



Pemberton Creek

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

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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 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

Pemberton Creek is located in eastern Hillsborough County in the Hillsborough Bay Watershed. Its headwaters are located west of Paul Buckman Highway and Sam Allen Road. The outfall of Pemberton Creek is in Baker Creek. The assessment of Pemberton Creek was conducted on April 28, 2021. At the time of the assessment, the water levels were normal for the dry season. The Pemberton Creek WBID covers 5.14 square miles and is dominated by residential (32.8%), agricultural (27.3%) and natural (26.7%) land uses. The resulting calculated landscape development intensity index score was 4.27.

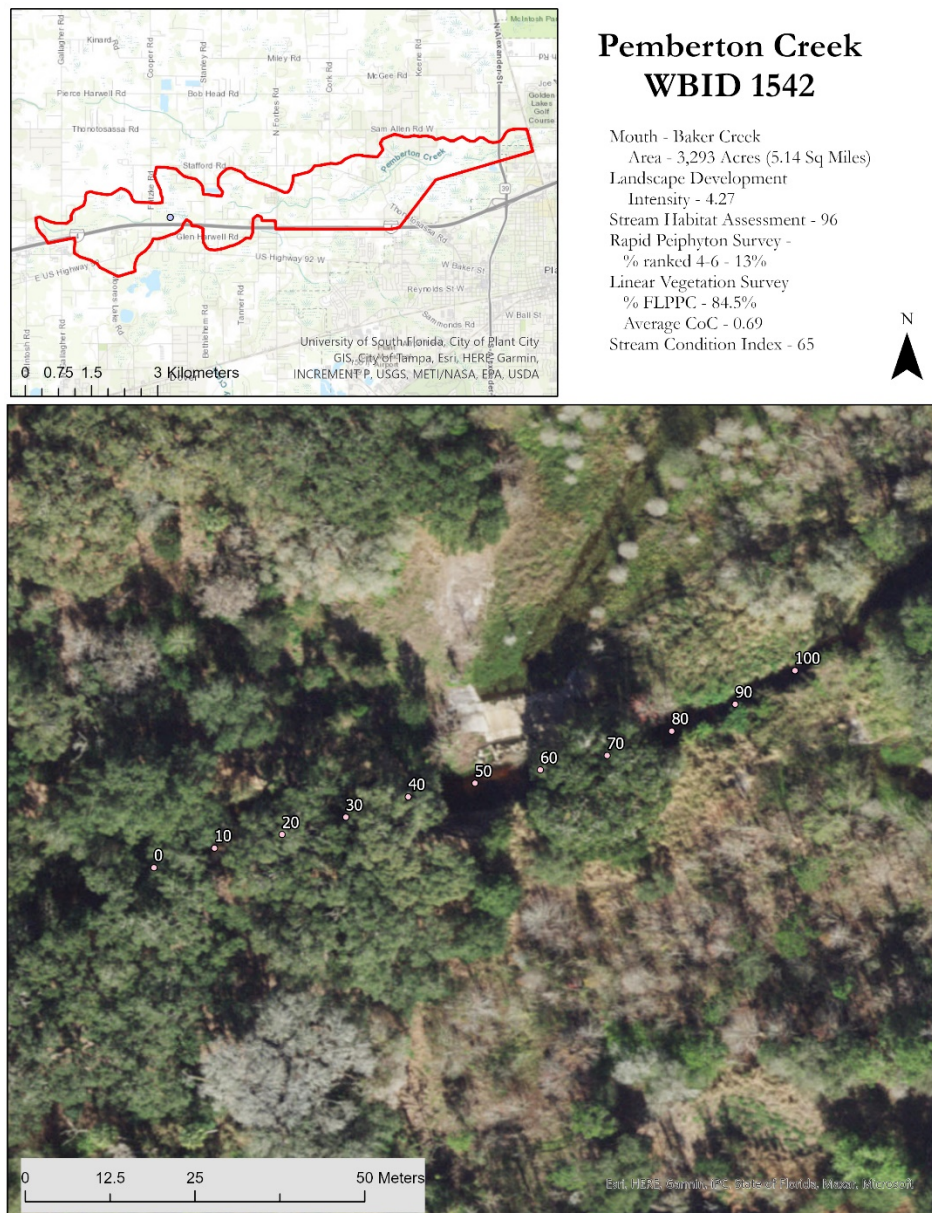


Figure 1 2021 Pemberton Creek Study Area Map



Figure 2 Overview photograph of the Pemberton Creek Sample Site showing the typical habitat features

Habitat and Vegetation Assessment

The region of Pemberton Creek where the assessment was conducted is in a natural region along Interstate 4 where a series of treatment wetlands are located. The region was moderately shaded with a mean canopy cover measurement of 57.1% although the range of canopy coverage among the study area varied from 96% to 0%. Pemberton Creek averaged 0.2 meters in depth, approximately 5.4 meters wide with a flow of 0.27 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 Water Velocity (0.27 m/s). Suboptimal category scores were achieved for Habitat Smothering (sufficient pools but many of the productive habitats were affected by sand smothering) and Substrate Diversity (Presence of three major productive habitats (snags, submerged aquatic vegetation, rocks)). Substrate Availability (3.5% of stream are productive habitats) was scored as poor. Minor habitats included roots, leaf packs/mats and sand and silt deposits. The total score for the primary habitat components was a 44 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 optimal category for Riparian Buffer Zone Width on the right bank (greater than 18 meters of buffer). Bank Stability (left bank with few raw eroded areas), Riparian Zone Vegetation Quality (both banks showing moderate levels of disturbance shown in the species present) and Riparian Buffer Zone Width for the left bank (15 meters of buffer) scored in the suboptimal category. Artificial Channelization and Bank Stability of the right bank scored in the marginal category due to several areas of high and eroding banks. The secondary habitat components received a score of 52 out of 80. The resulting FDEP Habitat Assessment score was a 96.

Table 1 Scoring Summary for the Stream Habitat Assessment

Metric		Score
Primary Habitat Components		
	Substrate Diversity	11
	Substrate Availability	4
	Water Velocity	17
	Habitat Smothering	12
	Primary Score	44
Secondary Habitat Components		
	Artificial Channelization	8
	Bank Stability - Right Bank	5
	Bank Stability - Left Bank	7
	Riparian Buffer Zone Width - Right Bank	9
	Riparian Buffer Zone Width - Left Bank	8
	Riparian Zone Vegetation Quality - Right Bank	8
	Riparian Zone Vegetation Quality - Left Bank	7
	Secondary Score	52
Habitat Assessment Score		96

Periphyton was encountered during the 99 samples taken during the Rapid Periphyton Survey. 13% of samples were classified as Ranks 4-6. The tree canopy in the assessment area averaged 57.1% allowing sufficient available light for periphyton to flourish in the open portions of the study area.

The FDEP Linear Vegetation Survey encountered greater than 2 m² of herbaceous species rooted in Pemberton Creek at the time of the assessment. The rooted herbaceous vegetation in the stream was dominated by invasive species (84.5% of occurrences). The vegetation in the creek was dominated by *Hydrilla verticillata*, *Hygrophila polysperma* and *Urochloa mutica*. The results of the linear vegetation survey shows that Pemberton Creek exceeded FDEP thresholds for Mean Coefficient of Conservatism and % FLEPPC metrics.

Table 1 Linear Vegetation Survey Results – Pemberton Creek. “D” and “C” indicate a species is dominant or codominant in the region.

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	
<i>Hydrilla verticillata</i>	0	D	D	D	C	1	1	D	1	1	1	10
<i>Hygrophila polysperma</i>	0	1	1	1	C	1	1	1	1		1	9
<i>Alternanthera philoxeroides</i>	0	1	1	1	1	1	1			1	1	8
<i>Commelina diffusa</i>	2.02	1	1	1	1	1	1	1			1	8
<i>Myriophyllum aquaticum</i>	0.98		1	1	1	1	1				1	6
<i>Lemna</i>	1				1	1		1		1	1	5
<i>Eichhornia crassipes</i>	0		1				1			1	1	4
<i>Ruellia simplex</i>	0		1		1			1		1		4
<i>Urochloa mutica</i>	0				1	1				D	D	4
<i>Cicuta maculata</i>	4.54						1			1	1	3
<i>Ludwigia peruviana</i>	0					1				1	1	3
<i>Colocasia esculenta</i>	0	1								1		2
<i>Polygonum hydropiperoides</i>	2.5					1	1					2
<i>Nuphar</i>	3.5						1					1
<i>Panicum repens</i>	0		1									1
<i>Sphagneticola trilobata</i>	0					1						1



Figure 3 Invasive aquatic vegetation was common in Pemberton 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 Pemberton Creek was 65 out of a possible 100 points, corresponding with a “Category 2 Healthy” designation, with minor loss of taxonomic diversity from the expected community of an exceptional stream. Both subsamples contained moderate total taxa with 28 taxa in subsample A and 29 in subsample B. The most recent previous SCI value was collected on 4/18/18 and scored 64.29.

High scores (scores above 7.0) were achieved for the Total Clingers, % Dominance and % Tanytarsini in both subsamples. Additional Higher scores were achieved for % Filter Feeders and % Very Tolerant Individuals in Sample B. Low scores (less than 3.0) were achieved for the Total Sensitive Taxa in both subsamples and Total Long Lived Taxa in Sample A. The full results of the SCI sampling are shown in Table 3 (Sample A) and Table 4 (Sample B) for Pemberton Creek.

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

SCI Metric	Raw Totals	SCI scores	Adjusted SCI scores
Total Taxa	28.00	5.42	5.42
Total Ephemeroptera	2.00	4.00	4.00
Total Trichoptera	3.00	4.29	4.29
% Filter Feeders	29.30	6.65	6.65
Total Clingers	5.00	7.14	7.14
Total Long-lived Taxa	0.00	0.00	0.00
% Dominance	18.47	9.11	9.11
% Tanytarsini	10.19	7.10	7.10
Total Sensitive Taxa	1.00	1.43	1.43
% Very Tolerant Individuals	11.46	5.44	5.44

SCI Sum	50.58
Final SCI score	56.20

SCI Metric	Raw Totals	SCI scores	Adjusted SCI scores
Total Taxa	29.00	5.83	5.83
Total Ephemeroptera	4.00	8.00	8.00
Total Trichoptera	3.00	4.29	4.29
% Filter Feeders	31.88	7.25	7.25
Total Clingers	7.00	10.00	10.00
Total Long-lived Taxa	1.00	3.33	3.33
% Dominance	17.45	9.31	9.31
% Tanytarsini	13.42	7.85	7.85
Total Sensitive Taxa	2.00	2.86	2.86
% Very Tolerant Individuals	2.68	8.49	8.49

SCI Sum	67.21
Final SCI score	74.68

Table 3 SCI full results for Sample A

Stream Condition Index Results for Pemberton Creek 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		Citellata	Oligochaeta	Tubificida	Naididae	Naidinae spp.	1		0	0	0	0	0	0	0		0	0	0	0 Regenerating anterior end?
Annelida		Citellata	Oligochaeta	Tubificida	Naididae	<i>Nais communis</i>	1	1	1	0	0	0	0	0	0		0	0	1	
Annelida		Citellata	Oligochaeta	Tubificida	Naididae	<i>Nais parvula</i>	5	6	1	0	0	0	0	0	0		0	0	6	
Annelida		Citellata	Oligochaeta	Tubificida	Naididae	<i>Allonais inaequalis</i>	1	1	1	0	0	0	0	0	0		0	0	0	
Annelida		Citellata	Oligochaeta	Tubificida	Naididae	<i>Stylaria fossilis</i>	2	2	1	0	0	0	0	0	0		0	0	0	
Mollusca		Gastropoda	Caenogastropoda	Littorinimorpha	Amnicolidae	<i>Amnicola dalli</i>	4	4	1	0	0	0	0	0	0		0	0	0	
Mollusca		Gastropoda	Caenogastropoda	Littorinimorpha	Hydrobiidae	<i>Pyrgophorus platyrachis</i>	4	4	1	0	0	0	0	0	0		0	0	4	
Mollusca		Gastropoda	Heterobranchia	Hydrophila	Ancylidae	<i>Ancylidae</i> spp.	2	2	1	0	0	0	0	0	0		0	0	0	Damaged
Mollusca		Gastropoda	Heterobranchia	Hydrophila	Physidae	<i>Physa acuta</i>	2	2	1	0	0	0	0	0	0		0	0	2	
Mollusca		Gastropoda	Heterobranchia	Hydrophila	Planorbidae	<i>Planorbis dilatatus</i>	2	2	1	0	0	0	0	0	0		0	0	2	
Mollusca		Gastropoda	Heterobranchia	Hydrophila	Planorbidae	<i>Planorbella trivolvis</i>	1	1	0	0	0	0	0	0	0		0	0	0	
Mollusca		Gastropoda	Heterobranchia	Hydrophila	Planorbidae	<i>Planorbella scolaris</i>	2	2	1	0	0	0	0	0	0		0	0	2	
Mollusca		Bivalvia	Autobranchia	Sphaeriida	Sphaeriidae	<i>Sphaeriidae</i> spp.	2	2	1	0	0	0	0	2	0		0	0	0	Damaged and/or immature
Arthropoda	Hexapoda	Insecta	Pterygota	Ephemeroptera	Baetidae	<i>Baetidae</i> spp.	1	0	0	0	0	0	0	0	0		0	0	0	Head only; like B. intercalaris
Arthropoda	Hexapoda	Insecta	Pterygota	Ephemeroptera	Baetidae	<i>Labiobaetis propinquus</i>	14	14	1	1	0	0	0	0	0		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Ephemeroptera	Baetidae	<i>Baetis intercalaris</i>	7	8	1	1	0	0	0	0	0		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Odonata	Coenagrionidae	<i>Coenagrionidae</i> spp.	1	0	0	0	0	0	0	0	0		0	0	0	Early instar; Like Enallagma
Arthropoda	Hexapoda	Insecta	Pterygota	Odonata	Coenagrionidae	<i>Enallagma</i> spp.	1	2	1	0	0	0	0	0	0		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Trichoptera	Trichoptera	<i>Trichoptera</i> spp.	1	0	0	0	0	0	0	0	0		0	0	0	Head only; like Cheumatopsyche
Arthropoda	Hexapoda	Insecta	Pterygota	Trichoptera	Hydropsychidae	<i>Hydropsychidae</i> spp.	2	0	0	0	0	0	0	0	0		0	0	0	Pupae = 2
Arthropoda	Hexapoda	Insecta	Pterygota	Trichoptera	Hydropsychidae	<i>Cheumatopsyche</i> spp.	20	23	1	0	1	0	0	23	1		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Trichoptera	Hydroptilidae	<i>Hydroptila</i> spp.	1	1	1	0	1	0	0	0	1		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Trichoptera	Hydroptilidae	<i>Neotrichia</i> spp.	1	1	1	0	1	0	0	0	1		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Coleoptera	Elmidae	<i>Stenelmis</i> spp.	2	2	1	0	0	0	0	0	1		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Coleoptera	Elmidae	<i>Microcyclus</i> spp.	10	10	1	0	0	0	0	0	0		0	0	0	Larvae = 9, Adult = 1
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Diptera	<i>Diptera</i> spp.	2	2	0	0	0	0	0	0	0		0	0	0	Pupae = 2, damaged
Arthropoda	Hexapoda	Insecta	Pterygota	Chironomidae	Chironomidae	<i>Chironomidae</i> spp.	7	7	0	0	0	0	0	0	0		0	0	0	Pupae = 7
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	<i>Cladotanytarsus</i> spp.	1	1	1	0	0	0	0.5	0	0		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	<i>Tanytarsus</i> spp.	12	15	1	0	0	0	7.5	0	0		15	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	<i>Polypedium flavum</i>	24	29	1	0	0	0	0	0	0		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	<i>Stenochironomus</i> spp.	1	1	1	0	0	0	0	0	0		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Chironomidae	<i>Labrundinia</i> spp.	2	3	1	0	0	0	0	0	0		0	0	0	
Arthropoda	Hexapoda	Insecta	Pterygota	Diptera	Simuliidae	<i>Simulium</i> spp.	13	13	1	0	0	0	0	13	1		0	1	0	Pupae = 5, Larvae = 8
Arthropoda	Hexapoda	Insecta	Pterygota	Heteroptera	Velidae	<i>Rhagovelia</i> spp.	2	2	1	0	0	0	0	0	0		0	0	0	
Arthropoda	Chelicerata	Arachnida	Acari	Trombidiformes	Hygrobatidae	<i>Hygrobatas</i> spp.	3	3	1	0	0	0	0	0	0		0	0	0	1 = molt loose in vial

Stream Condition Index Results for Pemberton Creek SCIB																				
Phylum	Subphylum	Class	Subclass	Order	Family	Taxa	Abundance	Collapsed Abundance	Taxa Presence	Ephemeroptera Taxa	Trichoptera Taxa	50% Filterer	100% Filterer	Ginger Taxa	Long-lived Taxa	Dominant Taxa	Tanytarsini	Sensitive Taxa	Very Tolerant Individuals	Specimen Notes
Nemertea		Hoploneurtemata		Monostilifera	Prostomatidae	<i>Prostoma</i> spp.	1	1	1	0	0	0	0	0	0	0	0	0	1	
Annelida		Citellata	Oligochaeta	Tubificida	Naididae	<i>Nois</i> spp.	1	1	1	0	0	0	0	0	0	0	0	0	Regenerating, can't see needles, maybe N. communis	
Annelida		Citellata	Oligochaeta	Tubificida	Naididae	<i>Nois variabilis</i>	1	1	1	0	0	0	0	0	0	0	0	0	1	
Annelida		Citellata	Oligochaeta	Tubificida	Naididae	<i>Nois parvula</i>	1	1	1	0	0	0	0	0	0	0	0	0	1	
Annelida		Citellata	Oligochaeta	Tubificida	Naididae	<i>Allonais inaequalis</i>	1	1	1	0	0	0	0	0	0	0	0	0	0	
Annelida		Citellata	Oligochaeta	Tubificida	Naididae	<i>Stylaria fossularis</i>	1	1	1	0	0	0	0	0	0	0	0	0	0	
Mollusca		Gastropoda	Caenogastropoda	Littorinimorpha	Ammnicolidae	<i>Ammicola dalli</i>	1	1	1	0	0	0	0	0	0	0	0	0	0	
Mollusca		Gastropoda	Heterobranchia	Hydrophilina	Ancylidae	<i>Ancylidae</i> spp.	1	1	1	0	0	0	0	0	0	0	0	0	0	Damaged, no shell
Mollusca		Gastropoda	Heterobranchia	Hydrophilina	Physidae	<i>Physa acuta</i>	1	1	1	0	0	0	0	0	0	0	0	0	1	
Mollusca		Bivalvia	Autobranchia	Venerida	Cyrenidae	<i>Corbicula</i> spp.	1	1	1	0	0	1	0	1	0	1	0	0	0	
Arthropoda	Hexapoda	Insecta		Ephemeroptera	Caeniidae	<i>Coenis amica</i>	1	1	1	1	0	0	0	0	0	0	0	0	0	
Arthropoda	Hexapoda	Insecta		Ephemeroptera	Baetidae	<i>Labiobaetis prapinquus</i>	17	17	1	1	0	0	0	0	0	0	0	0	0	
Arthropoda	Hexapoda	Insecta		Ephemeroptera	Baetidae	<i>Baetis intercalaris</i>	16	16	1	1	0	0	0	0	0	0	0	0	0	
Arthropoda	Hexapoda	Insecta		Ephemeroptera	Heptageniidae	<i>Heptageniidae</i> spp.	1	1	1	1	0	0	0	1	0	0	1	0	0	No 7th gill
Arthropoda	Hexapoda	Insecta		Ephemeroptera	Odonata	<i>Coenagrionidae</i>	6	6	1	0	0	0	0	0	0	0	0	0	0	Early instar; one possibly Enallagma
Arthropoda	Hexapoda	Insecta		Ephemeroptera	Trichoptera	<i>Trichoptera</i> spp.	1	1	0	0	0	0	0	0	0	0	0	0	0	Head only, like Cheumatopsyche
Arthropoda	Hexapoda	Insecta		Ephemeroptera	Trichoptera	<i>Hydropsychidae</i> spp.	6	6	0	0	0	0	0	0	0	0	0	0	0	Early instar; like Cheumatopsyche
Arthropoda	Hexapoda	Insecta		Ephemeroptera	Trichoptera	<i>Cheumatopsyche</i> spp.	19	26	1	0	1	0	26	1	0	0	0	0	0	0
Arthropoda	Hexapoda	Insecta		Ephemeroptera	Hydropsychidae	<i>Hydropsyla</i> sp.	1	1	1	0	1	0	1	0	0	0	0	0	0	0
Arthropoda	Hexapoda	Insecta		Ephemeroptera	Neotrichidae	<i>Neotrichia</i> spp.	1	1	1	0	1	0	1	0	0	0	0	0	0	0
Arthropoda	Hexapoda	Insecta		Ephemeroptera	Elmidae	<i>Stenelmis</i> spp.	1	1	1	0	0	0	0	0	0	0	0	0	0	0 Larva = 1
Arthropoda	Hexapoda	Insecta		Ephemeroptera	Elmidae	<i>Microcyletus</i> spp.	9	9	1	0	0	0	0	0	0	0	0	0	0	0 Larvae = 8, Adult = 1
Arthropoda	Hexapoda	Insecta		Ephemeroptera	Chironomidae	<i>Chironomidae</i> spp.	6	6	0	0	0	0	0	0	0	0	0	0	0	Pupae = 6
Arthropoda	Hexapoda	Insecta		Ephemeroptera	Chironomidae	<i>Tanytarsus</i> spp.	16	19	1	0	0	9.5	0	0	0	0	19	0	0	0
Arthropoda	Hexapoda	Insecta		Ephemeroptera	Chironomidae	<i>Polydium flavum</i>	22	25	1	0	0	0	0	0	0	0	0	0	0	0
Arthropoda	Hexapoda	Insecta		Ephemeroptera	Rheotanytarsus	<i>Rheotanytarsus</i> spp.	1	1	1	0	0	0	1	1	0	1	0	0	0	0
Arthropoda	Hexapoda	Insecta																		

[illegible]

Water Quality Assessment

Limited long-term water quality data is available for Pemberton Creek with recent years having sparse data. The data that is available was collected by the Hillsborough County Environmental Protection Commission, USGS and FDEP. Values for the physical water parameters begin in 1968 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 Pemberton Creek Physical Water Quality (Field)

Pemberton Creek								
Date	Depth (m)	Temp (°C)	pH	DO (mg/L)	DO (% Sat)	Cond (UMHO/cm)	Salinity (PPT)	Secchi Depth (m)
4/28/2021	0.2	23.2	7.48	9.29	107.6	236.9	0.11	1.5
Mean POR	0.25	21.85	7.39	6.77	78.67	326.5	0.12	

The chemical water quality analysis for Pemberton Creek is shown in Table 6 along with mean values for the period of record for available parameters. The most recent 3-years of data is incomplete to calculate NNC values as there is only 1 sample in 2019, no samples in 2020 and 4 samples in 2021. The previous 3-year geometric mean values for Total Phosphorous values were below the nutrient region threshold developed by FDEP of 0.49 mg/L with a geometric mean value of 0.330 mg/L (2019) and 0.291 mg/L (2021). Total Phosphorous values for the sample from this assessment were 0.326 mg/L. The period of record geometric mean value was 0.678 mg/L. Total Nitrogen values were below the nutrient region threshold developed by FDEP of 1.65 mg/L for the previous three year period with a mean value of 0.485 mg/L (2019) and 0.545 mg/L (2021). The Total Nitrogen value from the assessment was below the threshold with a concentration of 0.540 mg/L. The period of record geometric mean value was 1.711 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 (1.7 µg/l in 2019, 1.07 µg/l in 2021). For sites with Chlorophyll-a values in this range, the assessment is indicating conditions reflecting a balance in flora.

A slightly elevated biomass of the bacterial parameters was observed in the 3-year dataset with E. Coli having a geometric mean of 429.1 colonies/100 ml, 524.9/100 ml for Enterococci.

Table 6 Pemberton Creek Water Quality (Laboratory)

Parameter	Pemberton Creek 4/28/2021	POR Mean (1970- 2021)	Units
Alkalinity	115	122.5	mg/LCaCO ₃
Color(345)F.45	80	83.5	Pt/Co
E. Coli	410	282.6	#/100 ml
Enterococci	157	571.1	#/100 ml
Chlorophyll a	11.3	2.54	ug/L
Chlorophyll b	1.0	1.61	ug/L
Chlorophyll c	1.4	0.90	ug/L
Chlorophyll t	12.7	3.77	ug/L
Chlorophylla Corr	1.0	1.67	ug/L
Chlorophyll-pheo	18.6	5.18	ug/L
Ammonia	< 0.073	0.041	mg/L
Kjeldahl Nitrogen	0.480	0.823	mg/L
Total Nitrogen	0.540	1.711	mg/L
Nitrates/Nitrites	0.064	0.268	mg/L
Total Phosphorus	0.326	0.678	mg/L

Conclusion

Pemberton Creek at Interstate 4 and Fritzke Road is located in a predominantly natural area. At the time of the habitat assessment, the water levels were low, corresponding to the middle 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. Disruption to the vegetation community was observed in the results of the Linear Vegetation Survey with Pemberton Creek having a mean coefficient of conservatism of 0.69 and a %FLEPPC of 84.5%. Pemberton Creek did meet standards for the rapid periphyton survey with 11% of samples being ranked between 4 and 6 due to the patchy canopy coverage in the region allowing portions of the stream to have ample sunlight for periphyton growth. The recent water quality record for Pemberton 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		Pemberton Creek	2019	2020	2021	Threshold
Total Phosphorous (mg/l)		0.326	0.330	N/A	0.291	< 0.49
Total Nitrogen (mg/l)		0.540	0.485	N/A	0.545	< 1.65
RPS (% Rank 4-6)		13%				< 25%
LVS	Avg C of C	0.69				≥ 2.5
	FLEPPC %	84.5%				< 25%
Chlorophyll-a Corrected (µg/l)		1.0	1.7	N/A	1.07	< 20 µg/l
Habitat Assessment		96				> 34
SCI		65				> 34