

2010 Monitoring Summary



Little Reedy Creek at Gainestowne Road in Clarke County (31.43208/-87.74533)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Little Reedy Creek watershed for biological and water quality monitoring as part of the 2010 Assessment of the Alabama, Coosa, and Tallapoosa River Basin. The objectives of the project were to assess the biological integrity of each monitoring site and to estimate overall water quality within the basin. A habitat and macroinvertebrate assessment was conducted on Little Reedy Creek at LRDC-1 on May 10, 2010.



Figure 1. Little Reedy Creek at LRDC-1, October 18, 2010.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		Alabama River
Basin		Alabama River
Drainage Area (mi²)		10
Ecoregion^a		65f
% Landuse		
Open water		<1
Wetland	Woody	1
	Emergent herbaceous	<1
Forest	Deciduous	9
	Evergreen	51
	Mixed	16
Shrub/scrub		11
Grassland/herbaceous		<1
Pasture/hay		8
Cultivated crops		1
Development	Open space	3
	Low intensity	<1
	Moderate intensity	<1
Population/km^{2b}		3
# NPDES Permits^c	TOTAL	3
	Construction Stormwater	1
	Underground Injection Control	2

a.Southern Pine Plains & Hills

b.2000 US Census

c.#NPDES permits downloaded from ADEM's NPDES Management System database, September 1, 2012.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Little Reedy Creek at LRDC-1 is a *Fish & Wildlife (F&W)* stream located in Clarke County. Based on the 2006 National Land Cover Dataset, landuse within the watershed is 76% forest. Population density is very low, and less than 5% of the area is developed. As of September 1, 2012, the Department has issued three NPDES permits for this watershed.

REACH CHARACTERISTICS

General observations (Table 2) and a habitat assessment (Table 3) were completed during the macroinvertebrate assessment. In comparison with reference reaches in the same ecoregion, they give an indication of the physical condition of the site and the quality and availability of habitat. Little Reedy Creek at LRDC-1 is a glide-pool stream typical of the Southern Pine Plains and Hills ecoregion (Figure 1). The benthic substrate consisted primarily of sand, organic matter, and gravel. The presence of riparian buffer and an optimal score for sediment deposition categorized the overall habitat quality of this stream as *optimal* for supporting diverse aquatic macroinvertebrate communities.

BIOASSESSMENT RESULTS

Benthic macroinvertebrate communities were sampled using ADEM's Intensive Multi-habitat Bioassessment methodology (WMB-I). The WMB-I uses measures of taxonomic richness, community composition, and community tolerance to assess the overall health of the macroinvertebrate community. Each metric is scored on a 100 point scale in comparison to least-impaired reference reaches in the same ecoregion. The final score is the average of all individual metric scores. Metric results indicated the biological community to be in *good* condition (Table 4).

Table 2. Physical characteristics of Little Reedy Creek at LRDC-1, May 10, 2010.

Physical Characteristics	
Width (ft)	16
Canopy Cover	Shaded
Depth (ft)	
	Run
	Pool
	1.5
	3.0
% Substrate	
	Gravel
	Sand
	Silt
	Organic Matter
	10
	65
	5
	20

Table 3. Results of the habitat assessment conducted on Little Reedy Creek at LRDC-1, May 10, 2010.

Habitat Assessment	%Maximum Score	Rating
Instream Habitat Quality	62	Sub-optimal (53-65)
Sediment Deposition	75	Optimal >65
Sinuosity	80	Sub-optimal (65-84)
Bank and Vegetative Stability	65	Sub-optimal (60-74)
Riparian Buffer	95	Optimal >89
Habitat Assessment Score	164	
% Maximum Score	75	Optimal >65

Table 4. Results of the macroinvertebrate bioassessment conducted in Little Reedy Creek at LRDC-1, May 10, 2010.

Macroinvertebrate Assessment		
	Results	Scores (0-100)
Taxa richness and diversity measures		
% EPC taxa	38	78
% Trichoptera & Chironomidae Taxa	31	79
Taxonomic composition measures		
% EP Individuals	21	40
Functional feeding group		
% Collector-Filterer Individuals	33	43
Community tolerance		
% Nutrient Tolerant individuals	11	94
WMB-I Assessment Score	---	67
WMB-I Assessment Rating		Good (46-73)

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. In situ measurements were collected each visit, water samples (nutrients and metals) semi-monthly, or twice (pesticides, atrazine, and semi-volatile organics) during April through October of 2010 to help identify any stressors to the biological communities.

Organics were collected at LRDC-1 on April 15 and Oct. 18. In one of the four samples collected each, arsenic concentrations were above human health criteria and mercury concentrations were above aquatic life use and human health criteria applicable to the stream's *F&W* use classification. The median value of specific conductance was higher than the expected value at reference reaches within the Southern Pine Plains & Hills ecoregion.

SUMMARY

Bioassessment results indicated the macroinvertebrate community in Little Reedy Creek at LRDC-1 to be in *good* condition. An *optimal* habitat rating and riparian buffer provide the necessary environment to support a diverse macroinvertebrate community. However, concentrations of dissolved arsenic and mercury were slightly elevated.

Table 5. Summary of water quality data collected March-October, 2010. Minimum (Min) and maximum (Max) values calculated using minimum detection limits (MDL). Median, average (Avg), and standard deviations (SD) values were calculated by multiplying the MDL by 0.5 when results were less than this value.

Parameter	N	Min	Max	Med	Avg	SD	E
Physical							
Temperature (°C)	5	16.2	21.6	17.8	18.5	2.5	
Turbidity (NTU)	5	1.4	3.3	2.2	2.3	0.7	
Total Dissolved Solids (mg/L)	4	17.0	28.0	24.5	23.5	4.8	
Total Suspended Solids (mg/L)	4 <	5.0	5.0	2.5	2.5	0.0	
Specific Conductance (µmhos)	5	25.5	28.0	27.0 ^G	26.7	1.0	
Hardness (mg/L)	4	7.3	8.3	8.2	8.0	0.5	
^J Alkalinity (mg/L)	4	6.0	7.0	6.5	6.5	0.6	
Stream Flow (cfs)	5	12.6	22.2	17.6	17.8	3.9	
Chemical							
Dissolved Oxygen (mg/L)	5	8.5	9.7	8.9	9.0	0.6	
pH (su)	5	6.3	6.8	6.8	6.6	0.2	
^J Ammonia Nitrogen (mg/L)	4 <	0.029 <	0.029	0.014	0.014	0.000	
Nitrate+Nitrite Nitrogen (mg/L)	4	0.190	0.372	0.262	0.272	0.095	
Total Kjeldahl Nitrogen (mg/L)	4 <	0.070	2.000	0.142	0.580	0.952	
Total Nitrogen (mg/L)	4 <	0.225	2.192	0.495	0.852	0.905	
^J Dissolved Reactive Phosphorus (mg/L)	4 <	0.004	0.011	0.006	0.006	0.004	
^J Total Phosphorus (mg/L)	4 <	0.004 <	0.008	0.004	0.004	0.000	
^J CBOD-5 (mg/L)	4 <	1.0 <	1.0	0.5	0.5	0.0	
Chlorides (mg/L)	4 <	0.6 <	0.6	0.3	0.3	0.0	
Atrazine (µg/L)	2 <	0.02 <	0.02	0.01	0.01	0.00	
Total Metals							
^J Aluminum (mg/L)	4 <	0.033	0.148	0.038	0.060	0.062	
^J Iron (mg/L)	4	0.330	2.430	0.404	0.892	1.028	
^J Manganese (mg/L)	4	0.018	0.051	0.030	0.032	0.016	
Dissolved Metals							
^J Aluminum (mg/L)	4 <	0.033	0.195	0.070	0.088	0.088	
^J Antimony (µg/L)	4 <	1.9 <	2.3	1.0	1.0	0.1	
^J Arsenic (µg/L)	4 <	1.9	2.8 ^H	1.0	1.4	0.9	1
Cadmium (µg/L)	4 <	0.014 <	0.060	0.018	0.018	0.013	
^J Chromium (mg/L)	4 <	0.013 <	0.015	0.007	0.007	0.000	
Copper (mg/L)	4 <	0.013 <	0.014	0.007	0.007	0.000	
^J Iron (mg/L)	4	0.094	0.154	0.142	0.133	0.027	
^J Lead (µg/L)	4 <	1.7 <	2.6	1.1	1.1	0.3	
^J Manganese (mg/L)	4 <	0.001	0.036	0.012	0.015	0.015	
^J Mercury (µg/L)	4 <	0.080	0.143 ^{AH}	0.046	0.069	0.050	1
^J Nickel (mg/L)	4 <	0.009 <	0.019	0.007	0.007	0.003	
^J Selenium (µg/L)	4 <	0.8 <	1.7	0.8	0.8	0.2	
Silver (µg/L)	4 <	0.015 <	0.200	0.054	0.054	0.053	
^J Thallium (µg/L)	4 <	0.6 <	1.2	0.4	0.4	0.2	
^J Zinc (mg/L)	4 <	0.002 <	0.030	0.008	0.008	0.008	
Biological							
Chlorophyll a (ug/L)	4 <	1.00 <	1.00	0.50	0.50	0.00	
^J E. coli (col/100mL)	4	2	10	6	6	4	

A=*F&W* aquatic life use criterion exceeded; E=# samples that exceeded criteria; G= value higher than median concentration of all verified ecoregional reference reach data collected in the ecoregion 65f; H=*F&W* human health criterion exceeded; J=estimate; N=# samples.

FOR MORE INFORMATION, CONTACT:

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