

# Alafia River South Prong West Branch

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## Methods

### Study Area Analysis

The watershed containing the stream being assessed was analyzed using ESRI ArcGIS 10.2. Using this software with 2016 Hillsborough County aerial, 2011 Land Use/ Land Cover (LULC) and Watershed boundary (WBID) layers courtesy of the Florida Department of Environmental Protection. The Landscape Development Intensity Index (LDI) was calculated for the WBID containing the stream. From FDEP “The Landscape Development Intensity index (LDI) is an estimate of how much humans have altered an area of interest around a waterbody. Various land use types (low density residential, row crops, industrial and natural) are assigned coefficients of land use intensity based on estimates of the amount of human energy that is put into those land use types. The LDI is calculated by multiplying each land use coefficient by the percentage of the area of interest occupied by that land use, and then summing the results. The Florida Department of Environmental Protection (DEP) uses the LDI as a tool to estimate potential land use impacts on streams, lakes, and wetlands. LDI values less than two ( $\leq 2$ ) can be considered minimally disturbed.” 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

Alafia River South Prong West Branch is located north of Lithia Pinecrest Road near Keyville road in Hillsborough County Florida was sampled on 4/27/17. The sampling site is located off of Lithia Pinecrest Road and lies within the FDEP WBID 1652, which contains 2,273 acres of land. The watershed surrounding West Branch is dominated by Residential (26.65%), Agriculture/Pasture (6.03%), Forest/Natural (23.19%) land uses. The Landscape Development Intensity Index of the watershed is 4.88. The LDI was also calculated for the 100 meter buffer around the stream in the WBID to capture the land use that has the largest potential to alter the stream. The buffer LDI value was 2.85 and was dominated by Residential (24.13%), Agriculture/Pasture (5.3%), Forest/Natural (65.99%) land uses.

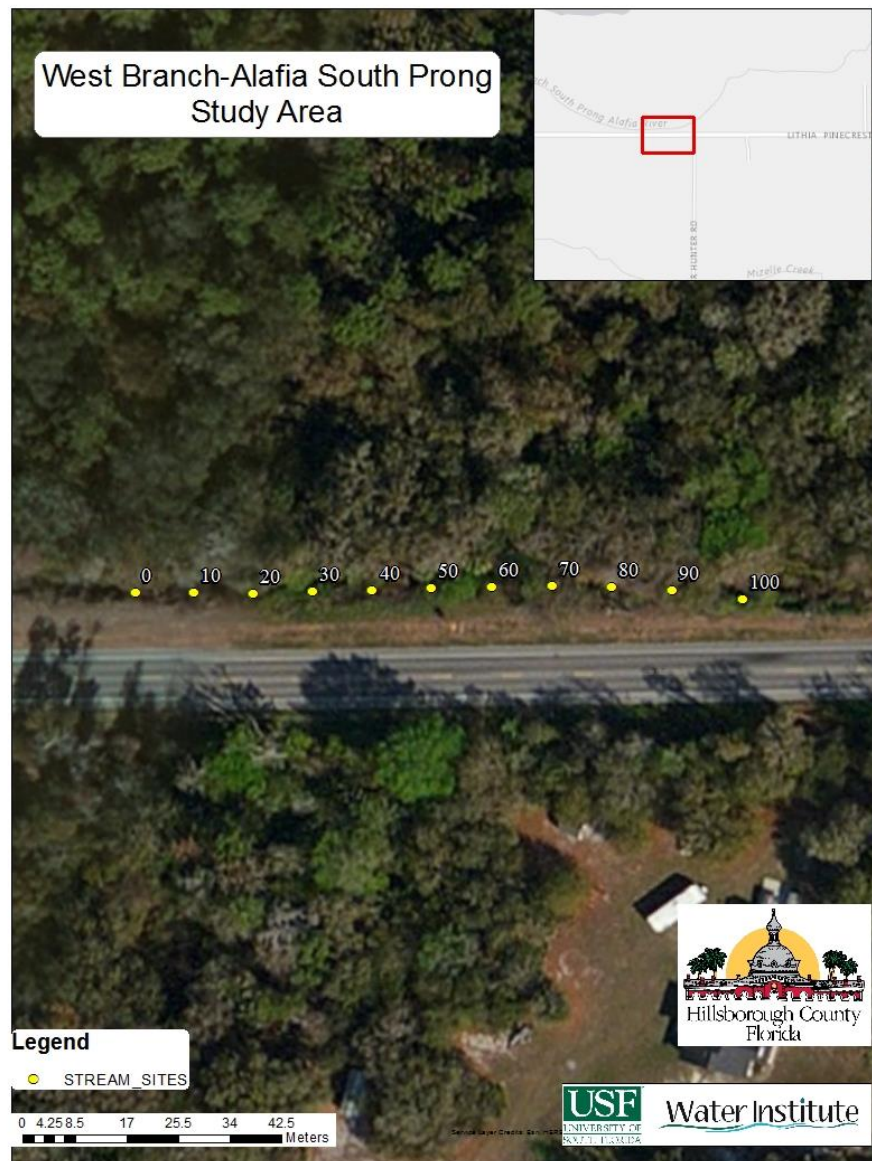


Figure 1. 2017 Alafia River South Prong West Branch Assessment Study Area Map



## Habitat Assessment



**Figure 2 Overview photograph of Alafia River South Prong West Branch sample site**

West Branch at Lithia Pinecrest Road received a suboptimal Habitat Assessment score of 96. Primary habitat components received suboptimal scores for Water Velocity and Habitat Smothering, and a marginal score Substrate Diversity. Substrate Availability (2.6% Snags, 2.6% Roots/undercut banks) scored in the poor category. Secondary habitat components received optimal scores for Bank Stability and Riparian Buffer Zone Width (left Bank) while suboptimal scores were recorded for Artificial Channelization and Riparian Zone Vegetation Quality (Left Bank). Marginal scores were observed for Riparian Zone Vegetation Quality (Right Bank) and Poor scores were observed for Riparian Buffer Zone Width (right Bank)

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 96.54%. The Secchi Disk Depth was measured as 0.4 meters visible on bottom at the 10 meter mark. The average water depth at the time of the assessment was 0.15 meters.

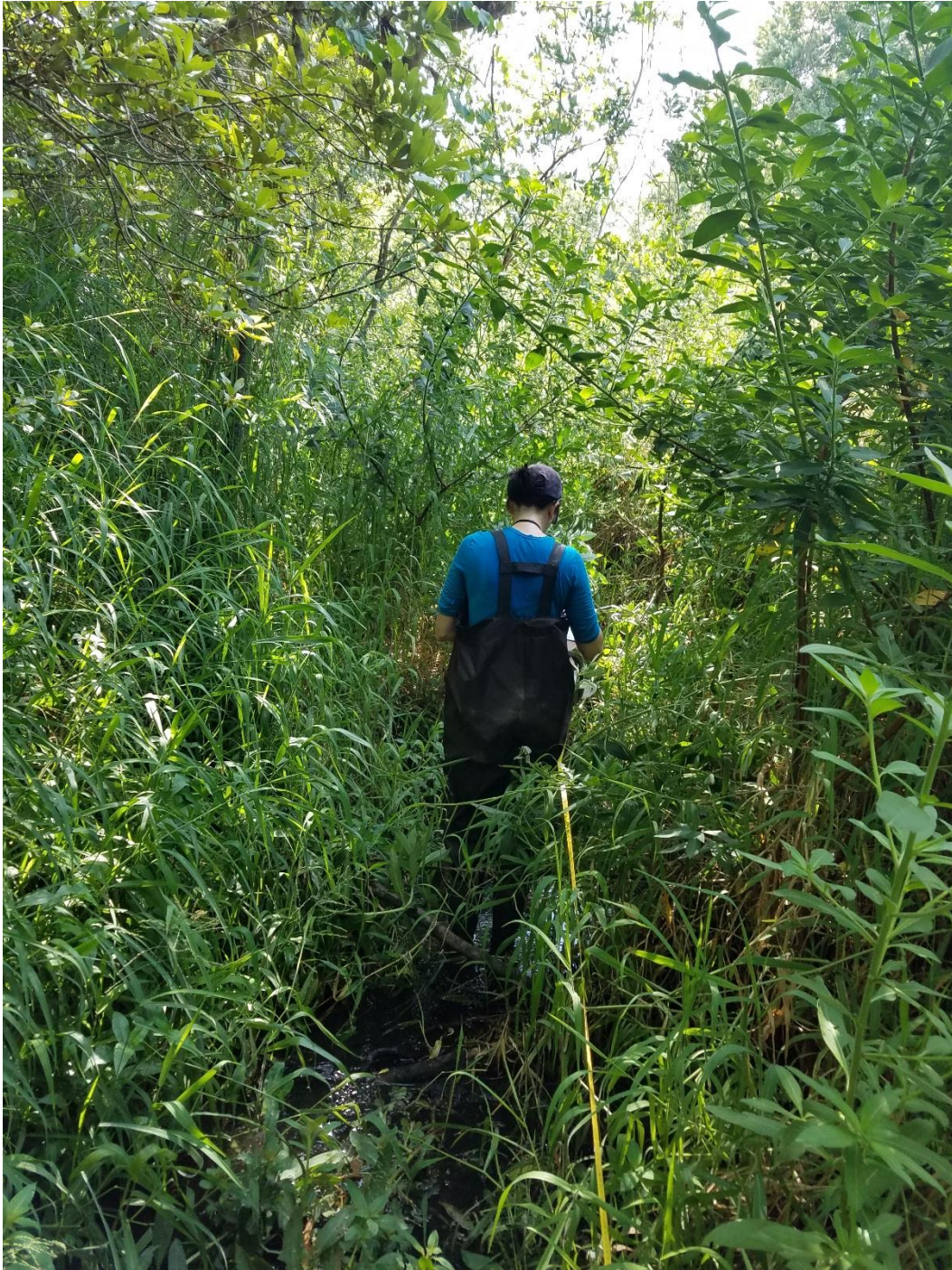
The Linear Vegetation Survey identified 9 species rooted in the water at the time of the assessment. Two of these species are non-native, invasive species (*Ludwigia peruviana* and *Urochloa mutica*). *Urochloa mutica* was identified as being a dominant species between the 30 and 50 meter marks. The vegetation community along this sample location showed some evidence of frequent disturbance resulting in the dominance by pioneering species. There were a total of 34 species observations in the 100 meter study area. The mean Coefficient of Conservatism (CoC) metric for the study area was 1.99 and the % FLEPPC metric for the study area was 26.5%.

### Table 1 Linear Vegetation Survey Results

[illegible]



Figure 3. *Urochola mutica* and *Ludwigia peruviana* along the banks of West Branch



## 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 West Branch was 56 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 *Cheumatopsyche spp.* Sample A contained 28 total taxa, including 1 sensitive taxa and 20.69% very tolerant individuals. Sample B contained 27 total taxa, including 3 sensitive taxa and 32.47% very tolerant individuals. Both samples contained a long-lived taxa *Corbicula spp.*

Table 2 SCI metric summaries for West Branch

	Raw Totals	SCI scores	Adjusted SCI scores
Total Taxa	28.00	5.42	5.42
Total Ephemeroptera	1.00	2.00	2.00
Total Trichoptera	3.00	4.29	4.29
% Filter Feeders	26.90	6.09	6.09
Total Clingers	4.00	5.71	5.71
Total Long-lived Taxa	1.00	3.33	3.33
% Dominance	21.38	8.52	8.52
% Tanytarsini	6.90	6.08	6.08
Total Sensitive Taxa	1.00	1.43	1.43
% Very Tolerant Individuals	20.69	4.06	4.06

SCI Sum	46.93
Final SCI score	52.15

	Raw Totals	SCI scores	Adjusted SCI scores
Total Taxa	27.00	5.00	5.00
Total Ephemeroptera	1.00	2.00	2.00
Total Trichoptera	5.00	7.14	7.14
% Filter Feeders	35.06	7.99	7.99
Total Clingers	5.00	7.14	7.14
Total Long-lived Taxa	1.00	3.33	3.33
% Dominance	26.62	7.48	7.48
% Tanytarsini	9.09	6.80	6.80
Total Sensitive Taxa	3.00	4.29	4.29
% Very Tolerant Individuals	32.47	2.97	2.97

SCI Sum	54.14
Final SCI score	60.16

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



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### Table 3 SCI full results for Sample A

[illegible]



[illegible]

## Water Quality Assessment

Limited long-term water quality data is available for West Branch. The data that is available was collected by the Hillsborough County Environmental Protection Commission. Values for the physical water parameters begin in 2005 and continue through present. Values for the laboratory water parameters begin in 2005 but end in 2013, aside from the sample taken along with this assessment. 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 site.

Table 5 West Branch Physical Water Quality (Field)

West Branch								
Date	Depth (m)	Temp (°C)	pH	DO (mg/L)	DO (% Sat)	Cond (UMHO/cm)	Salinity (PPT)	Secchi Depth (m)
4/27/17	0.12	23.61	7.92	7.51	87.7	278	0.13	0.4
Mean POR		25.43	7.28	7.56	86.39	275.8	0.13	

The chemical water quality analysis for West Branch is shown in Table 6 along with mean values for the period of record for available parameters. Period of record mean and the sample for this assessment for Total Phosphorous values were below the nutrient region threshold developed by FDEP of 0.49 mg/L with a mean value of 0.465 mg/L (2005-2012). Total Phosphorous values for the sample from this assessment were 0.371 mg/L. Total Nitrogen values for the period of record were above the nutrient region threshold developed by FDEP of 1.65 mg/L with a mean value of 2.940 mg/L. The Total Nitrogen value from the assessment was well below the threshold with a concentration of 0.371 mg/L. Chlorophyll-a values fall within the acceptable value range with a period of record mean value of 1.67 ug/L.

**Table 6 West Branch Water Quality (Laboratory)**

Parameter	Howell Branch	POR Mean	Units
Alkalinity	65.0		mg/LCaCO <sub>3</sub>
Nitrates/Nitrites	0.004		mg/L
Fecal Coliform	233	773	#/100 ml
Enterococci	1,260	1,493	#/100 ml
Chlorophyll a	1.2	2.19	ug/L
Chlorophyll b	2.6	0.47	ug/L
Chlorophyll c	0.5	0.17	ug/L
Chlorophyll t	1.7		ug/L
Chlorophylla Corr	3.4	1.67	ug/L
Chlorophyll-pheo	6.6		ug/L
Ammonia	0.006	0.059	mg/L
Kjeldahl Nitrogen	0.133	0.721	mg/L
Total Nitrogen	0.137	2.940	mg/L
Total Phosphorus	0.371	0.465	mg/L
Color(345)F.45	14.9	30.22	Pt/Co

## Conclusion

Alafia River south Prong West Branch at Lithia Pinecrest Road is located with some buffer of natural, undeveloped land surrounding it. The stream itself showed moderate alterations to the stream flow, buffer and banks in the region assessed. At the time of the habitat assessment, the water levels were low, corresponding to the end of the dry season, however sufficient habitat for macroinvertebrates was observed. Due to these factors, the Habit Assessment resulted in a Suboptimal score of 96. Some disruption to the vegetation community was observed in the results of the Linear Vegetation Survey with West Branch not meeting either metric for Average Coefficient of Conservatism or the Percent FLEPPC. The historical water quality record for West Branch showed elevated concentrations of Total Nitrogen and Bacteria. The results of the SCI sampling indicate that the stream is



not impaired based on the macroinvertebrate community. Table 7 Summarizes the results of the nutrient sampling, floristic sampling, habitat assessment and SCI.

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

Measure		Lithia Pinecrest Road	Mean POR	Threshold
Total Phosphorous (mg/l)		0.371	0.465	< 0.49
Total Nitrogen (mg/l)		0.137	2.94	< 1.65
RPS (% Rank 4-6)		0		< 25%
LVS	Avg C of C	1.99		≥ 2.5
	FLEPPC %	26.50%		< 25%
Chlorophyll (µg/l)		3.4	1.67	< 20 µg/l
Habitat Assessment		96		> 34
SCI		56		> 34