

Rice Creek

Methods

Study Area Analysis

The watershed containing the stream being assessed was analyzed using ESRI ArcGIS 10.2. Using this software with 2011 Hillsborough County aerial, Land Use/ Land Cover (LULC) and Watershed boundary layers courtesy of the Southwest Florida Water Management District, Landscape Development Intensity (LDI) Index values were calculated for each watershed following the procedures of Reiss & Brown 2012 (Reiss & Brown. 2012. Landscape Development Intensity (LDI) Index User's Manual. H.T. Odum Center for Wetlands, University of Florida. March 2012). According to Reiss and Brown "The LDI represents a human disturbance gradient for wetland systems. The LDI is an integrated measure of human activity, combining the effects from air and water pollutants, physical damage, changes in the suite of environmental conditions ... on the structure and processes of landscapes and ecosystems... Natural, undeveloped LU/LC classes have a LDI index value of zero. In the Florida framework, the maximum LDI index score is approximately 42."

Habitat/Vegetation Assessment

For small streams that are not easily navigated by Jonboat for bathymetric mapping and vegetation analysis, Hillsborough County requested the implementation of the Florida Department of Environmental Protection methods for Stream and River Habitat Assessment (FT 3100) (<http://www.dep.state.fl.us/water/sas/sop/sops.htm>) using forms FD 9000-3, FD 9000-4 and FD 9000-5, Rapid Periphyton Survey (FS 7230) using form FD 9000-25 and Linear Stream Vegetation Survey (FS 7320) using form FD 9000-32. These methods were utilized on two sampling locations on each stream, typically near access points along roadways.

Stream and River Habitat Assessment per FT3100 receives a score calculated in Form FD 9000-5. This score results from the ranking of the primary habitat components (substrate diversity, substrate availability, water velocity and habitat smothering) and secondary habitat components (Artificial channelization, bank stability, riparian buffer zone width and riparian zone vegetation quality). The maximum score possible in this method is a 160.

Two metrics are utilized in the Linear Vegetation Survey. The Mean Coefficient of Conservatism (CoC) applies a score of 0-10 to each species based on its ecological tolerances and fidelity to pre-settlement conditions. Species with higher scores show a high fidelity to native, undisturbed habitats and are typically sensitive to alterations. Available CoC scores can be obtained from LT 7000 from the Florida Department of Environmental Protection at: <http://www.dep.state.fl.us/water/sas/sop/sops.htm>. The Percent Florida Exotic Pest Plant Council (% FLEPPC) metric calculates the percent invasive exotics as the number of occurrences of FLEPPC Category I or II in the 100 m reach divided by the total number of taxa occurrences in the 100 m reach. The FLEPPC list can be found at: <http://www.fleppc.org/list/11list.html>

Stream Condition Index Assessment

The Stream Condition Index (SCI) was sampled per DEP SOP FS7420 and calculated per DEP SOP LT7200. The SCI consists of collecting macroinvertebrates via 20 D-frame dipnet sweeps (0.5 m in length) in the most productive habitats in a 100 m reach of stream. The organisms are sub-sampled, and identified to the lowest practical taxonomic level. The SCI is composed of ten metrics, eight of which decrease in response to human disturbance, with two metrics (% very tolerant and % dominant) increasing in response to human disturbance. According to DEP SOP LT 7000, the SCI score ranges and categories are: (68-100) Exceptional; (35-67) Healthy; and (0-34) Impaired. Proposed biological health assessment criteria state that a site is considered to meet designated uses if the average of the two most recent SCI scores is 40 or higher and neither of those scores is less than 35.

Water Quality Assessment

Physical water quality samples were taken using a Eureka Manta Sub-2 multiprobe pre and post calibrated daily. Measurements taken with this device include: depth, conductivity, pH, Dissolved Oxygen (mg/l and % Saturation) and salinity. Chemical water parameters were collected and preserved on ice by USF Water Institute staff and analyzed at the Environmental Protection Commission of Hillsborough County Laboratory. Analysis include; Chlorophyll (a, b, c, t and corrected), Alkalinity, Color, Fecal Coliform, Enterococci, Ammonia, Nitrates/Nitrites, Total Phosphorous, Kjeldahl Nitrogen and Total Nitrogen.

Study Area

Rice Creek is located south of the Alafia River in the town of Fishhawk, Hillsborough County Florida. The sample site selected for the study was located at Balm Riverview and was assessed on April 3, 2017. Rice Creek is located in FDEP WBID 1659 which contains 3,250 acres of land and drains into the Alafia River. The watershed surrounding Rice Creek is dominated by Residential (46.1%), Natural Land/Open Water (22.1%), and Field/Pasture (16.55%) land uses. The Landscape Development Intensity Index of the watershed is 5.36. The LDI value for the immediate 100 meter buffer around Rice Creek is 3.67 and dominated by Natural Land (44.17%), Residential (23.89%) and Cropland/Pastureland (16.08%).

Figure 1. 2017 Rice Creek at Balm Riverview Road Assessment Study Area Map



Habitat Assessment



Figure 2 Overview photograph of Rice Creek at Balm Riverview Road sample site

Rice Creek achieved a Habitat Assessment score of 122. Primary habitat components received optimal scores for Substrate Diversity and Habitat Smothering, a suboptimal score for Water Velocity, and a marginal score for Substrate Availability. Secondary habitat components received optimal scores for Artificial Channelization, Bank Stability and Riparian Buffer Zone Width (right bank), and received suboptimal scores for Riparian Buffer Zone Width (left bank) and Riparian Zone Vegetation Quality.

The major productive habitats found at the sample site were Snags (2.4%), Roots/Undercut Banks (0.7%), Leaf pack/mats (2.0%), and Rock (7.0%). The water velocity was measured at the zero meter mark and averaged 0.17m/s.

During the Rapid Periphyton Survey, periphyton was observed in 5 of the 99 individual grab samples performed, and two of these points were ranked 4-6. The average canopy cover in the 100 meter region was 83%. The Secchi Disk Depth was measured as 0.5m at the 50 meter mark. The average water depth at the time of the assessment was 1.14m.

Table 1 Linear Vegetation Survey Results – Rice Creek

[illegible]



Figure 3. Example of the shoreline conditions at Rice Creek at the time of the assessment

Stream Condition Index

The analysis of the SCI sample involves splitting the sample into 2 aliquots for analysis. The SCI metrics are then calculated on each separately. The final SCI score is an average of the two scores. The SCI score for Rice Creek was 52 out of a possible 100 points, corresponding with a “Healthy” designation, with the expected community of a healthy stream.

The summary of the metric scores for aliquot A (top) and aliquot B (bottom) are shown in Table 2. Both samples were dominated by *Microcylloepus spp.* Sample A contained 21 total taxa, including 1 sensitive taxa and 10.00% very tolerant individuals. Sample B contained 19 total taxa, including 2 sensitive taxa and 10.74% very tolerant individuals. Both samples contained a long-lived taxa *Corbicula spp.*

Table 2 SCI metric summaries for Rice Creek

	Raw Totals	SCI scores	Adjusted SCI scores
Total Taxa	21.00	2.50	2.50
Total Ephemeroptera	1.00	2.00	2.00
Total Trichoptera	1.00	1.43	1.43
% Filter Feeders	45.67	10.46	10.00
Total Clingers	3.00	4.29	4.29
Total Long-lived Taxa	1.00	3.33	3.33
% Dominance	17.33	9.33	9.33
% Tanytarsini	8.00	6.46	6.46
Total Sensitive Taxa	1.00	1.43	1.43
% Very Tolerant Individuals	10.00	5.76	5.76

SCI Sum	46.53
Final SCI score	51.70

	Raw Totals	SCI scores	Adjusted SCI scores
Total Taxa	19.00	1.67	1.67
Total Ephemeroptera	2.00	4.00	4.00
Total Trichoptera	2.00	2.86	2.86
% Filter Feeders	33.89	7.72	7.72
Total Clingers	4.00	5.71	5.71
Total Long-lived Taxa	1.00	3.33	3.33
% Dominance	31.54	6.49	6.49
% Tanytarsini	6.71	6.01	6.01
Total Sensitive Taxa	2.00	2.86	2.86
% Very Tolerant Individuals	10.74	5.59	5.59

SCI Sum	46.24
Final SCI score	51.38

The full results of the SCI sampling are shown in Table 3 (Sample A) and Table 4 (Sample B) for Rice Creek.

Rice Creek SCA

Stream Condition Index (SCI)

Samples Collected 1/4/03/2017

Project #: 0053170278

Stream Condition Index Results for Rice Creek SCA

Phylum	Class	Order	Family	Taxa	Abundance	Collapsed Abundance	Taxa Presence	Ephemeroptera Taxa	Trichoptera Taxa	50% Filterer	100% Filterer	Clinger Taxa	Long-lived Taxa	Dominant Taxa	Tandemini	Sensitive Taxa	Very Tolerant Individuals
Platyhelminthes				Platyhelminthes spp.	1	1	1	1									
Mollusca	Gastropoda	Hydrophila	Ancylidae	Ancylidae spp.	1	1	1	1									
Mollusca	Gastropoda	Hydrophila	Physidae	Physella zosteris	5	5	1										5
Mollusca	Gastropoda	Littoridinophila	Hydrobiidae	Hydrobiidae spp.	2	2	1										
Mollusca	Bivalvia	Veneroida	Corbiculidae	Corbicula spp.	14	14	1				14			1			
Arthropoda	Malacostraca	Amphipoda	Dogielinidae	Hyalella azteca sp. complex	2	2	1										
Arthropoda	Insecta	Ephemeroptera	Beetidae	Beetidae spp.	3												
Arthropoda	Insecta	Ephemeroptera	Beetidae	Beetis mercatoris	1	4	1	1									
Arthropoda	Insecta	Odonata	Ceraurionidae	Ceraurionidae spp.	1	1	1										
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Chamaelea spp.	25	25	1		1								
Arthropoda	Insecta	Coleoptera	Embiidae	Microgasterus spp.	26	26	1								26		
Arthropoda	Insecta	Coleoptera	Hydrophilidae	Tricosternus spp.	1	1	1										
Arthropoda	Insecta	Chironomidae	Tanytarsus spp.	Tanytarsus spp.	1	1	1			0.5						1	
Arthropoda	Insecta	Chironomidae	Polydora florum	Polydora florum	23	23	1										
Arthropoda	Insecta	Chironomidae	Polydora illoense group	Polydora illoense group	10	10	1										10
Arthropoda	Insecta	Chironomidae	Rhyacodrilus equus group	Rhyacodrilus equus group	11	11	1									11	
Arthropoda	Insecta	Chironomidae	Adiantum maloti	Adiantum maloti	1	1	1										
Arthropoda	Insecta	Chironomidae	Pentaneura inconspua	Pentaneura inconspua	1	1	1										
Arthropoda	Insecta	Chironomidae	Macrobodus spp.	Macrobodus spp.	1	1	1										
Arthropoda	Insecta	Chironomidae	Cricoidus or Ombodius	Cricoidus or Ombodius	1	1	1										
Arthropoda	Insecta	Ceratopogonidae	Adicopogon spp.	Adicopogon spp.	1	1	1										
Arthropoda	Insecta	Diptera	Simuliidae	Simuliidae spp.	18	18	1					18	1				1

Rice Creek SCB

Stream Condition Index (SCI)

Samples Collected 04/03/2017

Project #: 6033170278

Stream Condition Index Results for Rice Creek SCB

Phylum	Class	Order	Family	Taxa	Abundance	Collapsed Abundance	Taxa Presence	Epimeroptera Taxa	Trichoptera Taxa	50% Filterer	100% Filterer	Clinger Taxa	Long-lived Taxa	Dominant Taxa	Tentative	Sensitive Taxa	Very Tolerant
Armeida	Chealata	Phymatodidae	Gossypionidae	<i>Hebichia papilion</i>	1	1	1										1
Mollusca	Gastropoda	Hydrophila	Ancylidae	Ancylidae spp.	2	2	1										
Mollusca	Gastropoda	Hydrophila	Physidae	<i>Physella zuberis</i>	2	2	1										2
Mollusca	Bivalvia	Vermetida	Conchulidae	<i>Conchula</i> spp.	6	6	1				6		1				
Arthropoda	Malacostraca	Amphipoda	Dogielinidae	<i>Hyalella azteca</i> sp. complex	1	1	1										
Arthropoda	Insecta	Epimeroptera	Beetidae	Beetidae spp.	2	2	1	1									
Arthropoda	Insecta	Epimeroptera	Herpessidae	<i>Stenon</i> spp.	1	1	1	1				1					1
Arthropoda	Insecta	Onomata	Ctenarionidae	<i>Emilia</i> <i>occur</i>	1	1	1										1
Arthropoda	Insecta	Onomata	Coleopteryidae	<i>Coleptery</i> spp.	3	3	1	1									
Arthropoda	Insecta	Trichoptera	Lepidoptera	<i>Oreus</i> spp.	1	1	1	1									
Arthropoda	Insecta	Trichoptera	Hydroptilidae	<i>Chenopodys</i> spp.	18	18	1	1			18	1					
Arthropoda	Insecta	Coleoptera	Emiliae	<i>Mercurius</i> spp.	47	47	1								47		
Arthropoda	Insecta	Diptera	Chironomidae	<i>Chironomus</i> spp.	1	1	1			0.5						1	
Arthropoda	Insecta	Diptera	Chironomidae	<i>Polypellum</i> <i>laum</i>	19	19	1										
Arthropoda	Insecta	Diptera	Chironomidae	<i>Polypellum</i> <i>lineare</i> group	12	12	1										12
Arthropoda	Insecta	Diptera	Chironomidae	<i>Rhyacodonta</i> <i>enigmas</i> group	9	9	1				9	1					9
Arthropoda	Insecta	Diptera	Chironomidae	<i>Pentaneura</i> <i>incognita</i>	5	5	1										
Arthropoda	Insecta	Diptera	Chironomidae	<i>Corynura</i> spp.	1	1	1										
Arthropoda	Insecta	Diptera	Simuliidae	<i>Simulium</i> spp.	17	17	1				17	1					1

Water Quality Assessment

Limited long-term water quality data is available for this tributary to the Alafia River. The data that is available was collected by the Hillsborough County Environmental Protection Commission from 2005 to present. This assessment, which took place during March of 2017, occurred near the end of the dry season. As such the input of water from surrounding uplands and wetlands was greatly reduced. Values for the 2017 USF Water Institute Assessment fall within the range of the previous data collections. Table 5 provides a summary of the Physical/Chemical conditions recorded at the sample site.

Table 5 Rice Creek Physical Water Quality (Field)

Rice Creek at Balm Riverview Road								
Date	Depth (m)	T (°C)	pH	DO mg/L	DO Sat %	Cond. (UMHO/cm)	Salinity (ppt)	Secchi Depth (m)
5/11/2017	0.25	22.54	8.12	8.38	95.9	300	0.14	0.5 Visible on Bottom
Mean POR		21.75	7.41	7.61	86	290		

The chemical water quality analysis for Rice Creek is shown in Table 6 along with mean values for the period of record for available parameters. Total Phosphorous values were below the nutrient region threshold developed by FDEP of 0.49 mg/l for both the most recent sample and the mean value of the period of record (2005 – 2012). Total Nitrogen values were below the nutrient region threshold developed by FDEP of 1.65 mg/l for both most current and period of record (2005-2012) values. Chlorophyll-a corrected values fall within the site specific evaluation range of 3.2 µg/l to 20 µg/l for the most recent sample, but below this threshold for the period of record (2005-2012). For sites with Chlorophyll-a values in this range, the assessment is inconclusive of conditions reflecting an imbalance in flora. The results of bacterial sampling show contamination in both the current sample and the long term dataset.

Table 6 Rice Creek Water Quality (Laboratory)

Rice Creek		
Parameter	Balm Riverview Road	Period of Record Mean
Ammonia	0.036 mg/L	0.084 mg/L
Nitrates/Nitrites	0.320 mg/L	No Data
Kjeldahl Nitrogen	0.635 mg/L	0.905 mg/L
Total Nitrogen	0.955 mg/L	1.383 mg/L
Total Phosphorous	0.183 mg/L	0.238 mg/L
Alkalinity	54.0 mg/LCaCO ₃	No Data
Chlorophyll - a	3.0 ug/L	2.76 ug/L
Chlorophyll - a Corrected	4.7 ug/L	2.26 ug/L
Color	56.7 Pt/Co	63.79 Pt/Co
Fecal Coliform	2,100 #/100 ml	2,934 #/100ml
Enterococci	5,300 #/100 ml	2,800 #/100ml

Conclusion

The Alafia River Tributary that was assessed during this study does not show impairment based on water quality alone although the bacteria sampling indicates a stressed and potentially contaminated system. The system does show impairment in the vegetation communities through the linear vegetation survey results with a high percentage of non-native invasive species. The habitat assessment performed on the sample site shows suitable habitat for macroinvertebrates with a Habitat Assessment score of 122. The SCI score of 52 indicates a healthy macroinvertebrate community.

Table 5 Summary of Water Quality, Floristic Surveys and Habitat Assessments

Measure		Balm Riverview Road	Threshold
Total Phosphorous (mg/l)		0.183	< 0.49
Total Nitrogen (mg/l)		0.955	< 1.65
RPS (% Rank 4-6)		2%	< 25%
LVS	Avg C of C	1.31	≥ 2.5
	FLEPPC %	75.00%	< 25%
Chlorophyll (µg/l)		4.7	< 20 µg/l
Habitat Assessment		122	> 34
SCI		52	> 34