Sweetwater Creek

STREAM HABITAT ASSESSMENT, STREAM CONDITIONS INDEX, LINEAR VEGETATION SURVEY, RAPID PERIPHYTON SURVEY AND WATER QUALITY

David Eilers, Liliana Sikes, Seth Curtin, Elizabeth Brauer | USF Water Institute | April 1, 2021

Methods

STUDY AREA ANALYISIS

The watershed containing the stream being assessed was analyzed using ESRI ArcGIS 10.2. Using this software with 2020 Hillsborough County aerial, 2017 Land Use/ Land Cover (LULC) and Waterbody ID (WBID) layers courtesy of the Florida Department of Environmental Protection (FDEP). The Landscape Development Intensity Index (LDI) was calculated for the WBID containing the stream. From FDEP (https://floridadep.gov/dear/bioassessment/content/bioassessment-ldi-hdg-bcg) "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 FDEP uses the LDI as a tool to estimate potential land use impacts on streams, lakes, and wetlands. LDI values less than two (≤ 2) can be considered minimally disturbed." In the Florida framework, the maximum LDI index score is approximately 42.

HABITAT AND 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 FDEP 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 (LVS). 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 Table LVI 1000-1 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 in FDEP LVI 1000-1.

STREAM CONDITION INDEX ASSESSMENT

The Stream Condition Index (SCI) was sampled and calculated per DEP SOP SCI 1000. . 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 SCI 1000, the SCI scores greater than 35 are considered healthy. Proposed biological health assessment criteria state that a WBID is considered to meet designated uses if the average of the two most recent SCI scores is 40 or higher and neither of the most recent 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 Hillsborough County Public Utilities Laboratory. Analysis include; Chlorophyll (a, b, c, t and corrected), Alkalinity, Color, E. Coli, Enterococci, Ammonia, Nitrates/Nitrites, Total Phosphorous, Kjeldahl Nitrogen and Total Nitrogen. Results will be discussed in the Florida Department of Environmental Protection's Numeric Nutrient Criteria framework and combined with the monthly sampling from the Hillsborough County Environmental Protection Commission Monthly sampling data.

Study Area

Sweetwater Creek is located in northwestern Hillsborough County in the Old Tampa Bay Watershed. Its headwaters are located in Lake Magdalene. The outfall of Sweetwater Creek is in Old Tampa Bay. The assessment of Sweetwater Creek was conducted on April 1, 2021. At the time of the assessment, the water levels were high for the dry season. The Sweetwater Creek WBID covers 12.87 square miles and is dominated by residential (52.2%), natural (13.4%) and commercial (11.1%) land uses. The resulting calculated landscape development intensity index score was 6.88.

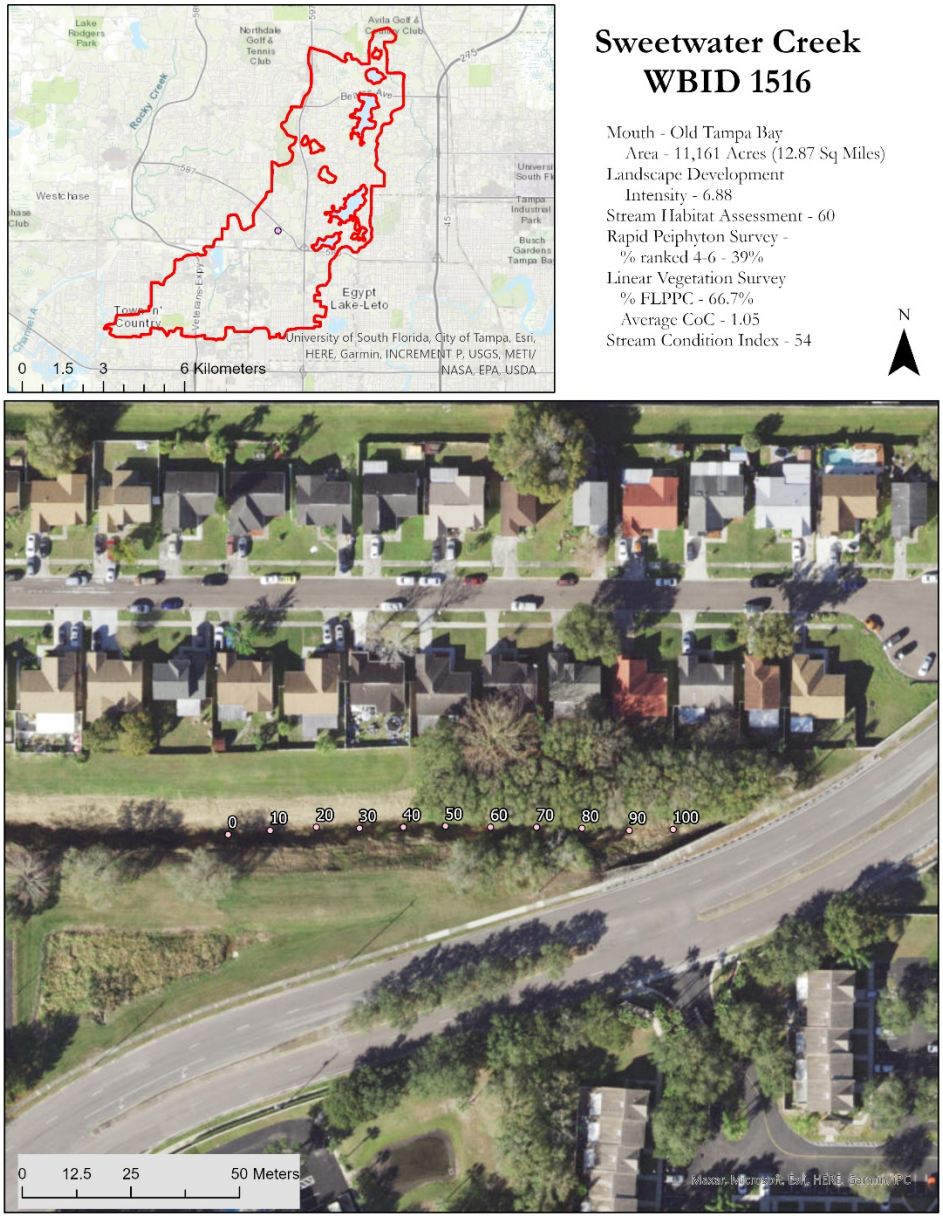

Figure 1 2021 Sweetwater Creek Study Area Map

Figure 2 Overview photograph of the Sweetwater Creek Sample Site showing the typical habitat features of the study area

Habitat and Vegetation Assessment

The region of Sweetwater Creek where the assessment was conducted is in a residential region downstream from the Mullis City Way Bridge. The region was sparsely shaded with a mean canopy cover measurement of 18.4%. Sweetwater Creek averaged 0.29 meters in depth, approximately 3.75 meters wide with a flow of 0.13 m/s.

The primary habitat components of the FDEP Habitat Assessment focus on in-water habitat. The primary habitat components score in the suboptimal category for Water Velocity (0.13 m/s). Substrate Diversity (Presence of two major productive habitats (rocks, submerged aquatic vegetation)), Substrate Availability (11.7% of stream are productive habitats) and Habitat Smothering (insufficient pools and many of the productive habitats were affected by sand smothering) were scored as marginal. Minor habitats included sand and silt deposits. The total score for the primary habitat components was a 37 out of 80.

The secondary habitat components of the FDEP Habitat Assessment focus on the surrounding features of the stream. The secondary habitat components scored in the marginal category for Artificial Channelization (clear lack of sinuosity) and Bank Stability (both banks with raw eroded areas and high banks). Riparian Zone Vegetation Quality (both banks showing high levels of disturbance shown in the species present) and Riparian Buffer Zone Width (both banks with than 6 meters of buffer). The secondary habitat components received a score of 23 out of 80. The resulting FDEP Habitat Assessment score was a 60.

Table 1 Scoring Summary for the Stream Habitat Assessment

Metric	Score
Primary Habitat Components	
Substrate Diversity	8
Substrate Availability	8
Water Velocity	12
Habitat Smothering	9
Primary Score	**37**
Secondary Habitat Components	
Artificial Channelization	6
Bank Stability - Right Bank	5
Bank Stability - Left Bank	4
Riparian Buffer Zone Width - Right Bank	2
Riparian Buffer Zone Width - Left Bank	2
Riparian Zone Vegetation Quality - Right Bank	2
Riparian Zone Vegetation Quality - Left Bank	2
Secondary Score	**23**
Habitat Assessment Score	**60**

Periphyton was encountered during the 99 samples taken during the Rapid Periphyton Survey. 39% of periphyton samples were classified as ranks 4-6 (> 6mm - > 10cm). The tree canopy in the assessment area averaged 18.4% allowing ample light for periphyton to flourish.

The FDEP Linear Vegetation Survey encountered significant herbaceous species rooted in Sweetwater Creek at the time of the assessment. The vegetation in Sweetwater Creek was dominated by *Hygrophila polysperma* and *Myriophyllum aquaticum*, both non-native invasive species. The resulting metrics for the Linear Vegetation Survey were 1.05 for average coefficient of conservatism and 66.7% for % FLEPPC, both exceeding the thresholds set by FDEP indicating an imbalance in flora.

Table 1 Linear Vegetation Survey Results – Sweetwater Creek

Taxa Name	C of C Score	Sample Site										Total Occurrences
		0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	
Hygrophila polysperma	0	1	1	1	1	C	D	D	D	D	D	10
Alternanthera philoxeroides	0	1	1	1	1	1	1		1	1	1	9
Limnophila sessiliflora	0	1		1	1	1	1	1	1	1	1	9
Myriophyllum aquaticum	0.98	D	D	D	D	C	1		1	1	1	9
Rumex verticillatus	3.17	1	1	1	1	1					1	6
Juncus marginatus	1.5	1	1	1	1	1						5
Colocasia esculenta	0				1	1					1	3
Polygonum glabrum	4.5			1		1			1			3
Polygonum hydropiperoides	2.5		1	1							1	3
Sphagneticola trilobata	0					1	1	1				3
Urochloa mutica	0		1	1	1							3
Bacopa monnieri	3.5	1	1									2
Ludwigia octovalvis	2	1								1		2
Commelina diffusa	2.02		1									1
Cyperus odoratus	3										1	1
Hydrilla verticillata	0									1		1
Ludwigia erecta	2.55										1	1
Typha	1										1	1

Figure 3 Rock and submerged aquatic vegetation were the most abundant major productive habitats in Sweetwater Creek.

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 Sweetwater Creek was 54 out of a possible 100 points, corresponding with a "Category 2 Healthy" designation, with noticeable loss of taxonomic diversity from the expected community of a healthy stream. The most recent previous SCI for Sweetwater Creek at this location was conducted on 1/2/2018 with a score of 55. Both 2021 subsamples contained moderate total taxa with 24 taxa in subsample A and 26 in subsample B.

High scores (scores above 7.0) were achieved for the % Dominance (both samples) and % Very Tolerant Individuals (Sample B). Low scores (less than 3.0) were achieved for the Total Sensitive Taxa in both subsamples. The full results of the SCI sampling are shown in Table 3 (Sample A) and Table 4 (Sample B) for Sweetwater Creek.

Table 2 SCI metric summaries for Sweetwater Creek Sample A (top) and Sample B (bottom)

SCI Metric	Raw Totals	SCI scores	Adjusted SCI scores
Total Taxa	24.00	3.75	3.75
Total Ephemeroptera	2.00	4.00	4.00
Total Trichoptera	3.00	4.29	4.29
% Filter Feeders	16.88	3.76	3.76
Total Clingers	4.00	5.71	5.71
Total Long-lived Taxa	1.00	3.33	3.33
% Dominance	20.00	8.80	8.80
% Tanytarsini	3.13	4.17	4.17
Total Sensitive Taxa	1.00	1.43	1.43
% Very Tolerant Individuals	5.63	7.02	7.02

SCI Sum	46.26
Final SCI score	51.40

SCI Metric	Raw Totals	SCI scores	Adjusted SCI scores
Total Taxa	26.00	4.58	4.58
Total Ephemeroptera	2.00	4.00	4.00
Total Trichoptera	3.00	4.29	4.29
% Filter Feeders	20.38	4.58	4.58
Total Clingers	3.00	4.29	4.29
Total Long-lived Taxa	2.00	6.67	6.67
% Dominance	23.57	8.09	8.09
% Tanytarsini	7.01	6.12	6.12
Total Sensitive Taxa	1.00	1.43	1.43
% Very Tolerant Individuals	7.64	6.36	6.36

SCI Sum	50.39
Final SCI score	55.99

Table 3 SCI full results for Sample A

Stream Condition Index Results for Sweetwater @ Mullis SCIA

Phylum	Subphylum	Class	Subclass	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	Specimen Notes
Annelida		Clitellata	Oligochaeta	Tubificida	Naididae	Tubificinae spp.	4		0	0	0	0	0	0	0		0	0	0	Damaged and/or immature
Annelida		Clitellata	Oligochaeta	Tubificida	Naididae	*Limnodrilus hoffmeisteri*	3	7	1	0	0	0	0	0	0		0	0	7	
Mollusca		Gastropoda				Gastropoda spp.	1	1	1	0	0	0	0	0	0		0	0	0	Damaged, no shell, maybe Physa acuta?
Mollusca		Gastropoda	Caenogastropoda	Littorinimorpha	Amnicolidae	*Amnicola dalli*	25	25	1	0	0	0	0	0	0		0	0	0	
Mollusca		Gastropoda	Heterobranchia	Hygrophila	Ancylidae	Ancylidae spp.	2	2	1	0	0	0	0	0	0		0	0	0	Damaged
Mollusca		Bivalvia	Autobranchia	Venerida	Cyrenidae	*Corbicula* spp.	5	5	1	0	0	0	5	0	1		0	0	0	4 in oversized vial
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Hyalellidae	*Hyalella azteca* sp. complex	3	3	1	0	0	0	0	0	0		0	0	0	MX1 dissected; damaged/not H. wakulla
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Hyalellidae	*Hyalella wakulla*	4	4	1	0	0	0	0	0	0		0	0	0	MX1 dissected
Arthropoda	Hexapoda	Insecta	Pterygota	Ephemeroptera	Baetidae	Baetidae spp.	1		0	0	0	0	0	0	0		0	0	0	Like B. intercalaris
Arthropoda	Hexapoda	Insecta	Pterygota	Ephemeroptera	Baetidae	*Acerpenna pygmaea*	1	1	1	1	0	0	0	0	0		0	1	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Ephemeroptera	Baetidae	*Baetis intercalaris*	22	23	1	1	0	0	0	0	0		0	0	0	MAND dissected as needed
Arthropoda	Hexapoda	Insecta	Pterygota	Odonata	Coenagrionidae	Coenagrionidae spp.	1	1	1	0	0	0	0	0	0		0	0	0	Early instar; possibly Argia
Arthropoda	Hexapoda	Insecta	Pterygota	Trichoptera	Hydropsychidae	Hydropsychidae spp.	5		0	0	1	0	0	1	0		0	0	0	Immature
Arthropoda	Hexapoda	Insecta	Pterygota	Trichoptera	Hydropsychidae	*Cheumatopsyche* spp.	11	16	1	0	1	0	16	1	0		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Trichoptera	Hydroptilidae	*Hydroptila* spp.	10	10	1	0	1	0	0	1	0		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Coleoptera	Elmidae	*Microcylloepus* spp.	6	6	1	0	0	0	0	0	0		0	0	0	Larvae = 7
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	*Polypedilum scalaenum* group	1	1	1	0	0	0	0	0	0		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	*Polypedilum flavum*	32	32	1	0	0	0	0	0	0		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	*Polypedilum illinoense* group	2	2	1	0	0	0	0	0	0		0	0	2	
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	*Rheotanytarsus* spp.	5	5	1	0	0	0	5	1	0		5	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	*Ablabesmyia mallochi*	2	2	1	0	0	0	0	0	0		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	*Dicrotendipes* spp.	2	2	1	0	0	1	0	0	0		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	*Pentaneura inconspicua*	4	4	1	0	0	0	0	0	0		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	*Thienemanniella xena*	1	1	1	0	0	0	0	0	0		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	*Cricotopus* or *Orthocladius*	3	3	1	0	0	0	0	0	0		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Lepidoptera	Crambidae	Crambidae spp.	1		0	0	0	0	0	0	0		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Lepidoptera	Crambidae	Acentropinae spp.	1	2	1	0	0	0	0	0	0		0	0	0	Immature, Paraponyx or Neargyractis
Arthropoda	Chelicerata	Arachnida	Acari	Trombidiformes	Hygrobatidae	*Hygrobates* spp.	2	2	1	0	0	0	0	0	0		0	0	0	One without palps but same as one with palps intact

Table 4 SCI full results for Sample B

Stream Condition Index Results for Sweetwater @ Mullis SCIB

Phylum	Subphylum	Class	Subclass	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	Specimen Notes
Platyhelminthes						Platyhelminthes spp.	1	1	1	0	0	0	0	0	0		0	0	0	
Annelida		Clitellata	Oligochaeta	Tubificida	Naididae	Tubificinae spp.	4		0	0	0	0	0	0	0		0	0	0	Damaged and/or immature
Annelida		Clitellata	Oligochaeta	Tubificida	Naididae	*Limnodrilus hoffmeisteri*	2	6	1	0	0	0	0	0	0		0	0	6	
Annelida		Clitellata	Hirudinida	Rhynchobdellida	Glossiphoniidae	Glossiphoniidae spp.	1	1	1	0	0	0	0	0	0		0	0	1	Immature
Mollusca		Gastropoda	Caenogastropoda	Littorinimorpha	Amnicolidae	*Amnicola dalli*	23	23	1	0	0	0	0	0	0		0	0	0	
Mollusca		Gastropoda	Caenogastropoda	Littorinimorpha	Hydrobiidae	*Pyrgophorus platyrachis*	1	1	1	0	0	0	0	0	0		0	0	1	
Mollusca		Gastropoda	Heterobranchia	Hygrophila	Ancylidae	Ancylidae spp.	1		0	0	0	0	0	0	0		0	0	0	Damaged/immature
Mollusca		Gastropoda	Heterobranchia	Hygrophila	Ancylidae	*Hebetancylus excentricus*	1	2	1	0	0	0	0	0	0		0	0	2	
Mollusca		Gastropoda	Caenogastropoda		Thiaridae	*Melanoides tuberculata*	1	1	1	0	0	0	0	0	0		0	0	1	
Mollusca		Bivalvia	Autobranchia	Venerida	Cyrenidae	*Corbicula* spp.	1	1	1	0	0	0	1	0	1		0	0	0	
Mollusca		Bivalvia	Autobranchia	Sphaeriida	Sphaeriidae	*Musculium* spp.	1	1	1	0	0	0	1	0	0		0	0	0	
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Hyalellidae	*Hyalella azteca* sp. complex	5	5	1	0	0	0	0	0	0		0	0	0	MX1 dissected; damaged/not H. wakulla
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Hyalellidae	*Hyalella wakulla*	2	2	1	0	0	0	0	0	0		0	0	0	MX1 dissected
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Decapoda	Cambaridae	Cambaridae spp.	1	1	1	0	0	0	0	0	1		0	0	0	Juvenile
Arthropoda	Hexapoda	Insecta	Pterygota	Ephemeroptera	Baetidae	*Acerpenna pygmaea*	1	1	1	1	0	0	0	0	0		0	1	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Ephemeroptera	Baetidae	*Baetis intercalaris*	16	16	1	1	0	0	0	0	0		0	0	0	MAND dissected as needed
Arthropoda	Hexapoda	Insecta	Pterygota	Odonata		Anisoptera spp.	1	1	1	0	0	0	0	0	0		0	0	0	Early instar
Arthropoda	Hexapoda	Insecta	Pterygota	Trichoptera	Leptoceridae	*Oecetis* spp.	1	1	1	0	1	0	0	0	0		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Trichoptera	Hydropsychidae	*Cheumatopsyche* spp.	20	20	1	0	1	0	20	1	0		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Trichoptera	Hydroptilidae	*Hydroptila* spp.	7	7	1	0	1	0	0	1	0		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Coleoptera	Elmidae	*Microcylloepus* spp.	5	5	1	0	0	0	0	0	0		0	0	0	Larvae = 3, Adults = 2
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	Chironomidae spp.	1		0	0	0	0	0	0	0		0	0	0	Pupa = 1
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	Tanytarsini spp.	1		0	0	0	0	0	0	0		0	0	0	Damaged
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	*Tanytarsus* spp.	1	2	1	0	0	1	0	0	0		2	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	*Polypedilum flavum*	36	37	1	0	0	0	0	0	0		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	*Polypedilum illinoense* group	1	1	1	0	0	0	0	0	0		0	0	1	
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	*Rheotanytarsus* spp.	9	9	1	0	0	0	9	1	0		9	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	*Pentaneura inconspicua*	6	6	1	0	0	0	0	0	0		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Lepidoptera	Crambidae	Acentropinae spp.	5	5	1	0	0	0	0	0	0		0	0	0	Immature, Paraponyx or Neargyractis
Arthropoda	Chelicerata	Arachnida	Acari	Trombidiformes	Hygrobatidae	*Hygrobates* spp.	1	1	1	0	0	0	0	0	0		0	0	0	

Water Quality Assessment

Long-term water quality data is available for Sweetwater Creek. The data that is available was collected by the Hillsborough County Environmental Protection Commission, USGS, FDEP and Lakewatch. Values for the physical water parameters begin in 1965 and continue through 2021. Values for the laboratory water parameters begin in 1970 through 2021. The 2021 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 Sweetwater Creek Physical Water Quality (Field)

Sweetwater Creek								
Date	**Depth (m)**	**Temp (°C)**	**pH**	**DO (mg/L)**	**DO (% Sat)**	**Cond (UMHO/cm)**	**Salinity (PPT)**	**Secchi Depth (m)**
4/1/2021	0.15	23.41	6.86	4.63	53.8	343.4	0.16	0.3
Mean POR	0.25	23.15	6.96	3.55	54.9	305.5	0.17	0.32

The chemical water quality analysis for Sweetwater Creek is shown in Table 6 along with mean values for the period of record for available parameters. The previous 3-year geometric mean values for Total Phosphorous values were below the nutrient region threshold developed by FDEP of 0.12 mg/L with a geometric mean value of 0.081 mg/L (2019), 0.116 mg/L (2020) and 0.104 mg/L (2021). Total Phosphorous values for the sample from this assessment were 0.068 mg/L. Total Nitrogen values were below the nutrient region threshold developed by FDEP of 1.54 mg/L for the previous three year period with a mean value of 0.662 mg/L (2019), 0.574 mg/L (2020) and 0.808 mg/L (2021). The Total Nitrogen value from the assessment was below the threshold with a concentration of 0.800 mg/L. Chlorophyll-a corrected values fall below the site specific evaluation range of 3.2 µg/l to 20 µg/l for the most recent 3-years of samples (4.27 µg/l in 2019, 2.52 µg/l in 2020, 1.84 µg/l in 2021). For sites with Chlorophyll-a values in this range, the assessment is indicating conditions reflecting a balance in flora.

An elevated biomass of the bacterial parameters was observed in the 3-year dataset with E. Coli having a geometric mean of 165.1 colonies/100 ml, 600.4/100 ml for Enterococci.

Table 6 Sweetwater Creek Water Quality (Laboratory)

Parameter	Sweetwater Creek 4/26/2021	POR Mean (1970-2021)	Units
Alkalinity	79.4	50.7	mg/LCaCO3
Color(345)F.45	50	38.2	Pt/Co
E. Coli	53.0	165.4	#/100 ml
Enterococci	411	640.2	#/100 ml
Chlorophyll a	5.8	5.57	ug/L
Chlorophyll b	1.0	1.33	ug/L
Chlorophyll c	1.0	1.11	ug/L
Chlorophyll t	5.80	N/A	ug/L
Chlorophylla Corr	1.0	5.02	ug/L
Chlorophyll-pheo	9.10	N/A	ug/L
Ammonia	< 0.073	0.052	mg/L
Kjeldahl Nitrogen	0.698	0.685	mg/L
Total Nitrogen	0.800	0.804	mg/L
Nitrates/Nitrites	0.098	0.056	mg/L
Total Phosphorus	< 0.068	0.093	mg/L

Conclusion

Sweetwater Creek at Millis City Way is located in a predominantly residential area. At the time of the habitat assessment, the water levels were high for dry season, however sufficient habitat for macroinvertebrates was observed. Due to these factors, the Habit Assessment resulted in a marginal score of 60. Disruption to the vegetation community was observed in the results of the Linear Vegetation Survey with Sweetwater Creek exceeding the % FLEPPC and mean coefficient of conservatism metrics. Sweetwater Creek also exceeded the metrics for the rapid periphyton survey with 39% of samples being ranked between 4 and 6 due to the sparse canopy coverage in the region and ample nutrients. The recent water quality record for Sweetwater Creek showed concentrations of Chlorophyll-a corrected, Total Phosphorous and Total Nitrogen below the FDEP thresholds. The results of the SCI sampling indicate that the stream is "healthy" 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		Sweetwater Creek	2019	2020	2021	Threshold
Total Phosphorous (mg/l)		0.068	0.081	0.116	0.104	< 0.49
Total Nitrogen (mg/l)		0.800	0.662	0.574	0.808	< 1.65
RPS (% Rank 4-6)		39%				< 25%
LVS	**Avg C of C**	1.05				≥ 2.5
	FLEPPC %	66.67%				< 25%
Chlorophyll-a Corrected (µg/l)		1.0	4.27	2.52	1.85	< 20 µg/l
Habitat Assessment		60				> 34
SCI		54				> 34