Delaney 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

Delaney Creek located in Hillsborough County Florida was sampled at two localities on separate dates. The first sampling locality was samples on 5/12/2016 and is located between the Selmon Expressway and Highway 301 in Tampa Florida at: N 27.935008, W 82.354735. The second sampling locality was sampled on 5/16/2016 located near Maydell Drive between 31st Ave South and 34th Ave South at: N 27.919112, W 82.385757. Delaney Creek discharges into Hillsborough Bay. The watershed surrounding Delaney Creek is dominated by Medium Density, 2>5 dwelling units/acre (20.95%), High Density, 6 or more dwelling units/acre (19.96%), and Commercial and Services (15.90%) land use. The Landscape Development Intensity Index of the watershed is 6.57.

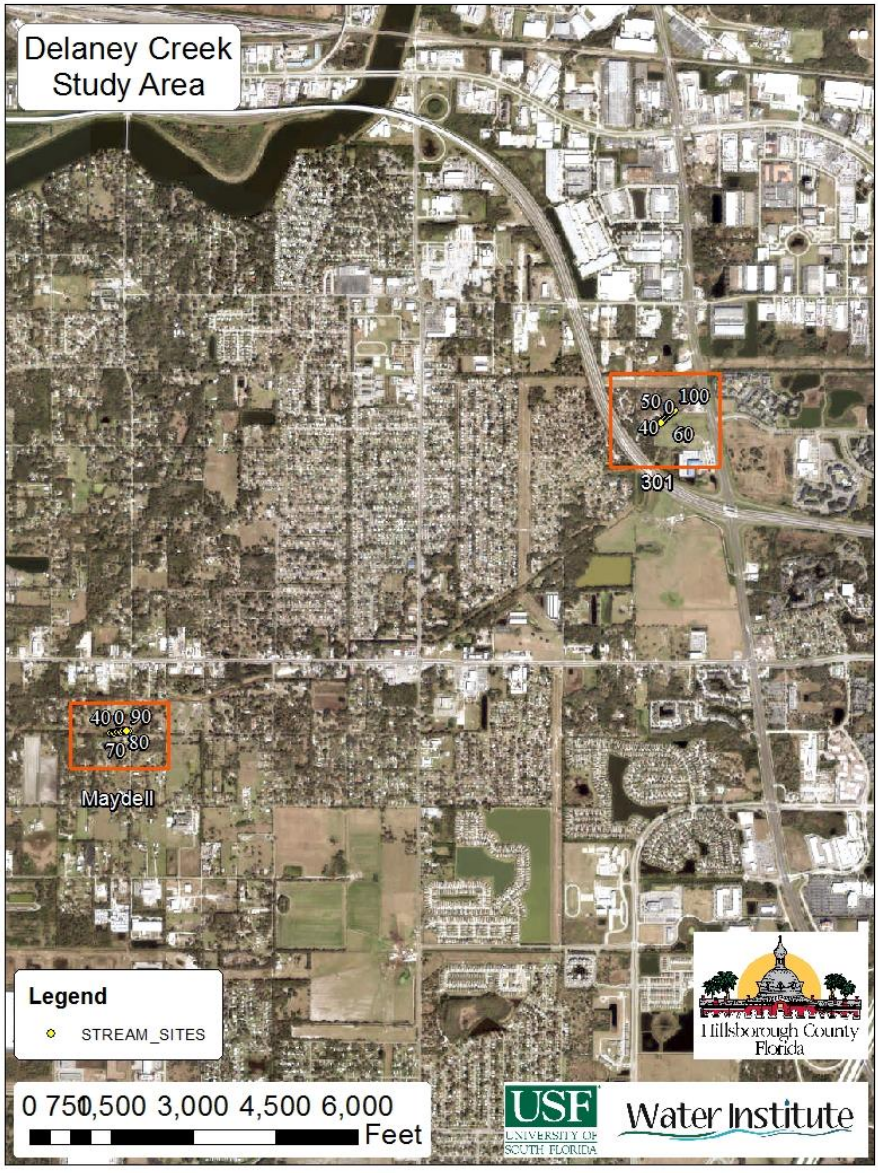

Figure 1. 2016 Delaney Creek Assessment Study Area Map

Habitat Assessment

Delaney Creek at Highway 301

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

Delaney Creek at highway 301 received a Habitat Assessment score of 96 with signs of artificial channelization, an adequate number of stable pools and good water velocity. The primary habitat components scored in the optimal category for Substrate Diversity and Suboptimal for Substrate Availability, Water Velocity and Habitat Smothering. The secondary habitat components showed marginal scores for artificial channelization. The left bank scored in the suboptimal range for Bank Stability, Riparian Buffer Width and Riparian Zone Vegetation Quality. The right bank scored lower than the left bank with marginal scores for Bank Stability and Poor scores for Riparian Buffer Width and Riparian Zone Vegetation Quality.

During the Rapid Periphyton Survey, periphyton was observed in 1 of the 99 individual grab samples performed. The average canopy cover in the 100 meter region was 89%. The Secchi Disk Depth was measured as 0.75 meters visible on bottom at the 50 meter mark. The average water depth at the time of the assessment was 0.5 meters.

The Linear Vegetation Survey identified 9 species rooted in the water at the time of the assessment. The majority of these species (6) are non-native, invasive species shown in bold in Table 1. The remaining 3 species are native to this region. *Hygrophila polysperma* was the dominant species in Region 30-40 of the Linear Vegetation Survey. The vegetation community along this sample location showed evidence of frequent disturbance resulting in the dominance by pioneering species. There were a total of 30 species observations in the 100 meter study area. The mean Coefficient of Conservatism

(CoC) metric for the study area was 1.00 and the % FLEPPC metric for the study area was 70%. Both of these metrics do not meet the FDEP thresholds of > 2.5 for Mean CoC and < 25% for % FLEPPC.

Table 1 Linear Vegetation Survey Results – Delaney Creek at HWY 301

Plant Species	C of C Score	Sample Site										
		0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	Observations/ Species
Hygrophila polysperma	0	1	1	1	D	1		1	1		1	8
Hydrocotyle umbellata	1.92	1			1	1	1	1			1	6
Commelina diffusa	2.02				1	1		1	1		1	5
Alternanthera philoxeroides	0	1						1	1			3
Colocasia esculenta	0									1	1	2
Salix caroliniana	2.95							1			1	2
Urochloa mutica	0				1	1						2
Ludwigia peruviana	0				1							1
Polygonum hydropiperoides	2.5				1							1
Total Observations/ Station		3	1	1	6	4	1	5	3	1	5	30
Total Observations	29											
Mean CoC	1											
% FLEPPC	70%											

Figure 3. *Hygrophila polysperma* was the dominant species in the 30-40 meter region on Delaney Creek near Hwy 301

Stream Condition Index Assessment

The SCI score for this site was 56 out of a possible 100 points, corresponding with a "Healthy" designation, with the expected community of a healthy stream. One of the taxa collected in each cohort were pollution-sensitive.

Delaney Creek @ Hwy 301 SCI A	**Raw Totals**	**SCI scores**	**Adjusted SCI scores**
Total Taxa	31.0	6.67	6.67
Total Ephemeroptera	2.0	4.00	4.00
Total Trichoptera	3.0	4.29	4.29
% Filter Feeders	24.69	5.58	5.58
Total Clingers	4.0	5.71	5.71
Total Long-lived Taxa	1.00	3.33	3.33
% Dominance	25.63	7.68	7.68
% Tanytarsini	5.63	5.56	5.56
Total Sensitive Taxa	1.0	1.43	1.43
% Very Tolerant Individuals	11.88	5.36	5.36

SCI Sum	49.61
Final SCI score	55.12

Delaney Creek @ Hwy 301 SCI B	**Raw Totals**	**SCI scores**	**Adjusted SCI scores**
Total Taxa	29.00	5.83	5.83
Total Ephemeroptera	2.00	4.00	4.00
Total Trichoptera	2.00	2.86	2.86
% Filter Feeders	33.44	7.61	7.61
Total Clingers	4.00	5.71	5.71
Total Long-lived Taxa	1.00	3.33	3.33
% Dominance	25.00	7.80	7.80
% Tanytarsini	10.00	7.05	7.05
Total Sensitive Taxa	1.00	1.43	1.43
% Very Tolerant Individuals	12.50	5.24	5.24

SCI Sum	50.88
Final SCI score	56.53

Delaney Creek at Maydell Dr.

Figure 4. Overview photograph of the Delaney Creek at Maydell Dr Sample Site

Delaney Creek at Maydell Dr received a Habitat Assessment score of 92 due to optimal scores for Substrate Availability, suboptimal scores for water velocity and marginal scores for Substrate availability and Habitat Smothering for Primary Habitat Components. Secondary habitat components scored marginal for artificial channelization as straightening of the channel was obvious. Both banks scored optimal for bank stability. The left bank scored in the suboptimal range for riparian buffer width whereas the right bank scored in the marginal range. Both banks scored in the poor category for riparian zone vegetation quality. Water velocity was suboptimal at .13 m/s measured at the 20 meter mark. Thickness of riparian zone was measured at an average of 15m for the left bank and 4.5m for the right bank.

During the Rapid Periphyton Survey, periphyton was observed in 4 of the 99 samples. The average canopy cover in the 100 meter region was 0.45%. The Secchi Disk Depth was measured as 0.75 meters visible on bottom at the 50 meter mark. The average water depth in the study area was 0.5m at the time of the assessment.

The Linear Vegetation Survey identified 11 species rooted in the water at the time of the assessment. The majority of these species (6) are non-native, invasive species. The remaining 5 species are native to this region. *Ludwigia peploides* was the dominant species in the 0-90 regions and *Hydrilla verticillata* and *Urochloa mutica* were the dominant species in region 90-100. The vegetation community along this sample location showed evidence of frequent disturbance resulting in the dominance by pioneering species. There were a total of 69 species observations in the 100 meter study area. The mean Coefficient of Conservatism (CoC) metric for the study area was 1.65 and the % FLEPPC metric for

the study area was 62.30%. Both of these metrics were below the FDEP threshold of Mean CoC > 2.5 and % FLEPPC < 25%.

Table 2 Linear Vegetation Survey Results – Delaney Creek @ Maydell Dr.

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	Observations / Species
Alternanthera philoxeroides	0	1	1	1	1	1	1	1	1	1	1	10
Colocasia esculenta	0	1	1	1	1	1	1	1	1	1	1	10
Commelina diffusa	2.02	1	1	1	1	1	1	1	1	1	1	10
Ludwigia peploides	4	D	D	D	D	D	D	D	D	D	1	10
Urochloa mutica	0	1	1	1	1	1	1	1	1	1	C	10
Ludwigia repens	3.2	1	1		1	1		1	1	1	1	8
Ludwigia leptocarpa	3	1			1		1			1		4
Polygonum glabrum	4.5		1			1			1			3
Hydrilla verticillata	0							1			C	2
Polygonum hydropiperoides	2.5			1								1
Sphagneticola trilobata	0										1	1
Observations/Station		7	7	6	7	7	6	7	7	7	8	69
Total Observations	69											
Mean CoC	1.65											
% FLEPPC	62.30%											

Figure 5 Delaney Creek at Maydell Dr was heavily vegetated at the time of the assessment

Stream Condition Index Assessment

The SCI score for this site was 40 out of a possible 100 points, corresponding with a "Healthy" designation, with the expected community of a healthy stream. One of the taxa collected were pollution-sensitive

Delaney Creek at Maydell Dr SCI A	**Raw Totals**	**SCI scores**	**Adjusted SCI scores**
Total Taxa	22.00	2.92	2.92
Total Ephemeroptera	2.00	4.00	4.00
Total Trichoptera	3.00	4.29	4.29
% Filter Feeders	8.13	1.73	1.73
Total Clingers	2.00	2.86	2.86
Total Long-lived Taxa	2.00	6.67	6.67
% Dominance	43.75	4.05	4.05
% Tanytarsini	3.75	4.58	4.58
Total Sensitive Taxa	0.00	0.00	0.00
% Very Tolerant Individuals	30.63	3.12	3.12

SCI Sum	34.20
Final SCI score	38.00

Delaney Creek at Maydell Dr SCI B	**Raw Totals**	**SCI scores**	**Adjusted SCI scores**
Total Taxa	23.00	3.33	3.33
Total Ephemeroptera	1.00	2.00	2.00
Total Trichoptera	4.00	5.71	5.71
% Filter Feeders	6.88	1.44	1.44
Total Clingers	2.00	2.86	2.86
Total Long-lived Taxa	2.00	6.67	6.67
% Dominance	42.50	4.30	4.30
% Tanytarsini	5.63	5.56	5.56
Total Sensitive Taxa	1.00	1.43	1.43
% Very Tolerant Individuals	25.00	3.60	3.60

SCI Sum	36.90
Final SCI score	41.00

Water Quality Assessment

Limited long-term water quality data is available for Delaney Creek downstream from the Maydell Dr sample site. The data that is available was collected by the Hillsborough County Environmental Protection Commission and USF Water Institute. Table 3 provides a summary of the Physical/Chemical conditions recorded at both sites. Of note in the physical water quality table is the overall low Dissolved oxygen in the system.

Table 3 Delaney Creek Physical Water Quality (Field)

Depth (m)	Temp (c)	pH	DO (mg/L)	DO (% Sat)	Cond (umho/cm)	Salinity (ppt)	TDS (mg/L)	Sample Site
0.1	28.59	6.81	2.21	28.1	178	0.08	113.9	HWY 301
0.12	28.82	7.25	3.43	43.7	219.8	0.1	140.6	Maydell

The chemical water quality analysis for the Delaney Creek is shown in Table 4 along with geometric mean values for the past three years for available parameters. Total Phosphorous values were below the nutrient region threshold developed by FDEP of 0.49 mg/l. Total Nitrogen values were also below the nutrient region threshold developed by FDEP of 1.65 mg/l. 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. Of particular concern in the laboratory analysis values are the values at both sample sites for Fecal Coliform and Enterococci with the sample site at Maydell Dr Avenue showing clear contamination.

Table 4 Delaney Creek Water Quality (Laboratory)

Parameter	HWY 301	Maydell Dr	3-Year Geomean	Units
Alkalinity	52.0	62.0		mg/LCaCO3
Nitrates/Nitrites	0.007	0.052		mg/L
Fecal Coliform	160	450		#/100 ml
Enterococci	>2000	4700		#/100 ml
Chlorophyll a	17.1	11.0		ug/L
Chlorophyll b	2.6	2.6		ug/L
Chlorophyll c	0.9	0.8		ug/L
Chlorophyll t	19.6	13.1		ug/L
Chlorophylla Corr	14.0	9.1	4.11	ug/L
Chlorophyll-pheo	6.6	6.6		ug/L
Ammonia	0.088	0.097		mg/L
Kjeldahl Nitrogen	0.978	1.103		mg/L
Total Nitrogen	0.985	1.155	0.891	mg/L
Total Phosphorus	0.269	0.307	0.185	mg/L
Color(345)F.45	51.8	56.6		Pt/Co

Conclusion

The Delaney Creek region that was assessed during this study does not show impairment based on water quality alone although the bacteria sampling indicates a stressed and potentially contaminated system. The system does show impairment in the vegetation communities through the linear vegetation survey results with a high percentage of non-native invasive species at both sites. The habitat assessment performed on the two sample sites shows habitat is sufficient for biotic use. The Hwy 301 site showed a higher SCI value than the Maydell site.

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

Measure		301	Maydell	Threshold
Total Phosphorous (mg/l)		0.269	0.307	< 0.49
Total Nitrogen (mg/l)		0.985	1.155	< 1.65
RPS (% Rank 4-6)		0	0	< 25%
LVS	Avg C of C	1	1.65	≥ 2.5
	FLEPPC %	70.00%	62.30%	< 25%
Chlorophyll (µg/l)		14	9.1	< 20 µg/l
Habitat Assessment		96	92	> 34
SCI		56	40	> 34

Delaney@301 SCI A
Stream Condition Index (SCI)
Samples Collected 5/12/2016
Project #: 6067160115

Stream Condition Index Results for Delaney@301 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.	1	1	1	0	0	0	0	0	0		0	0	0
Annelida	Clitellata	Rhynchobdellida	Glossiphoniidae	*Helobdella stagnalis*	1	1	1	0	0	0	0	0	0		0	0	1
Mollusca	Gastropoda	Littorinimorpha	Hydrobiidae	Hydrobiidae spp.	4	3	1	0	0	0	0	0	0		0	0	0
Mollusca	Gastropoda	Neotaenioglossa	Thiaridae	*Melanoides tuberculata*	15	10	1	0	0	0	0	0	0		0	0	10
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*	51	41	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Ephemeroptera	Caenidae	*Caenis spp.*	5	4	1	1	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Ephemeroptera	Baetidae	Baetidae spp.	8	6	1	1	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Odonata	Coenagrionidae	*Argia sedula*	1	1	1	0	0	0	0	0	0		0	0	1
Arthropoda	Insecta	Odonata	Coenagrionidae	*Enallagma coecum*	3	1	1	0	0	0	0	0	0		0	0	1
Arthropoda	Insecta	Trichoptera	Leptoceridae	*Oecetis spp.*	1	1	1	0	1	0	0	0	0		0	0	0
Arthropoda	Insecta	Trichoptera	Hydropsychidae	*Cheumatopsyche spp.*	45	32	1	0	1	0	32	1	0		0	0	0
Arthropoda	Insecta	Trichoptera	Hydroptilidae	*Oxyethira spp.*	3	3	1	0	1	0	0	0	0		0	0	0
Arthropoda	Insecta	Coleoptera	Elmidae	*Dubiraphia spp.*	2	2	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Coleoptera	Elmidae	*Microcylloepus spp.*	25	19	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Chironomus spp.*	1	1	1	0	0	0	0	0	0		0	0	1
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.*	1	1	1	0	0	0.5	0	0	0		1	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Cryptochironomus spp.*	1	1	1	0	0	0	0	0	0		0	0	1
Arthropoda	Insecta	Diptera	Chironomidae	*Polypedilum convictum group*	9	6	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Rheotanytarsus spp.*	1	1	1	0	0	0	1	1	0		1	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Ablabesmyia rhamphe group*	1	1	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Dicrotendipes spp.*	1	1	1	0	0	0.5	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Pentaneura spp.*	8	7	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Paracladopelma spp.*	1	1	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Asheum beckae*	1	1	1	0	0	0	0	0	0		0	0	1
Arthropoda	Insecta	Diptera	Chironomidae	*Pseudochironomus spp.*	1	1	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Paratanytarsus spp.*	6	6	1	0	0	3	0	0	0		6	0	0
Arthropoda	Insecta	Diptera	Simuliidae	Simuliidae spp.	1	1	1	0	0	0	1	1	0		0	1	0
Arthropoda	Insecta	Lepidoptera	Crambidae	Crambidae spp.	2	0	0	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Lepidoptera	Crambidae	*Petrophila spp.*	2	3	1	0	0	0	0	1	0		0	0	2
Arthropoda	Insecta	Lepidoptera	Crambidae	*Parapoynx spp.*	1	1	1	0	0	0	0	0	0		0	0	1

	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	24.69	5.58	5.58
Total Clingers	4.00	5.71	5.71
Total Long-lived Taxa	1.00	3.33	3.33
% Dominance	25.63	7.68	7.68
% Tanytarsini	5.63	5.56	5.56
Total Sensitive Taxa	1.00	1.43	1.43
% Very Tolerant Individuals	11.88	5.36	5.36

SCI Sum	49.61
Final SCI score	55.12

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

Delaney@301 SCI B
Stream Condition Index (SCI)
Samples Collected 5/12/2016
Project #: 6067160115

Stream Condition Index Results for Delaney@301 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	*Limnodrilus hoffmeisteri*	1	1	1	0	0	0	0	0	0		0	0	1
Annelida	Clitellata	Tubificida	Naididae	*Slavina appendiculata*	1	1	1	0	0	0	0	0	0		0	0	0
Annelida	Clitellata	Rhynchobdellida	Glossiphoniidae	*Helobdella stagnalis*	2	2	1	0	0	0	0	0	0		0	0	2
Mollusca	Gastropoda	Littorinimorpha	Hydrobiidae	Hydrobiidae spp.	5	3	1	0	0	0	0	0	0		0	0	0
Mollusca	Gastropoda	Neotaenioglossa	Thiaridae	*Melanoides tuberculata*	18	10	1	0	0	0	0	0	0		0	0	10
Mollusca	Bivalvia	Veneroida	Corbiculidae	*Corbicula fluminea*	3	3	1	0	0	0	3	0	1		0	0	0
Arthropoda	Malacostraca	Amphipoda	Dogielinotidae	*Hyalella azteca sp. complex*	68	40	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	*Baetis intercalaris*	6	4	1	1	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Odonata	Corduliidae	*Neurocordulia spp.*	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*	4	3	1	0	0	0	0	0	0		0	0	3
Arthropoda	Insecta	Trichoptera	Hydropsychidae	*Cheumatopsyche spp.*	60	36	1	0	1	0	36	1	0		0	0	0
Arthropoda	Insecta	Trichoptera	Hydroptilidae	*Oxyethira spp.*	2	2	1	0	1	0	0	0	0		0	0	0
Arthropoda	Insecta	Coleoptera	Elmidae	*Dubiraphia spp.*	4	3	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Coleoptera	Elmidae	*Microcylloepus spp.*	29	18	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.*	4	3	1	0	0	1.5	0	0	0		3	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Cryptochironomus spp.*	1	1	1	0	0	0	0	0	0		0	0	1
Arthropoda	Insecta	Diptera	Chironomidae	*Polypedilum convictum group*	11	7	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	*Glyptotendipes spp.*	1	1	1	0	0	0	0	0	0		0	0	1
Arthropoda	Insecta	Diptera	Chironomidae	*Ablabesmyia rhamphe group*	2	1	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Pentaneura spp.*	2	1	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Stenochironomus spp.*	1	1	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Paratanytarsus spp.*	2	1	1	0	0	0.5	0	0	0		1	0	0
Arthropoda	Insecta	Diptera	Ceratopogonidae	Ceratopogonidae spp.	1	1	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Simuliidae	Simuliidae spp.	1	1	1	0	0	0	1	1	0		0	1	0
Arthropoda	Insecta	Lepidoptera	Crambidae	*Petrophila spp.*	2	1	1	0	0	0	0	1	0		0	0	1

	Raw Totals	SCI scores	Adjusted SCI scores
Total Taxa	29.00	5.83	5.83
Total Ephemeroptera	2.00	4.00	4.00
Total Trichoptera	2.00	2.86	2.86
% Filter Feeders	33.44	7.61	7.61
Total Clingers	4.00	5.71	5.71
Total Long-lived Taxa	1.00	3.33	3.33
% Dominance	25.00	7.80	7.80
% Tanytarsini	10.00	7.05	7.05
Total Sensitive Taxa	1.00	1.43	1.43
% Very Tolerant Individuals	12.50	5.24	5.24

SCI Sum	50.88
Final SCI score	56.53

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

Delaney @ Maydell SCI A
Stream Condition Index (SCI)
Samples Collected 5/16/2016
Project #: 6067160115

Stream Condition Index Results for Delaney @ Maydell 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.	1	1	1	0	0	0	0	0	0		0	0	0
Mollusca	Gastropoda	Littorinimorpha	Hydrobiidae	Hydrobiidae spp.	3	3	1	0	0	0	0	0	0		0	0	0
Mollusca	Gastropoda	Neotaenioglossa	Thiaridae	*Melanoides tuberculata*	32	30	1	0	0	0	0	0	0		0	0	30
Mollusca	Bivalvia	Veneroida	Corbiculidae	*Corbicula fluminea*	4	3	1	0	0	0	3	0	1		0	0	0
Arthropoda	Malacostraca	Amphipoda	Dogielinotidae	*Hyalella azteca sp. complex*	81	70	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	Ephemeroptera	Caenidae	*Caenis spp.*	1	1	1	1	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Ephemeroptera	Baetidae	Baetidae spp.	6	4	1	1	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Odonata	Coenagrionidae	*Enallagma coecum*	17	15	1	0	0	0	0	0	0		0	0	15
Arthropoda	Insecta	Trichoptera	Hydropsychidae	*Cheumatopsyche spp.*	6	6	1	0	1	0	6	1	0		0	0	0
Arthropoda	Insecta	Trichoptera	Hydroptilidae	*Oxyethira spp.*	2	2	1	0	1	0	0	0	0		0	0	0
Arthropoda	Insecta	Trichoptera	Hydroptilidae	*Hydroptila spp.*	3	3	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	Diptera	Chironomidae	*Cladotanytarsus spp.*	2	2	1	0	0	1	0	0	0		2	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Tanytarsus spp.*	3	3	1	0	0	1.5	0	0	0		3	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*	6	4	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Dicrotendipes spp.*	2	2	1	0	0	1	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Orthocladius spp.*	1	1	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	Ceratopogonidae	Ceratopogonidae spp.	1	1	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Lepidoptera	Crambidae	*Parapoynx spp.*	4	4	1	0	0	0	0	0	0		0	0	4

	Raw Totals	SCI scores	Adjusted SCI scores
Total Taxa	22.00	2.92	2.92
Total Ephemeroptera	2.00	4.00	4.00
Total Trichoptera	3.00	4.29	4.29
% Filter Feeders	8.13	1.73	1.73
Total Clingers	2.00	2.86	2.86
Total Long-lived Taxa	2.00	6.67	6.67
% Dominance	43.75	4.05	4.05
% Tanytarsini	3.75	4.58	4.58
Total Sensitive Taxa	0.00	0.00	0.00
% Very Tolerant Individuals	30.63	3.12	3.12

SCI Sum	34.20
Final SCI score	38.00

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

Delaney @ Maydell SCI B
Stream Condition Index (SCI)
Samples Collected 5/16/2016
Project #: 6067160115

Stream Condition Index Results for Delaney @ Maydell 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.	2	1	1	0	0	0	0	0	0		0	0	0
Mollusca	Gastropoda	Neotaenioglossa	Thiaridae	*Melanoides tuberculata*	20	19	1	0	0	0	0	0	0		0	0	19
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*	74	68	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	Insecta	Ephemeroptera	Baetidae	Baetidae spp.	3	3	1	1	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Odonata	Coenagrionidae	*Enallagma spp.*	2	0	0	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Odonata	Coenagrionidae	*Enallagma coecum*	20	19	1	0	0	0	0	0	0		0	0	19
Arthropoda	Insecta	Trichoptera	Leptoceridae	*Oecetis spp.*	2	2	1	0	1	0	0	0	0		0	0	0
Arthropoda	Insecta	Trichoptera	Hydropsychidae	*Cheumatopsyche spp.*	3	3	1	0	1	0	3	1	0		0	0	0
Arthropoda	Insecta	Trichoptera	Hydroptilidae	*Oxyethira spp.*	4	4	1	0	1	0	0	0	0		0	0	0
Arthropoda	Insecta	Trichoptera	Hydroptilidae	*Hydroptila spp.*	9	7	1	0	1	0	0	1	0		0	0	0
Arthropoda	Insecta	Coleoptera	Elmidae	*Dubiraphia spp.*	3	3	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Cladotanytarsus spp.*	5	4	1	0	0	2	0	0	0		4	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Tanytarsus spp.*	6	5	1	0	0	2.5	0	0	0		5	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Cryptochironomus spp.*	1	1	1	0	0	0	0	0	0		0	0	1
Arthropoda	Insecta	Diptera	Chironomidae	*Polypedilum scalaenum group*	7	6	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Polypedilum convictum group*	4	3	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Ablabesmyia mallochi*	1	1	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Dicrotendipes spp.*	6	5	1	0	0	2.5	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Chironomidae	*Paracladopelma spp.*	1	1	1	0	0	0	0	0	0		0	0	0
Arthropoda	Insecta	Diptera	Ceratopogonidae	*Ceratopogonidae spp.*	1	1	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	Insecta	Lepidoptera	Crambidae	*Parapoynx spp.*	1	1	1	0	0	0	0	0	0		0	0	1

	Raw Totals	SCI scores	Adjusted SCI scores
Total Taxa	23.00	3.33	3.33
Total Ephemeroptera	1.00	2.00	2.00
Total Trichoptera	4.00	5.71	5.71
% Filter Feeders	6.88	1.44	1.44
Total Clingers	2.00	2.86	2.86
Total Long-lived Taxa	2.00	6.67	6.67
% Dominance	42.50	4.30	4.30
% Tanytarsini	5.63	5.56	5.56
Total Sensitive Taxa	1.00	1.43	1.43
% Very Tolerant Individuals	25.00	3.60	3.60

SCI Sum	36.90
Final SCI score	41.00

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