English 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

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

English Creek located in Hillsborough County Florida was sampled at two localities on 5/10/2016 and 5/31/2016. The first sampling locality is north of Highway 60 in Plant City Florida at: N 27.93809, W 82.0885 was sampled on 5/31/2016. The second sampling site is located near County Line Road at: N 27.959657, W 82.056114 was sampled on 5/10/2016. English Creek has its headwaters near HWY 92 and Charlie Taylor Rd in Hillsborough County and outfall to Howell Branch Creek. The watershed surrounding English Creek is dominated by Low Density, <2 dwelling units/acre (20.36%), Extractive (16.62%), and Cropland and Pastureland (11.06%) land use. The Landscape Development Intensity Index of the watershed is 4.84.

Figure 1. 2016 English Creek Assessment Study Area Map

Habitat Assessment

English Creek at Highway 60

Figure 2 Overview photograph of English Creek at Highway 60 sample site

English Creek at highway 60 received a Habitat Assessment score of 122. An optimal score was given in regards to the amount of dredging or artificial straightening that was visible, the riparian buffer zone width being greater than 18 m, and the riparian zone vegetation quality due to over 80% of riparian surfaces consisted of normal, expected plant community for the given sunlight and habitat conditions. A suboptimal score was given to the substrate availability being between 16% and 30%, there was an adequate number of stable pools and >25% of habitats affected by sand or silt, and the bank stability was met by 2 out of the 3 requirements (slope, % above bankful, and armorment). Two productive habitats were observed, snag and root. Water velocity was suboptimal at 0.23 m/s at the time of assessment at the 0 meter mark. The thickness of the riparian zone was measured at >18 m for both the left and right banks.

During the Rapid Periphyton Survey, periphyton was observed in 6 of the 99 individual grab samples performed with 2 of the samples being in Rank 4-6. The average canopy cover in the 100 meter

region was 90.75%. The Secchi Disk Depth was measured as 1.5 meters visible on bottom at the 50 meter mark. The average water depth at the time of the assessment was 0.76m.

The Linear Vegetation Survey identified 3 species rooted in the water at the time of the assessment. There were a total of 8 observations in the 100 meter study area. The mean Coefficient of Conservatism (CoC) metric for the study area was 1.47 and the % FLEPPC metric for the study area was 50%.

Table 1 Linear Vegetation Survey Results – English Creek at Highway 60

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		
Commelina diffusa							1			1	2	4.04
Hydrocotyl umbellata		1	1			1			1		4	7.68
Hymenachne amplexicaulis							1			1	2	0
Observations/station	0	1	1	0	0	1	2	0	1	2	8	
Total Observations	8											
Mean CoC	1.47											
% FLEPPC	50											

Figure 3. USF Students assisting Water Institute staff at the English Creek at HWY 60 sampling site

Stream Condition Index Assessment

The SCI score for English Creek at Highway 60 had a mean value of 68 out of a possible 100 points, corresponding with an "Exceptional" designation, with the expected community of a healthy stream. Two of the taxa collected in each subsample were pollution-sensitive.

English Creek at 60 SCI A	**Raw Totals**	**SCI scores**	**Adjusted SCI scores**
Total Taxa	28.00	5.42	5.42
Total Ephemeroptera	3.00	6.00	6.00
Total Trichoptera	3.00	4.29	4.29
% Filter Feeders	26.25	5.94	5.94
Total Clingers	5.00	7.14	7.14
Total Long-lived Taxa	1.00	3.33	3.33
% Dominance	22.50	8.30	8.30
% Tanytarsini	9.38	6.88	6.88
Total Sensitive Taxa	2.00	2.86	2.86
% Very Tolerant Individuals	4.38	7.55	7.55

SCI Sum	57.70
Final SCI score	64.12

English Creek at 60 SCI B	**Raw Totals**	**SCI scores**	**Adjusted SCI scores**
Total Taxa	31.00	6.67	6.67
Total Ephemeroptera	2.00	4.00	4.00
Total Trichoptera	3.00	4.29	4.29
% Filter Feeders	32.50	7.40	7.40
Total Clingers	4.00	5.71	5.71
Total Long-lived Taxa	3.00	10.00	10.00
% Dominance	21.25	8.55	8.55
% Tanytarsini	13.13	7.79	7.79
Total Sensitive Taxa	2.00	2.86	2.86
% Very Tolerant Individuals	4.38	7.55	7.55

SCI Sum	64.80
Final SCI score	72.00

English Creek at County Line Road

Figure 4. Overview photograph of the English Creek at County Line Road Sample Site

English Creek at County Line Road received an average Habitat Assessment score of 117. An optimal score was given to the artificial channelization section for showing no evidence of dredging or artificial straightening, no spoil banks, and a diversity of water depth. An optimal score was given to the right bank in regards to bank stability (bankfull >60% and slope ≤60 degrees), riparian buffer zone width (>18 m), and riparian zone vegetation quality (>80% of normal plant communities). Suboptimal scores were given to substrate diversity, substrate availability, and habitat smothering. The left bank was given suboptimal scores in bank stability, riparian buffer zone width, and riparian zone vegetation quality. Three productive habitats were observed in the field, sand smothering of the productive habitats were moderate, silt smothering of productive habitats was slight. Water velocity was suboptimal at 0.25 m/s measured at the 30 meter mark. Thickness of riparian zone was measured at an average of 12 m on the left bank and 18 m on the right bank.

During the Rapid Periphyton Survey, periphyton was observed in 5 of the 99 grab samples with 2 of these samples ranked 4-6. The average canopy cover in the 100 meter region was 91.06%. The Secchi Disk Depth was measured as 0.5 meters visible on bottom at the 50 meter mark. The average water depth in the study area was 0.15 m at the time of the assessment.

The Linear Vegetation Survey identified 5 species rooted in the water at the time of the assessment. The majority of these species (3) are non-native, invasive species. The remaining 2 species are native to this region. Mexican petunia (*Ruellia simplex*) was the dominant species in the Linear Vegetation Survey. There were a total of 15 species observations in the 100 meter study area. The mean Coefficient of Conservatism (CoC) metric for the study area was 0.918 and the % FLEPPC metric for the study area was 86.6%.

Table 2 Linear Vegetation Survey Results – English Creek at County Line Road

Plant Species	Sample Site										Observations/ Species	CoC
	0-1 m	10-20m	20-30m	30-40m	40-50m	50-60m	60-70m	70-80m	80-90m	90-100m		
Acrostichum danaeifolium								1			1	5.79
Alternanthera philoxeroides					1						1	0
Commelina diffusa								1	1	1	3	0
Hydrocotyle umbellata							1				1	1.48
Ruellia simplex		1	1	1	1	1	1	1	1	1	9	0
Observations/station	0	1	1	1	2	1	2	3	2	2	15	

Total Observations	15
Mean CoC	0.918
% FLEPPC	86.6

Figure 5 USF Students and Water Institute staff conducting the Linear Vegetation Survey on English Creek at Countyline Road

Stream Condition Index Assessment

The SCI score for this site was 61 out of a possible 100 points, corresponding with a "Healthy" designation, with the expected community of a healthy stream. Two of the taxa collected in subsample A and one taxa in subsample B were pollution-sensitive

English Creek at County Line Rd SCI A	**Raw Totals**	**SCI scores**	**Adjusted SCI scores**
Total Taxa	23.00	3.33	3.33
Total Ephemeroptera	0.00	0.00	0.00
Total Trichoptera	4.00	5.71	5.71
% Filter Feeders	17.19	3.83	3.83
Total Clingers	5.00	7.14	7.14
Total Long-lived Taxa	2.00	6.67	6.67
% Dominance	30.00	6.80	6.80
% Tanytarsini	11.25	7.37	7.37
Total Sensitive Taxa	2.00	2.86	2.86
% Very Tolerant Individuals	3.75	7.85	7.85

SCI Sum	51.57
Final SCI score	57.30

English Creek at County Line Rd SCI A	**Raw Totals**	**SCI scores**	**Adjusted SCI scores**
Total Taxa	25.00	4.17	4.17
Total Ephemeroptera	1.00	2.00	2.00
Total Trichoptera	2.00	2.86	2.86
% Filter Feeders	22.50	5.07	5.07
Total Clingers	5.00	7.14	7.14
Total Long-lived Taxa	3.00	10.00	10.00
% Dominance	28.13	7.18	7.18
% Tanytarsini	16.25	8.38	8.38
Total Sensitive Taxa	1.00	1.43	1.43
% Very Tolerant Individuals	0.63	10.54	10.00

SCI Sum	58.22
Final SCI score	64.68

Water Quality Assessment

Long-term water quality data is available for both locations on English Creek from Polk County Natural Resources for the Countyline Road site and Hillsborough County Environmental Protection Commission Routine Monitoring for the Highway 60 site. Table 3 provides a summary of the Physical/Chemical conditions recorded at both sites. Of note in the physical water quality table is the increase in conductivity, salinity and TDS as it passes through an area of agriculture between the two sites.

Table 3 English Creek Physical Water Quality (Field)

Site	Depth (m)	Temp (c)	pH	DO (mg/L)	DO (% Sat)	Cond (umhl/cm)	Salinity (ppt)	TDS (mg/L)
Highway 60	0.43	23.82	8	6.69	77.9	313.4	0.15	200.6
Countyline Road	0.06	24.38	8.09	6.76	79.5	226.1	0.1	144.7

The chemical water quality analysis English Creek is shown in Table 4 along with geometric mean values for the past three years for available parameters. Three year geometric mean Total Phosphorous values for both sites were above the nutrient region threshold developed by FDEP of 0.49 mg/l, although the samples associated with this assessment were below that threshold. Three year geometric mean Total Nitrogen values were also above the nutrient region threshold developed by FDEP of 1.65 mg/l. The Total Nitrogen values for the samples with the assessment were also above the threshold. Chlorophyll-a values fall within the site specific evaluation range of 3.2 µg/l to 20 µg/l. For sites with Chlorophyll-a values in this range, the assessment is inconclusive of conditions reflecting an imbalance in flora. T laboratory analysis values also indicates elevated biomass at both sample sites for Fecal Coliform and Enterococci.

Table 4 English Creek Water Quality (Laboratory)

Parameter	English Creek at HWY 60	English Creek at Countyline	Units	3-Year Geomean Hwy 60	3-Year Geomean Countyline
Nitrates/Nitrites	1.42	1.686	mg/L		
Fecal Coliform	1220	960	#/100 ml		
Enterococci	3100	1500	#/100 ml		
Chlorophyll a	2.4	1.8	ug/L		
Chlorophyll b	2.6	2.6	ug/L		
Chlorophyll c	0.6	0.6	ug/L		
Chlorophyll t	3.4	2.7	ug/L		
Chlorophylla Corr	3.4	3.4	ug/L		
Chlorophyll-pheo	6.6	6.6	ug/L		
Ammonia	0.03	0.064	mg/L		
Kjeldahl Nitrogen	0.811	0.762	mg/L		
Total Nitrogen	2.231	2.448	mg/L	2.37	3.056
Total Phosphorus	0.419	0.286	mg/L	0.639	0.812
Color(345)F.45	27.8	23.6	Pt/Co		

Table 5 Summary of Water Quality, Floristic Surveys, Habitat Assessments and SCI

Measure		Hwy 60	Countyline	Threshold
Total Phosphorous (mg/l)		0.639	0.812	< 0.49
Total Nitrogen (mg/l)		2.37	3.056	< 1.65
RPS (% Rank 4-6)		2	2	< 25%
LVS	Avg C of C	1.47	0.918	≥ 2.5
	FLEPPC %	50.00%	86.67%	< 25%
Chlorophyll (µg/l)		3.4	3.4	< 20 µg/l
Habitat Assessment		122	117	> 34
SCI		68	61	> 34

Conclusion

The portion of English Creek that was assessed during this study shows impairment based on water quality (Nitrogen and Phosphorous). The system also shows impairment in the vegetation communities through the linear vegetation survey results with a high percentage of non-native invasive species and low Average Coefficient of Conservatism. The Rapid Periphyton Survey did not show excessive growths of periphyton. The habitat assessment performed on the two sample sites shows sufficient habitat is present with Habitat Assessment scores of 122 and 117. The results of the Stream Conditions Index macroinvertebrate analysis showed healthy assemblages of macroinvertebrates present at the time of the assessment with scores of 68 and 61.

English Creek @ CL SCI A
Stream Condition Index (SCI)
Samples Collected 5/10/2016
Project #: 6067160115

Stream Condition Index Results for English Creek @ CL SCI A

Phylum	Class	Order	Family	Genus Species	Abundance	Collapsed/Reduced Abundance	Taxa Presence	Ephemeroptera Taxa	Trichoptera Taxa	50% Filterer	100% Filterer	Clinger Taxa	Long-lived Taxa	Dominant Taxa	Tanytarsini	Sensitive Taxa	Very Tolerant Individuals
Annelida	Clitellata	Tubificida	Naididae	Tubificinae spp.	2	2	1	0	0	0	0	0	0		0	0	0
Annelida	Clitellata	Lumbriculida	Lumbriculidae	*Lumbriculus cf. variegatus*	1	1	1	0	0	0	0	0	0		0	0	1
Mollusca	Gastropoda	Hygrophila	Planorbidae	*Planorbella spp.*	2	2	1	0	0	0	0	0	0		0	0	2
Mollusca	Gastropoda	Littorinimorpha	Hydrobiidae	Hydrobiidae spp.	8	7	1	0	0	0	0	0	0		0	0	0
Mollusca	Bivalvia	Veneroida	Corbiculidae	*Corbicula fluminea*	3	2	1	0	0	0	2	0	1		0	0	0
Arthropoda	Malacostraca	Amphipoda	Dogielinotidae	*Hyalella azteca sp. complex*	1	1	1	0	0	0	0	0	0		0	0	0
Arthropoda	Malacostraca	Decapoda	Cambaridae	Cambaridae spp.	1	1	1	0	0	0	0	0	1		0	0	0
Arthropoda	Insecta	Odonata	Coenagrionidae	*Argia sedula*	3	2	1	0	0	0	0	0	0		0	0	2
Arthropoda	Insecta	Trichoptera	Leptoceridae	*Triaenodes spp.*	1	1	1	0	1	0	0	0	0		0	1	0
Arthropoda	Insecta	Trichoptera	Hydropsychidae	*Cheumatopsyche spp.*	11	8	1	0	1	0	8	1	0		0	0	0
Arthropoda	Insecta	Trichoptera	Hydroptilidae	*Hydroptila spp.*	1	1	1	0	1	0	0	1	0		0	0	0
Arthropoda	Insecta	Trichoptera	Hydroptilidae	*Neotrichia spp.*	2	2	1	0	1	0	0	1	0		0	0	0
Arthropoda	Insecta	Coleoptera	Elmidae	*Dubiraphia spp.*	12	9	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Coleoptera	Elmidae	*Stenelmis spp.*	3	2	1	0	0	0	0	1	0		0	0	0
Arthropoda	Insecta	Coleoptera	Elmidae	*Microcylloepus spp.*	57	48	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Coleoptera	Gyrinidae	*Gyretes spp.*	1	1	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Cladotanytarsus spp.*	1	1	1	0	0	0.5	0	0	0		1	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Polypedilum scalaenum group*	3	2	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Polypedilum convictum group*	52	46	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Polypedilum illinoense group*	2	1	1	0	0	0	0	0	0		0	0	1
Arthropoda	Insecta	Diptera	Chironomidae	*Rheotanytarsus spp.*	18	17	1	0	0	0	17	1	0		17	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Ablabesmyia rhamphe group*	2	2	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Rheocricotopus spp.*	1	1	1	0	0	0	0	0	0		0	1	0

	Raw Totals	SCI scores	Adjusted SCI scores
Total Taxa	23.00	3.33	3.33
Total Ephemeroptera	0.00	0.00	0.00
Total Trichoptera	4.00	5.71	5.71
% Filter Feeders	17.19	3.83	3.83
Total Clingers	5.00	7.14	7.14
Total Long-lived Taxa	2.00	6.67	6.67
% Dominance	30.00	6.80	6.80
% Tanytarsini	11.25	7.37	7.37
Total Sensitive Taxa	2.00	2.86	2.86
% Very Tolerant Individuals	3.75	7.85	7.85

SCI Sum	51.57
Final SCI score	57.30

Source: Amec Foster Wheeler, 2016
Prepared by: SEM
Checked by: MAE

English Creek @ CL SCI B
Stream Condition Index (SCI)
Samples Collected 5/10/2016
Project #: 6067160115

Stream Condition Index Results for English Creek @ CL SCI B

Phylum	**Class**	**Order**	**Family**	**Genus Species**	Abundance	Collapsed/Reduced Abundance	Taxa Presence	Ephemeroptera Taxa	Trichoptera Taxa	50% Filterer	100% Filterer	Clinger Taxa	Long-lived Taxa	Dominant Taxa	Tanytarsini	Sensitive Taxa	Very Tolerant Individuals
Annelida	Clitellata	Tubificida	Naididae	*Tubificinae spp.*	3	2	1	0	0	0	0	0	0		0	0	0
Annelida	Clitellata	Opisthopora	Sparganophilidae	*Sparganophilus spp.*	1	1	1	0	0	0	0	0	0		0	0	0
Mollusca	Gastropoda	Littorinimorpha	Hydrobiidae	Hydrobiidae spp.	14	10	1	0	0	0	0	0	0		0	0	0
Mollusca	Bivalvia	Veneroida	Corbiculidae	*Corbicula fluminea*	1	1	1	0	0	0	1	0	1		0	0	0
Arthropoda	Malacostraca	Amphipoda	Dogielinotidae	*Hyalella azteca sp. complex*	1	0	1	0	0	0	0	0	0		0	0	0
Arthropoda	Malacostraca	Decapoda	Palaemonidae	*Palaemonetes spp.*	1	1	1	0	0	0	0	0	1		0	0	0
Arthropoda	Malacostraca	Decapoda	Cambaridae	Cambaridae spp.	1	1	1	0	0	0	0	0	1		0	0	0
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	*Maccaffertium spp.*	2	1	1	1	0	0	0	1	0		0	1	0
Arthropoda	Insecta	Odonata	Coenagrionidae	*Argia spp.*	3	3	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Trichoptera	Hydropsychidae	*Cheumatopsyche spp.*	17	13	1	0	1	0	13	1	0		0	0	0
Arthropoda	Insecta	Trichoptera	Hydroptilidae	*Neotrichia spp.*	4	2	1	0	1	0	0	1	0		0	0	0
Arthropoda	Insecta	Coleoptera	Elmidae	*Dubiraphia spp.*	14	12	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Coleoptera	Elmidae	*Stenelmis spp.*	5	4	1	0	0	0	0	1	0		0	0	0
Arthropoda	Insecta	Coleoptera	Elmidae	*Microcylloepus spp.*	37	27	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Coleoptera	Gyrinidae	*Dineutus spp.*	1	1	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Cladotanytarsus spp.*	1	1	1	0	0	0.5	0	0	0		1	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Tanytarsus spp.*	6	6	1	0	0	3	0	0	0		6	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Polypedilum scalaenum group*	3	3	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Polypedilum convictum group*	63	45	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Polypedilum illinoense group*	1	1	1	0	0	0	0	0	0		0	0	1
Arthropoda	Insecta	Diptera	Chironomidae	*Rheotanytarsus spp.*	27	18	1	0	0	0	18	1	0		18	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Ablabesmyia mallochi*	5	4	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Paratanytarsus spp.*	1	1	1	0	0	0.5	0	0	0		1	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Labrundinia spp.*	1	1	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Stelechomyia perpulchra*	1	1	1	0	0	0	0	0	0		0	0	0

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Project #: 6067160115

Stream Condition Index Results for English Creek @ 60 SCI A

Phylum	Class	Order	Family	Genus Species	Abundance	Collapsed/Reduced Abundance	Taxa Presence	Ephemeroptera Taxa	Trichoptera Taxa	50% Filterer	100% Filterer	Clinger Taxa	Long-lived Taxa	Dominant Taxa	Tanytarsini	Sensitive Taxa	Very Tolerant Individuals
Annelida	Clitellata	Tubificida	Naididae	Tubificinae spp.	3	0	0	0	0	0	0	0	0		0	0	0
Annelida	Clitellata	Tubificida	Naididae	*Limnodrilus hoffmeisteri*	1	4	1	0	0	0	0	0	0		0	0	4
Annelida	Clitellata	Lumbriculida	Lumbriculidae	*Eclipidrilus palustris*	1	1	1	0	0	0	0	0	0		0	0	0
Mollusca	Gastropoda	Neotaeniglossa	Pleuroceridae	*Pleurocera spp.*	4	4	1	0	0	0	0	0	0		0	0	0
Mollusca	Gastropoda	Littorinimorpha	Hydrobiidae	Hydrobiidae spp.	23	20	1	0	0	0	0	0	0		0	0	0
Mollusca	Gastropoda	Architaeniglossa	Viviparidae	*Viviparus georgianus*	1	1	1	0	0	0	0	0	0		0	0	0
Mollusca	Bivalvia	Veneroida	Corbiculidae	*Corbicula fluminea*	5	3	1	0	0	0	3	0	1		0	0	0
Arthropoda	Malacostraca	Isopoda		Isopoda spp.	1	1	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Ephemeroptera	Caenidae	*Caenis spp.*	1	1	1	1	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Ephemeroptera	Baetidae	Baetidae spp.	2	1	1	1	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Heptageniidae spp.	1	1	1	1	0	0	0	1	0		0	1	0
Arthropoda	Insecta	Odonata	Corduliidae	*Epitheca princeps regina*	4	4	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Odonata	Coenagrionidae	*Argia spp.*	2	1	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Trichoptera	Leptoceridae	*Triaenodes spp.*	2	1	1	0	1	0	0	0	0		0	1	0
Arthropoda	Insecta	Trichoptera	Hydropsychidae	*Cheumatopsyche spp.*	29	26	1	0	1	0	26	1	0		0	0	0
Arthropoda	Insecta	Trichoptera	Hydroptilidae	*Neotrichia spp.*	8	7	1	0	1	0	0	1	0		0	0	0
Arthropoda	Insecta	Coleoptera	Elmidae	*Dubiraphia spp.*	1	1	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Coleoptera	Elmidae	*Stenelmis spp.*	4	4	1	0	0	0	0	1	0		0	0	0
Arthropoda	Insecta	Coleoptera	Elmidae	*Microcylloepus spp.*	44	36	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Chironomus spp.*	3	3	1	0	0	0	0	0	0		0	0	3
Arthropoda	Insecta	Diptera	Chironomidae	*Tanytarsus spp.*	4	4	1	0	0	2	0	0	0		4	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Polypedilum convictum group*	15	10	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Rheotanytarsus spp.*	14	11	1	0	0	0	11	1	0		11	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Ablabesmyia mallochi*	4	3	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Stenochironomus spp.*	7	5	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Xenochironomus xenolabis*	5	4	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Stelechomyia perpulchra*	1	1	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Tipulidae	Tipulidae spp.	1	1	1	0	0	0	0	0	0		0	0	0
Arthropoda	Arachnida	Trombidiformes	Sperchonidae	*Sperchon spp.*	1	1	1	0	0	0	0	0	0		0	0	0

	Raw Totals	SCI scores	Adjusted SCI scores
Total Taxa	28.00	5.42	5.42
Total Ephemeroptera	3.00	6.00	6.00
Total Trichoptera	3.00	4.29	4.29
% Filter Feeders	26.25	5.94	5.94
Total Clingers	5.00	7.14	7.14
Total Long-lived Taxa	1.00	3.33	3.33
% Dominance	22.50	8.30	8.30
% Tanytarsini	9.38	6.88	6.88
Total Sensitive Taxa	2.00	2.86	2.86
% Very Tolerant Individuals	4.38	7.55	7.55

SCI Sum	57.70
Final SCI score	64.12

Source: Amec Foster Wheeler, 2016
Prepared by: SEM
Checked by: MAE

English Creek @ 60 SCI B
Stream Condition Index (SCI)
Samples Collected 5/31/2016
Project #: 6067160115

Stream Condition Index Results for English Creek @ 60 SCI B

Phylum	Class	Order	Family	Genus Species	Abundance	Collapsed/Reduced Abundance	Taxa Presence	Ephemeroptera Taxa	Trichoptera Taxa	50% Filterer	100% Filterer	Clinger Taxa	Long-lived Taxa	Dominant Taxa	Tanytarsini	Sensitive Taxa	Very Tolerant Individuals
Annelida	Clitellata	Tubificida	Naididae	Tubificinae spp.	3	3	1	0	0	0	0	0	0		0	0	0
Annelida	Clitellata	Tubificida	Naididae	*Dero trifida*	3	3	1	0	0	0	0	0	0		0	0	3
Annelida	Clitellata	Lumbriculida	Lumbriculidae	*Eclipidrilus palustris*	7	7	1	0	0	0	0	0	0		0	0	0
Mollusca	Gastropoda	Neotaeniglossa	Pleuroceridae	*Pleurocera spp.*	5	5	1	0	0	0	0	0	0		0	0	0
Mollusca	Gastropoda	Littorinimorpha	Hydrobiidae	Hydrobiidae spp.	8	8	1	0	0	0	0	0	0		0	0	0
Mollusca	Bivalvia	Veneroida	Corbiculidae	*Corbicula spp.*	2	1	1	0	0	0	1	0	1		0	0	0
Arthropoda	Malacostraca	Decapoda	Palaemonidae	*Palaemonetes spp.*	2	2	1	0	0	0	0	0	1		0	0	0
Arthropoda	Malacostraca	Decapoda	Cambaridae	Cambaridae spp.	1	1	1	0	0	0	0	0	1		0	0	0
Arthropoda	Insecta	Ephemeroptera	Caenidae	*Caenis spp.*	1	1	1	1	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Ephemeroptera	Baetidae	Baetidae spp.	2	2	1	1	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Odonata	Corduliidae	*Epitheca princeps regina*	1	1	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Odonata	Coenagrionidae	*Argia sedula*	2	1	1	0	0	0	0	0	0		0	0	1
Arthropoda	Insecta	Odonata	Coenagrionidae	*Enallagma coecum*	2	2	1	0	0	0	0	0	0		0	0	2
Arthropoda	Insecta	Odonata	Calopterygidae	*Calopteryx spp.*	1	1	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Trichoptera	Leptoceridae	*Triaenodes spp.*	1	1	1	0	1	0	0	0	0		0	1	0
Arthropoda	Insecta	Trichoptera	Hydropsychidae	*Cheumatopsyche spp.*	40	34	1	0	1	0	34	1	0		0	0	0
Arthropoda	Insecta	Trichoptera	Hydroptilidae	*Neotrichia spp.*	10	9	1	0	1	0	0	1	0		0	0	0
Arthropoda	Insecta	Coleoptera	Elmidae	*Dubiraphia spp.*	1	1	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Coleoptera	Elmidae	*Stenelmis spp.*	1	1	1	0	0	0	0	1	0		0	0	0
Arthropoda	Insecta	Coleoptera	Elmidae	*Microcylloepus spp.*	28	23	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Coleoptera	Gyrinidae	*Dineutus spp.*	1	1	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Chironomus spp.*	2	1	1	0	0	0	0	0	0		0	0	1
Arthropoda	Insecta	Diptera	Chironomidae	*Tanytarsus spp.*	10	8	1	0	0	4	0	0	0		8	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Polypedilum scalaenum group*	6	5	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Polypedilum convictum group*	17	14	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Rheotanytarsus spp.*	17	13	1	0	0	0	13	1	0		13	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Ablabesmyia mallochi*	3	3	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Stenochironomus spp.*	6	4	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Stelechomyia perpulchra*	2	2	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Empididae	*Hemerodromia spp.*	1	1	1	0	0	0	0	0	0		0	1	0
Arthropoda	Arachnida	Trombidiformes	Sperchonidae	*Sperchon spp.*	1	1	1	0	0	0	0	0	0		0	0	

	SCI scores	Adjusted SCI scores
Total Taxa	6.67	6.67
Total Ephemeroptera	4.00	4.00
Total Trichoptera	4.29	4.29
% Filter Feeders	7.40	7.40
Total Clingers	5.71	5.71
Total Long-lived Taxa	10.00	10.00
% Dominance	8.55	8.55
% Tanytarsini	7.79	7.79
Total Sensitive Taxa	2.86	2.86
% Very Tolerant Individuals	7.55	7.55

SCI Sum	64.80
Final SCI score	72.00

Source: Amec Foster Wheeler, 2016
Prepared by: SEM
Checked by: MAE