Slomans Branch 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.

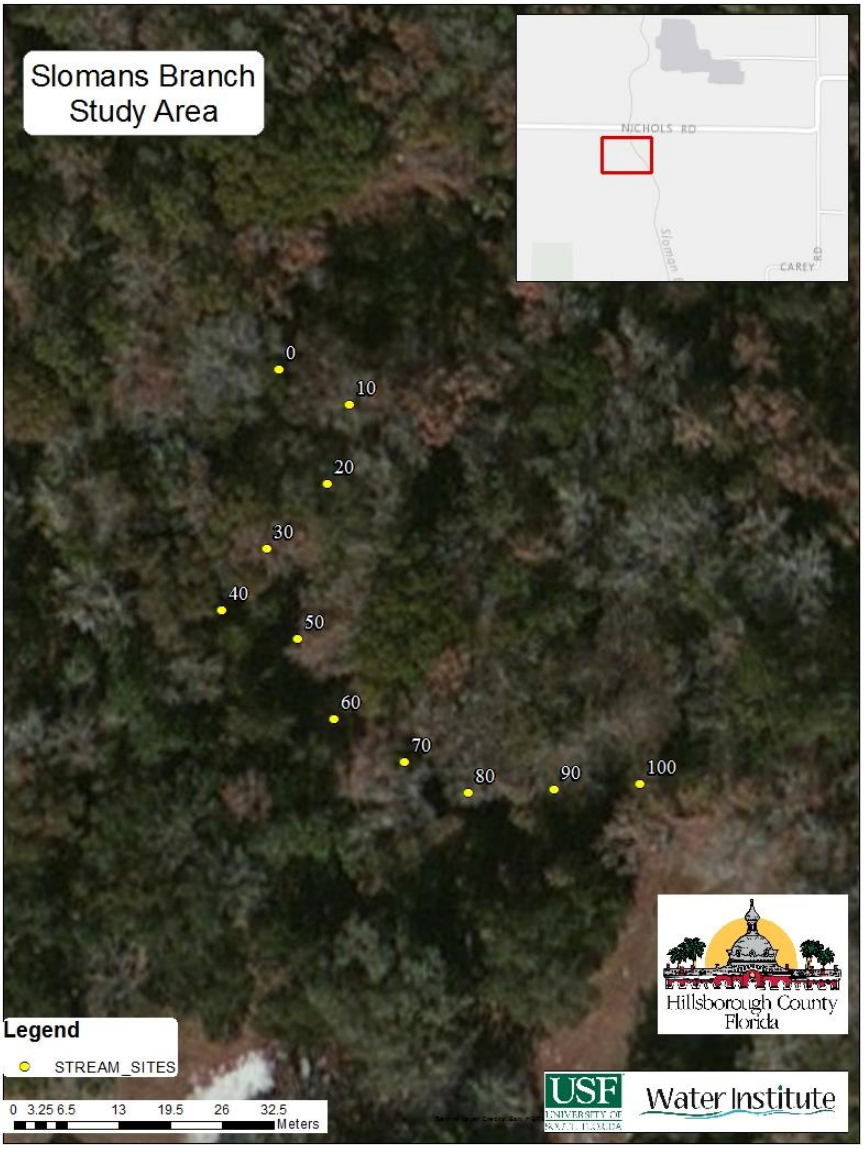
Water Quality Assessment

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

Slomans Branch Creek is located south of the North Prong of the Alafia River near the border of Polk County and Hillsborough County, Florida. The sample site selected for the study was located upstream of the Nichols Road Bridge and was assessed on May 8, 2017. Slomans Branch Creek is located in FDEP WBID 1642 which contains 1,223 acres of land. Slomans Branch Creek drains into the North Prong of the Alafia River north of Pritcher Road. The watershed surrounding Slomans Branch is dominated by Residential (47.18%), Natural Land/Open Water (20.05%) and Agriculture/Cropland and Pastureland (12.18%) land uses. The Landscape Development Intensity Index of the watershed is 4.56. The LDI of the 100 meter buffer around Slomans Branch Creek was 2.48 including 67.67% Natural Land, 19.32% Residential, and 9.55% Agriculture/ Cropland and Pastureland.

Figure 1. 2017 Slomans Branch Creek Assessment Study Area Map



Habitat Assessment

Figure 2 Overview photograph of Slomans Branch Creek sample site

Slomans Branch received a Habitat Assessment score of 101 primarily due to high scores in the secondary habitat components. Primary habitat components received a suboptimal score for Habitat Smothering, a marginal score for Water Velocity, and poor scores for Substrate Diversity and Substrate Availability. Secondary habitat components received optimal scores for Artificial Channelization, Bank Stability, and Riparian Buffer Zone Width (left bank), and received suboptimal scores for Riparian Buffer one Width (right bank) and Riparian Zone Vegetation Quality.

One major productive habitat was found at the sample site (3.5% Snags). Minor Habitats included Roots/ undercut banks (1.9%), Leaf Packs (1.8%) and Rock (0.75%) with the remainder classified as sand and shell rubble. The water velocity was measured at the 90 meter mark and averaged 0.07m/s.

During the Rapid Periphyton Survey, periphyton was not observed in the 99 individual grab samples performed. The average canopy cover in the 100 meter region was 86%. The Secchi Disk Depth

was measured as 0.25 at the 50 meter mark. The average water depth at the time of the assessment was .25m.

The Linear Vegetation Survey identified 5 species rooted in the water at the time of the assessment. One of these species*, Colocasia esculenta*, is classified as non-native, invasive species. The remaining 6 species are native to this region. The vegetation community along this sample location showed some evidence of frequent disturbance due to wild hogs. There were a total of 23 species observations in the 100 meter study area. The mean Coefficient of Conservatism (CoC) metric for the study area was 1.75 and the % FLEPPC metric for the study area was 9%.

Table 1 Linear Vegetation Survey Results – Slomans Branch Creek

Plant Species	Sample Site										Obsevations/ Species	CoC
	0-10m	10-20m	20-30m	30-40m	40-50m	50-60m	60-70m	70-80m	80-90m	90-100m		
Cicuta maculata										1	1	4.54
Colocasia esculenta	1	1									2	0
Commelina diffusa			1	1	1				1		4	2.02
Hydrocotyle umbellata	1	1		1	1	1	1	1	1	1	9	1.92
Sambucus nigra	1	1	1		1		1		1	1	7	1.48
Observations/station	3	3	2	2	3	1	2	1	3	3	23	
Total Observations	23											
Mean CoC	1.75											
% FLEPPC	9%											

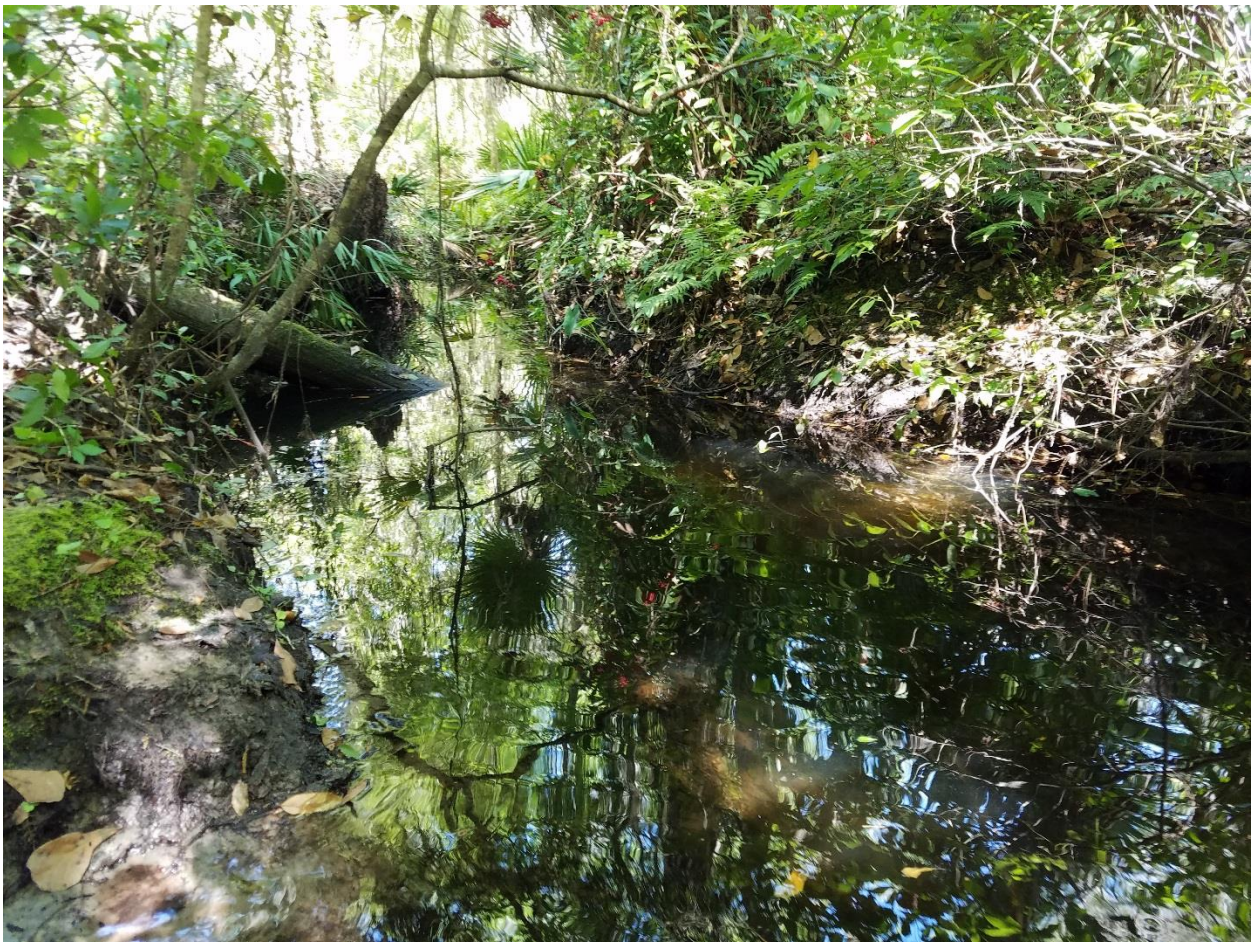


Figure 3. Typical conditions of Slomans Branch Creek at the time of the assessment

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 Slomans Branch Creek was 33 out of a possible 100 points, corresponding with an "Impaired" designation, with disruption to 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 20 total taxa, including 2 sensitive taxa and 25.17% very tolerant individuals. Sample A also contained 2 long-lived taxa *Corbicula spp* and *Cambaridae spp.* Sample B contained 24 total taxa, including 3 sensitive taxa and 30.52% very tolerant individuals. Sample B also contained a long-lived taxa *Corbicula spp.*

Table 2 SCI metric summaries for Slomans Branch Creek

	Raw Totals	SCI scores	Adjusted SCI scores
Total Taxa	20.00	2.08	2.08
Total Ephemeroptera	0.00	0.00	0.00
Total Trichoptera	2.00	2.86	2.86
% Filter Feeders	10.20	2.21	2.21
Total Clingers	1.00	1.43	1.43
Total Long-lived Taxa	2.00	6.67	6.67
% Dominance	30.61	6.68	6.68
% Tanytarsini	0.00	0.00	0.00
Total Sensitive Taxa	2.00	2.86	2.86
% Very Tolerant Individuals	25.17	3.59	3.59

SCI Sum	28.37
Final SCI score	31.52

	Raw Totals	SCI scores	Adjusted SCI scores
Total Taxa	24.00	3.75	3.75
Total Ephemeroptera	0.00	0.00	0.00
Total Trichoptera	3.00	4.29	4.29
% Filter Feeders	9.42	2.03	2.03
Total Clingers	2.00	2.86	2.86
Total Long-lived Taxa	1.00	3.33	3.33
% Dominance	31.82	6.44	6.44
% Tanytarsini	0.65	1.47	1.47
Total Sensitive Taxa	3.00	4.29	4.29
% Very Tolerant Individuals	30.52	3.12	3.12

SCI Sum	31.57
Final SCI score	35.08

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

Slomans Branch SCIA

Stream Condition Index (SCI)

Samples Collected 05/08/2017

Project #: 6063170278

Stream Condition Index Results for Slomans Branch SCIA

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	Tanytarsini	Sensitive Taxa	Very Tolerant Individuals
Mollusca	Gastropoda	Hygrophila	Ancylidae	Ancylidae spp.	8	8	1										
Mollusca	Gastropoda	Hygrophila	Physidae	*Physella cubensis*	4	4	1										4
Mollusca	Gastropoda	Littorinimorpha	Hydrobiidae	*Amnicola dalli*	7	7	1										
Mollusca	Gastropoda		Thiaridae	*Melanoides tuberculata*	32	32	1										32
Mollusca	Bivalvia	Veneroida	Corbiculidae	*Corbicula* spp.	2	2	1				2		1				
Arthropoda	Malacostraca	Isopoda	Asellidae	*Caecidotea* spp.	6	6	1									1	
Arthropoda	Malacostraca	Amphipoda	Dogielinotidae	*Hyalella azteca* sp. complex	10	10	1										
Arthropoda	Malacostraca	Decapoda	Cambaridae	Cambaridae spp.	1	1	1						1				
Arthropoda	Insecta	Odonata	Coenagrionidae	Coenagrionidae spp.	1	1	1										
Arthropoda	Insecta	Trichoptera	Leptoceridae	*Triaenodes* spp.	2												
Arthropoda	Insecta	Trichoptera	Leptoceridae	*Triaenodes ignitus*	1	3	1		1							1	
Arthropoda	Insecta	Trichoptera	Hydropsychidae	*Cheumatopsyche* spp.	13	13	1		1		13	1					
Arthropoda	Insecta	Coleoptera	Elmidae	*Microcylloepus* spp.	45	45	1							45			
Arthropoda	Insecta	Coleoptera	Scirtidae	*Scirtes* spp.	6	6	1										
Arthropoda	Insecta	Diptera	Chironomidae	*Polypedilum flavum*	1	1	1										
Arthropoda	Insecta	Diptera	Chironomidae	*Polypedilum illinoense* group	1	1	1										1
Arthropoda	Insecta	Diptera	Chironomidae	*Polypedilum fallax* group	1	1	1										
Arthropoda	Insecta	Diptera	Chironomidae	*Pentaneura inconspicua*	2	2	1										
Arthropoda	Insecta	Diptera	Chironomidae	*Corynoneura* spp.	1	1	1										
Arthropoda	Insecta	Diptera	Ceratopogonidae	*Atrichopogon* spp.	1	1	1										
Arthropoda	Insecta	Diptera	Tipulidae	Tipulidae spp.	2	2	1										

Table 3 SCI full results for Sample A

Slomans Branch SCIB
Stream Condition Index (SCI)
Samples Collected 05/08/2017
Project #: 6063170278

Stream Condition Index Results for Slomans Branch SCIB

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	Tanytarsini	Sensitive Taxa	Very Tolerant Individuals
Nemertea	Enopla	Hoplonemertea	Tetrastemmatidae	*Prostoma* spp.	1	1	1										1
Annelida	Clitellata	Tubificida	Naididae	Tubificinae spp.	2	2	1										
Annelida	Clitellata	Lumbriculida	Lumbriculidae	*Lumbriculus* cf. *variegatus*	2	2	1										2
Mollusca	Gastropoda			Gastropoda spp.	4												
Mollusca	Gastropoda	Hygrophila	Ancylidae	Ancylidae spp.	7												
Mollusca	Gastropoda	Hygrophila	Ancylidae	*Laevapex fuscus*	2	9	1										9
Mollusca	Gastropoda	Hygrophila	Physidae	*Physella cubensis*	1	1	1										1
Mollusca	Gastropoda	Littorinimorpha	Hydrobiidae	*Amnicola dalli*	7	11	1										
Mollusca	Gastropoda		Thiaridae	*Melanoides tuberculata*	30	30	1										30
Mollusca	Bivalvia	Veneroida	Sphaeriidae	Sphaeriidae spp.	2	2	1				2						
Arthropoda	Malacostraca	Isopoda	Asellidae	*Caecidotea* spp.	6	6	1									1	
Arthropoda	Malacostraca	Amphipoda	Dogielinotidae	*Hyalella azteca* sp. complex	10	10	1										
Arthropoda	Insecta	Odonata	Calopterygidae	*Calopteryx dimidiata*	2	2	1										
Arthropoda	Insecta	Odonata	Aeshnidae	*Boyeria vinosa*	1	1	1						1				
Arthropoda	Insecta	Trichoptera	Leptoceridae	*Triaenodes ignitus*	1	1	1		1							1	
Arthropoda	Insecta	Trichoptera	Hydropsychidae	*Cheumatopsyche* spp.	11	11	1		1		11	1					
Arthropoda	Insecta	Trichoptera	Hydroptilidae	*Neotrichia* spp.	1	1	1		1			1					
Arthropoda	Insecta	Coleoptera	Elmidae	*Dubiraphia* spp.	2	2	1										
Arthropoda	Insecta	Coleoptera	Elmidae	*Microcylloepus* spp.	49	49	1							49			
Arthropoda	Insecta	Diptera	Chironomidae	*Tanytarsus* spp.	1	1	1			0.5					1		
Arthropoda	Insecta	Diptera	Chironomidae	*Polypedilum illinoense* group	4	4	1										4
Arthropoda	Insecta	Diptera	Chironomidae	*Tribelos jucundum*	1	1	1									1	
Arthropoda	Insecta	Diptera	Chironomidae	*Pentaneura inconspicua*	3	3	1										
Arthropoda	Insecta	Diptera	Chironomidae	*Stenochironomus* spp.	1	1	1										
Arthropoda	Insecta	Diptera	Ceratopogonidae	*Atrichopogon* spp.	2	2	1										
Arthropoda	Insecta	Diptera	Psychodidae	*Pericoma* or *Telmatoscopus spp.*	1	1	1				1						

Table 4 SCI full results for Sample B

Water Quality Assessment

Long-term water quality data is not available for this tributary to the North Prong Alafia River. This assessment, which took place during May of 2017, occurred near the end of the dry season. As such the input of water from surrounding uplands and wetlands was greatly reduced. Table 5 provides a summary of the Physical/Chemical conditions recorded at the sample site.

Table 5 Slomans Branch Creek Physical Water Quality (Field)

Slomans Branch Creek at Nichols Road								
Date	Depth (m)	T (ºC)	pH	DO mg/L	DO Sat %	Cond. (UMHO/cm)	Salinity (ppt)	Secchi Depth (m)
5/8/2017	0.17	22.95	8.97	7.59	87.5	251.2	0.12	0.25 VOB

The chemical water quality analysis for Slomans Branch Creek is shown in Table 6. Total Phosphorous values were above the nutrient region threshold developed by FDEP of 0.49 mg/l for the most recent sample. Total Nitrogen values were below the nutrient region threshold developed by FDEP of 1.65 mg/l for most current. 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. For sites with Chlorophyll-a values in this range, the assessment is inconclusive of conditions reflecting an imbalance in flora.

Table 6 Slomans Branch Creek Water Quality (Laboratory)

Slomans Branch Creek		
Parameter	Nichols Road	Units
Alkalinity	82.0	mg/LCaCO3
Nitrates/Nitrites	0.475	mg/L
Fecal Coliform	1600	#/100 ml
Enterococci	2800	#/100 ml
Chlorophyll a	20.4	ug/L
Chlorophyll b	5.8	ug/L
Chlorophyll c	3.6	ug/L
Chlorophyll t	29.8	ug/L
Chlorophylla Corr	8.3	ug/L
Chlorophyll-pheo	20.1	ug/L
Ammonia	0.063	mg/L
Kjeldahl Nitrogen	0.294	mg/L
Total Nitrogen	0.769	mg/L
Total Phosphorus	0.685	mg/L
Color(345)F.45	23.4	Pt/Co

Conclusion

The North Prong Alafia River tributary that was assessed during this study shows elevated phosphorous concentrations at the time of the assessment. Bacteria sampling indicates a stressed and potentially contaminated system with high values for Fecal Coliform and Enterococci. The system also shows some impairment in the vegetation communities through the linear vegetation survey results with a low mean Coefficient of Conservatism. The habitat assessment performed on the sample site shows suitable conditions for macroinvertebrates with Habitat Assessment score of 101. The Macroinvertebrate Community sampled during the SCI showed some disruption with an average score of 33.

Table 7 Summary of Water Quality, Floristic Surveys and Habitat Assessments

Measure		Nichols Road	Threshold
Total Phosphorous (mg/l)		0.685	< 0.49
Total Nitrogen (mg/l)		0.769	< 1.65
RPS (% Rank 4-6)		0	< 25%
LVS	Avg C of C	1.75	≥ 2.5
	FLEPPC %	9.00%	< 25%
Chlorophyll (µg/l)		8.3	< 20 µg/l
Habitat Assessment		101	> 34
SCI		33	> 34