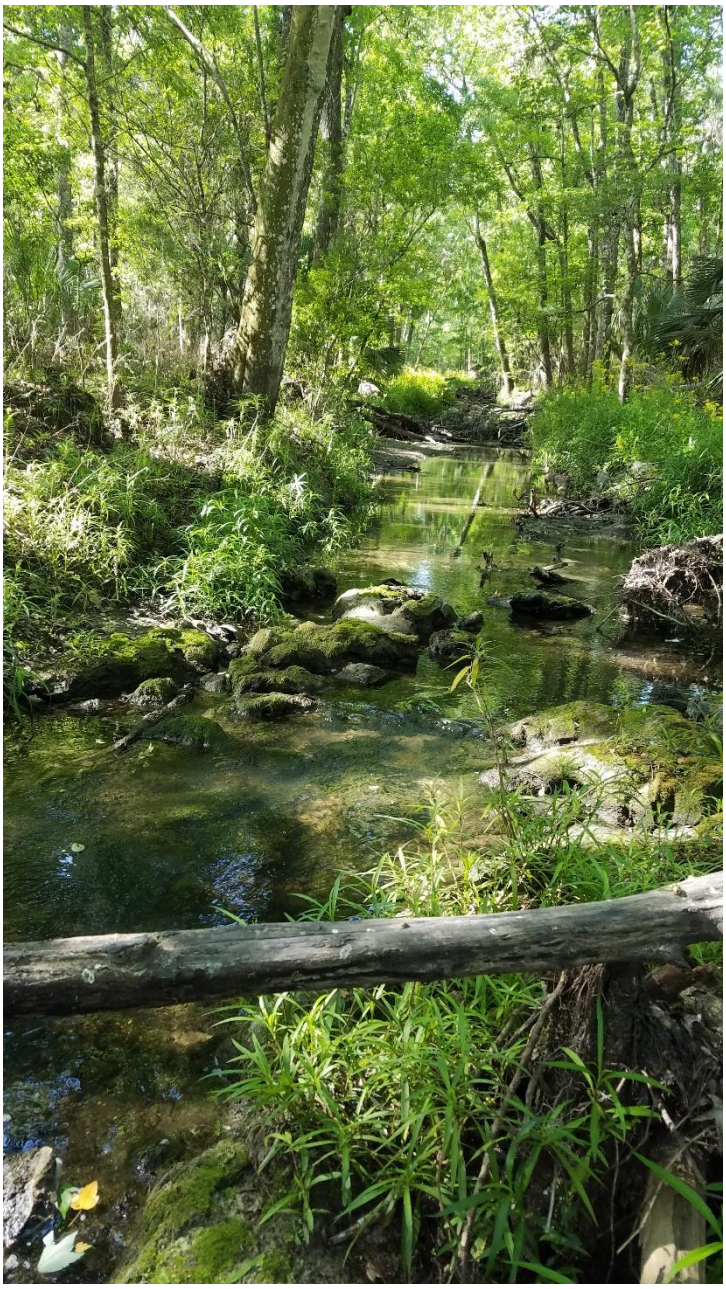

East Canal

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

David Eilers | USF Water Institute | March 31, 2018

Methods

STUDY AREA ANALYISIS

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 (≤ 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 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, E. Coli, Enterococci, Ammonia, Nitrates/Nitrites, Total Phosphorous, Kjeldahl Nitrogen and Total Nitrogen.

Study Area

East Canal is located in north eastern Hillsborough County. Its headwaters are located near Collins St S in Plant City and the outfall of East Canal is in Itchepackesassa Creek. The assessment of East Canal was conducted on March 31, 2018. At the time of the assessment, the water levels were average for the dry season. The Landscape Development Intensity Index for the East Canal WBID 1518 was 4.6. The land use was 29.5% Residential, 26.1 % agricultural, 23.8% Natural and 5.2% Commercial.

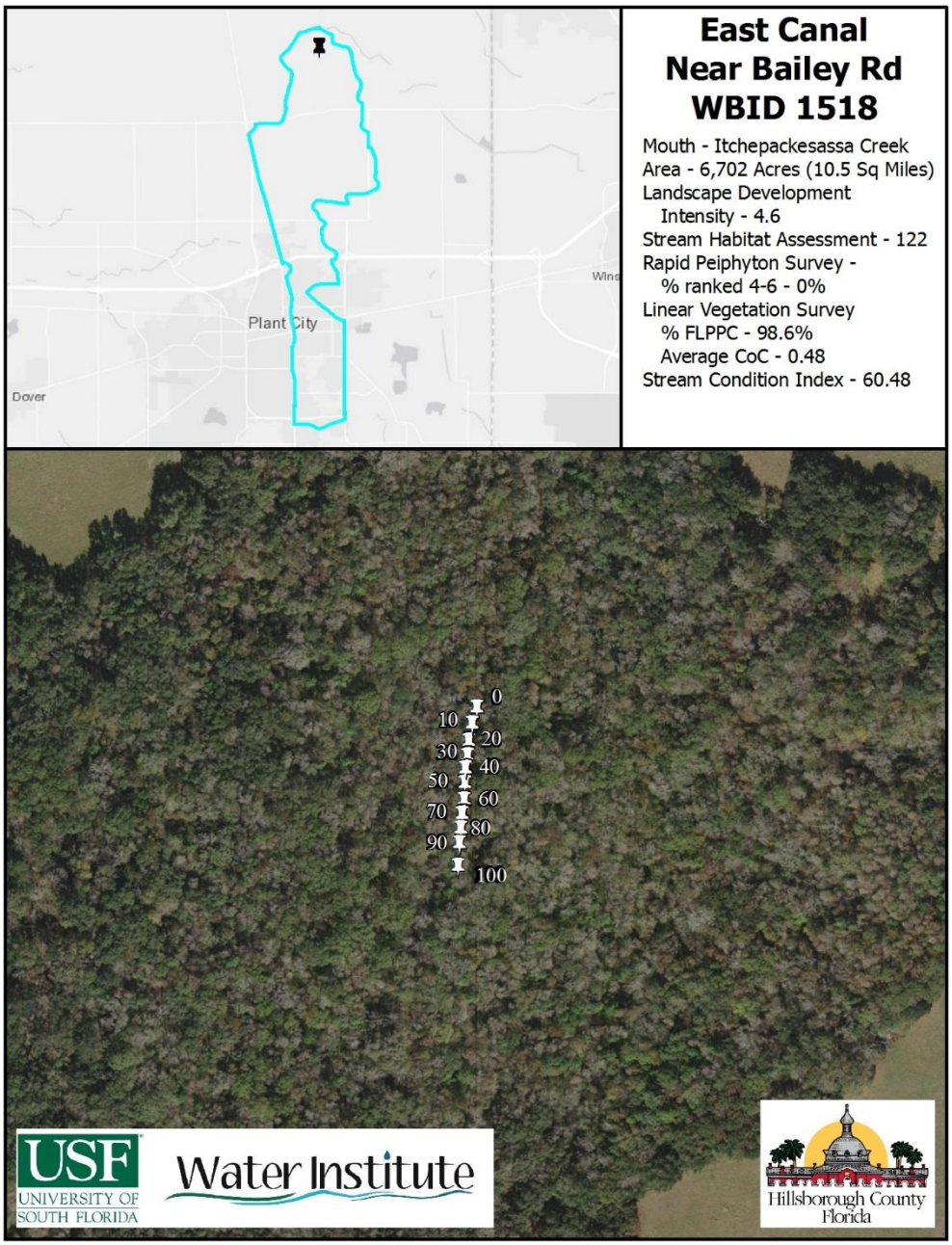

Figure 1 2018 East Canal Study Area Map

Habitat and Vegetation Assessment

Figure 2 Overview photograph of East Canal near Bailey Road Sample Site

The region of East Canal where the assessment was conducted is on Hillsborough County Preserve land with an active cattle lease. Fences were in place to prevent livestock from being within 50 meters of the stream. The region was heavily shaded with a mean canopy cover measurement of 92%. East Canal averaged 0.3 meters in depth, approximately 3.25 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 optimal category for substrate diversity and substrate availability. 18.6% of the surface area of the assessment region occupied by major

productive habitat (7.2% Macrophytes, 5.6% Snags, 4.2% Rock and 1.6% Roots. Minor habitats included leaf packs, sand and silt. Suboptimal scores were achieved for water velocity (0.13 m/s) and Habitat Smothering due to >25% of habitats affected by sedimentation. The total score for the primary habitat components was a 60 out of 80.

The secondary habitat components of the FDEP Habitat Assessment focus on the surrounding features of the stream. East canal has been intensively straightened and channelized in the past but sufficient time has passed for the surrounding vegetation to return. The secondary habitat components scored in the optimal category for Bank Stability, Riparian Buffer Width and Riparian Zone Vegetation Quality. The banks passed all 3 requirements in the assessment region with few raw eroded areas. The riparian buffer zone surrounding the stream was greater than 18 meters on both banks and consisted of mostly native vegetation. The vegetation in the stream itself was dominated by non-native invasive species likely from an upstream source. Marginal scores were achieved for Artificial Channelization due to the time that has elapsed since the channelization of East Canal occurred. The main flow channel has developed some sinuosity inside the constructed banks. The secondary habitat components received a score of 62 out of 80. The resulting FDEP Habitat Assessment score was a 122.

The FDEP Rapid Periphyton Survey did not encounter periphyton during the assessment in part due to the heavy canopy in the study area.

The FDEP Linear Vegetation Survey showed the aquatic vegetation was dominated by non-native invasive species with Hydrilla being present in all 10 regions and dominant in 4 regions where it covered as much as 50% of the stream. Ruellia was also common in each region. The mean Coefficient of Conservatism for the assessment was 0.48 and the Percent FLEPPC metric was 92.59%.

Table 1 Linear Vegetation Survey Results – East Canal near Bailey Rd

Taxa Name	C of C Score	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	Total Occurrences
Hydrilla verticillata	0	1	d	1	1	d	d	d	1	1	1	10
Ruellia simplex	0	1	1	1	1	1	1	1	1	1	1	10
Colocasia esculenta	0				1	1	1			1	1	5
Osmunda cinnamomea	6.44								1		1	2
Observations/station		2	2	2	3	3	3	2	3	3	4	27
Total Observations	27											
Mean CoC	0.48											
% FLEPPC	93%											

Figure 3 Picture of the aquatic vegetation on East Canal with Hydrilla shown in the foreground

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 East Canal was 60.48 out of a possible 100 points, corresponding with a "Healthy" designation, with the expected community of a healthy stream.

For subsample A, high scores were achieved for the Total Ephemeroptera and Total Clingers. Low scores were achieved for Total Long-lived Taxa and % Very Tolerant Individuals. Subsample B achieved high scores for % Filter Feeders and low scores for Total Long-lived taxa and Total Sensitive Taxa.

Table 2 SCI metric summaries for East Canal Subsample A (Top) and Subsample B (Bottom)

SCI Metric	Raw Totals	SCI scores	Adjusted SCI scores
Total Taxa	30.00	6.25	6.25
Total Ephemeroptera	4.00	8.00	8.00
Total Trichoptera	3.00	4.29	4.29
% Filter Feeders	23.18	5.23	5.23
Total Clingers	7.00	10.00	10.00
Total Long-lived Taxa	1.00	3.33	3.33
% Dominance	27.81	7.24	7.24
% Tanytarsini	8.61	6.66	6.66
Total Sensitive Taxa	3.00	4.29	4.29
% Very Tolerant Individuals	29.80	3.18	3.18

SCI Sum	58.46
Final SCI score	64.95

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	35.56	8.11	8.11
Total Clingers	5.00	7.14	7.14
Total Long-lived Taxa	1.00	3.33	3.33
% Dominance	26.76	7.45	7.45
% Tanytarsini	7.75	6.38	6.38
Total Sensitive Taxa	1.00	1.43	1.43
% Very Tolerant Individuals	16.90	4.54	4.54

SCI Sum	50.41
Final SCI score	56.01

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

East Canal SCIA
Stream Condition Index (SCI)
Samples Collected 03/31/2018
Project #: 6063170278

Stream Condition Index Results for East Canal 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	*Nais pardalis*	1	1	1	0	0	0	0	0	0		0	0	1	
Annelida		Clitellata	Oligochaeta	Tubificida	Naididae	*Slavina appendiculata*	1	1	1	0	0	0	0	0	0		0	0	0	
Mollusca		Gastropoda	Heterobranchia	Hygrophila	Ancylidae	Ancylidae spp.	1	1	1	0	0	0	0	0	0		0	0	0	Damaged
Mollusca		Gastropoda	Caenogastropoda	Littorinimorpha	Hydrobiidae	Hydrobiidae spp.	7		0	0	0	0	0	0	0		0	0	0	
Mollusca		Gastropoda	Caenogastropoda	Littorinimorpha	Hydrobiidae	*Pyrgophorus platyrachis*	35	42	1	0	0	0	0	0	0		0	0	42	
Mollusca		Bivalvia	Heterodonta	Veneroida	Corbiculidae	*Corbicula* spp.	6	6	1	0	0	0	6	0	1		0	0	0	
Mollusca		Bivalvia	Heterodonta	Veneroida	Sphaeriidae	Sphaeriidae spp.	2	2	1	0	0	0	2	0	0		0	0	0	Damaged, small
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Dogielinotidae	*Hyalella azteca* sp. complex	5	5	1	0	0	0	0	0	0		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Ephemeroptera	Caenidae	*Caenis* spp.	5		0	0	0	0	0	0	0		0	0	0	Damaged
Arthropoda	Hexapoda	Insecta	Pterygota	Ephemeroptera	Caenidae	*Caenis macafferti*	1	6	1	1	0	0	0	0	0		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Ephemeroptera	Baetidae	Baetidae spp.	2	2	1	1	0	0	0	0	0		0	0	0	Damaged, not A. pygmaea
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	Heptageniidae	*Maccaffertium smithae*	1	1	1	1	0	0	0	1	0		0	1	0	Reference collection
Arthropoda	Hexapoda	Insecta	Pterygota	Odonata	Coenagrionidae	Coenagrionidae spp.	5	5	1	0	0	0	0	0	0		0	0	0	Damaged and/or immature
Arthropoda	Hexapoda	Insecta	Pterygota	Trichoptera	Hydropsychidae	*Cheumatopsyche* spp.	16	16	1	0	1	0	16	1	0		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Trichoptera	Hydroptilidae	*Hydroptila* spp.	1	1	1	0	1	0	0	1	0		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Trichoptera	Hydroptilidae	*Neotrichia* spp.	4	4	1	0	1	0	0	1	0		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Coleoptera	Elmidae	*Dubiraphia* spp.	10	10	1	0	0	0	0	0	0		0	0	0	larvae
Arthropoda	Hexapoda	Insecta	Pterygota	Coleoptera	Elmidae	*Stenelmis* spp.	5	5	1	0	0	0	0	1	0		0	0	0	3 larvae, 2 adults
Arthropoda	Hexapoda	Insecta	Pterygota	Coleoptera	Elmidae	*Microcylloepus* spp.	5	5	1	0	0	0	0	0	0		0	0	0	3 larvae, 2 adults
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	Chironomidae spp.	2		0	0	0	0	0	0	0		0	0	0	pupae
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	*Cladotanytarsus* spp.	1	1	1	0	0	0.5	0	0	0		1	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	*Tanytarsus* spp.	1	1	1	0	0	0.5	0	0	0		1	0	0	Not T. buckleyi
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	*Tanytarsus buckleyi*	5	5	1	0	0	2.5	0	0	0		5	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	*Cryptochironomus* spp.	1	1	1	0	0	0	0	0	0		0	0	1	
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	*Polypedilum flavum*	13	14	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 exiguus* group	5	6	1	0	0	0	6	1	0		6	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	*Dicrotendipes* spp.	1	1	1	0	0	0.5	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	Ceratopogonidae	Ceratopogonidae spp.	1	1	1	0	0	0	0	0	0		0	0	0	larva
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Simuliidae	*Simulium* spp.	1	1	1	0	0	0	1	1	0		0	1	0	larva
Arthropoda	Hexapoda	Insecta	Pterygota	Heteroptera	Veliidae	*Rhagovelia* spp.	1	1	1	0	0	0	0	0	0		0	0	0	Immature

Table 3 SCI full results for Sample A

East Canal SCIB
Stream Condition Index (SCI)
Samples Collected 03/31/2018
Project #: 6063170278

Stream Condition Index Results for East Canal 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
Annelida		Clitellata	Oligochaeta	Tubificida	Naididae	*Tubificinae spp.*	1	1	1	0	0	0	0	0	0		0	0	0	Damaged and/or immature
Mollusca		Gastropoda	Heterobranchia	Hygrophila	Ancylidae	*Ancylidae spp.*	4	4	1	0	0	0	0	0	0		0	0	0	Damaged
Mollusca		Gastropoda	Caenogastropoda	Littorinimorpha	Hydrobiidae	*Hydrobiidae spp.*	5		0	0	0	0	0	0	0		0	0	0	
Mollusca		Gastropoda	Caenogastropoda	Littorinimorpha	Hydrobiidae	*Pyrgophorus platyrachis*	19	24	1	0	0	0	0	0	0		0	0	24	
Mollusca		Bivalvia	Heterodonta	Veneroida	Corbiculidae	*Corbicula spp.*	4	4	1	0	0	0	4	0	1		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Ephemeroptera	Caenidae	*Caenis spp.*	1		0	0	0	0	0	0	0		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Ephemeroptera	Caenidae	*Caenis diminuta*	3	4	1	1	0	0	0	0	0		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Ephemeroptera	Baetidae	*Baetidae spp.*	9		0	0	0	0	0	0	0		0	0	0	Damaged
Arthropoda	Hexapoda	Insecta	Pterygota	Ephemeroptera	Baetidae	*Acentrella alachua*	1	10	1	1	0	0	0	0	0		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Odonata	Coenagrionidae	*Coenagrionidae spp.*	5		0	0	0	0	0	0	0		0	0	0	Immature
Arthropoda	Hexapoda	Insecta	Pterygota	Odonata	Coenagrionidae	*Argia spp.*	1	6	1	0	0	0	0	0	0		0	0	0	Damaged
Arthropoda	Hexapoda	Insecta	Pterygota	Trichoptera		*Trichoptera spp.*	2		0	0	0	0	0	0	0		0	0	0	1 pupa, 1 immature
Arthropoda	Hexapoda	Insecta	Pterygota	Trichoptera	Leptoceridae	*Leptoceridae spp.*	1	1	1	0	1	0	0	0	0		0	0	0	Immature, probably Triaenodes spp.
Arthropoda	Hexapoda	Insecta	Pterygota	Trichoptera	Hydropsychidae	*Hydropsychidae spp.*	4		0	0	0	0	0	0	0		0	0	0	Immature
Arthropoda	Hexapoda	Insecta	Pterygota	Trichoptera	Hydropsychidae	*Cheumatopsyche spp.*	32	38	1	0	1	0	38	1	0		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Trichoptera	Hydroptilidae	*Neotrichia spp.*	6	6	1	0	1	0	0	1	0		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Coleoptera	Elmidae	*Dubiraphia spp.*	1	1	1	0	0	0	0	0	0		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Coleoptera	Elmidae	*Stenelmis spp.*	8	8	1	0	0	0	0	1	0		0	0	0	6 larvae, 2 adults
Arthropoda	Hexapoda	Insecta	Pterygota	Coleoptera	Elmidae	*Microcylloepus spp.*	3	3	1	0	0	0	0	0	0		0	0	0	2 larvae, 1 adult
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	*Cladotanytarsus spp.*	2	2	1	0	0	1	0	0	0		2	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	*Tanytarsus spp.*	1	1	1	0	0	0.5	0	0	0		1	0	0	Not T. buckleyi
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	*Tanytarsus buckleyi*	6	6	1	0	0	3	0	0	0		6	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	*Polypedilum scalaenum group*	2	2	1	0	0	0	0	0	0		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	*Polypedilum flavum*	9	9	1	0	0	0	0	0	0		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	*Rheotanytarsus exiguus group*	2	2	1	0	0	0	2	1	0		2	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	Ceratopogonidae	*Ceratopogonidae spp.*	1	1	1	0	0	0	0	0	0		0	0	0	larva
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Simuliidae	*Simulium spp.*	2	2	1	0	0	0	2	1	0		0	1	0	larvae
Arthropoda	Hexapoda	Insecta	Pterygota	Heteroptera	Veliidae	*Rhagovelia spp.*	2	2	1	0	0	0	0	0	0		0	0	0	Immature
Arthropoda	Chelicerata	Arachnida	Acari	Sarcoptiformes		*Oribatida spp.*	1	1	1	0	0	0	0	0	0		0	0	0	

Table 4 SCI full results for Sample B

Water Quality Assessment

Limited long-term water quality data is available for East Canal. The data that is available was collected by the Hillsborough County Environmental Protection Commission and the Florida Department of Environmental Protection. Values for the physical water parameters begin in 2000 and continue through present. Values for the laboratory water parameters begin in 2009 through present. The 2018 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 East Canal Physical Water Quality (Field)

East Canal								
Date	**Depth (m)**	**Temp (°C)**	**pH**	**DO (mg/L)**	**DO (% Sat)**	**Cond (UMHO/cm**	**Salinity (PPT)**	**Secchi Depth (m)**
5/14/18	0.15	27.9	8.05	8.16	101.8	881	0.43	0.45
Mean POR		21.8	7.25	5.66	55.36	281	0.16	0.39

The chemical water quality analysis for East Canal 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 0.382 mg/L (2000-2018). Total Phosphorous values for the sample from this assessment were 0.375 mg/L. The geomean for the past 3 years of data was 0.197 mg/L (2015 – 0.231 mg/L, 2016 – 0.159 mg/L and 2017 – 0.207 mg/L). Only one sample during the three year period exceeded the 0.49 mg/L threshold on 1/13/2015 0.949 mg/L.

Total Nitrogen values were below the nutrient region threshold developed by FDEP of 1.65 mg/L with a mean value of 0.883 mg/L (2000-2018). The Total Nitrogen value from the assessment was well below the threshold with a concentration of 0.888 mg/L. The geomean for the past 3 years of data was 1.096 mg/L (2015 – 0.831 mg/L, 2016 – 1.470 mg/L and 2017 – 1.078 mg/L). Two samples during the three year period exceeded the 1.65 mg/L threshold on 1/25/2016 – 3.779 mg/L and 4/26/17 – 1.846 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 sample, but in this threshold for the period of record (2000-2018) with a geomean value of 3.55 µg/l. For sites with Chlorophyll-a values in this range, the assessment is inconclusive of conditions reflecting an imbalance in flora. Low biomass of the bacterial parameters were observed in both the sample for this assessment and the long term dataset.

Table 6 East Canal Water Quality (Laboratory)

Parameter	East Canal	POR Mean	Units
Alkalinity	264	93.7	mg/LCaCO3
Nitrates/Nitrites	0.169	0.136	mg/L
E. Coli	92	149.8	#/100 ml
Enterococci	176	153.4	#/100 ml
Chlorophyll a	2.0	4.4	ug/L
Chlorophyll b	5.1	1.87	ug/L
Chlorophyll c	0.7	1.08	ug/L
Chlorophyll t	7.8		ug/L
Chlorophylla Corr	2.2	3.55	ug/L
Chlorophyll-pheo	3.2		ug/L
Ammonia	0.042	0.039	mg/L
Kjeldahl Nitrogen	0.719	0.79	mg/L
Total Nitrogen	0.888	0.883	mg/L
Total Phosphorus	0.375	0.382	mg/L
Color(345)F.45	8.0	74.95	Pt/Co

Conclusion

East Canal near Bailey Road is located with some buffer of natural, undeveloped land surrounding it in a rural landscape. The stream itself showed previous 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 an Optimal score of 122. Disruption to the vegetation community was observed in the results of the Linear Vegetation Survey with East Canal not meeting either metric for Average Coefficient of Conservatism or the Percent FLEPPC. East Canal did meet standards for the rapid periphyton survey with 0% of samples being ranked between 4 and 6. The historical water quality record for East Canal showed acceptable concentrations of Total Phosphorous and Total Nitrogen but showed slightly elevated biomass for Bacteria. 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		East Canal	Mean POR	Threshold
Total Phosphorous (mg/l)		0.375	0.046	< 0.49
Total Nitrogen (mg/l)		0.888	0.883	< 1.65
RPS (% Rank 4-6)		0		< 25%
LVS	Avg C of C	0.48		≥ 2.5
	FLEPPC %	92.59%		< 25%
Chlorophyll-a (µg/l)		2.2	3.55	< 20 µg/l
Habitat Assessment		122		> 34
SCI		60.48		> 34