
Habitat Support/Buffer 1.0	100% Upland buffer 30 feet in average width and was bordered by a single-family residence. Buffer contained 30% nuisance / exotic species Wetlands are connected to off-site wetland / wildlife corridor to the west.
Field Hydrology (HYD) 1.5	Wetlands exhibit adequate hydro period and drainage patterns. Surrounding subdivision development and past road construction has caused large amounts of siltation in wetlands.

WQ Input & Treatment (WQ) 1.78	<p data-bbox="440 109 1528 142">Land Use</p> <ul data-bbox="440 142 1528 241" style="list-style-type: none"><li data-bbox="440 142 1528 178">40% Undeveloped – 2.5<li data-bbox="440 178 1528 214">50% Single-family residential to the south – 1.5<li data-bbox="440 214 1528 241">10% low volume dirt road to the north – 2.0 <p data-bbox="440 262 1528 298">Wetland Pre-Treatment</p> <ul data-bbox="440 298 1528 392" style="list-style-type: none"><li data-bbox="440 298 1528 333">50% Natural undeveloped area 2.5<li data-bbox="440 333 1528 369">25% Road no treatment 0.0<li data-bbox="440 369 1528 392">25% Vegetated buffer 1.5
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APPENDIX B

Photographs

Figure B1. RSA 1 sampling site.



Figure B2. RSA 1 sampling site.



Figure B3. RSA 2 sampling site.



Figure B4. RSA 2 sampling site.

