

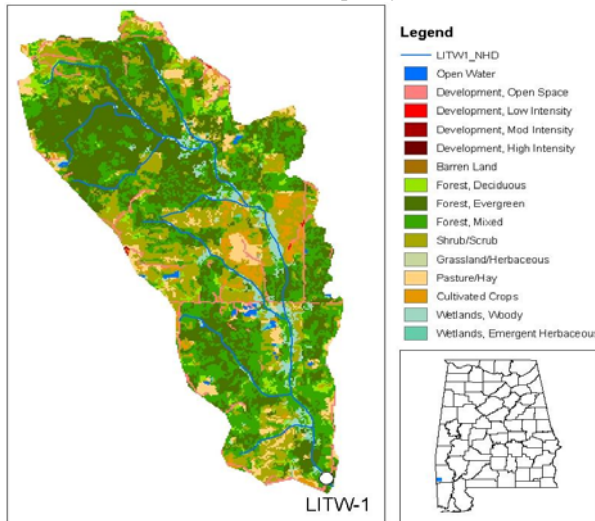
# 2006 Monitoring Summary



## Little Creek at Washington County Road 9 (31.18168/-88.35048)

### BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Little Creek watershed for biological and water quality monitoring as part of the 2006 Assessment of the Escatawpa, Mobile, and Tombigbee (EMT) River Basins. Objectives of the EMT Basin Assessments were to assess the biological integrity of each monitoring site and to estimate overall water quality within the EMT basin group.



**Figure 1.** Sampling location and landuse within the Little Creek watershed at LITW-1.

### WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Little Creek is a small *Fish & Wildlife (F&W)* stream located near the town of Deer Park (Figure 1). Landuse within the watershed is predominantly forest and shrubs with some pastures. As of September 18, 2009, ADEM has issued only one NPDES permit in 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 Creek at LITW-1 is a low-gradient, sand-bottomed stream in the Escatawpa River drainage. Overall habitat quality was categorized as *marginal* due to unstable stream banks, a relatively straight channel, and a lack of instream habitats (root-banks, submerged logs).

### 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. The final score is an average of the score for each metric. Metric results indicated the macroinvertebrate community to be in *good* condition (Table 4).

**Table 1.** Summary of watershed characteristics.

Watershed Characteristics	
Basin	Escatawpa River
Drainage Area (mi <sup>2</sup> )	14
Ecoregion <sup>a</sup>	65f
% Landuse	
Open water	1
Wetland	Woody 4
	Emergent herbaceous <1
Forest	Deciduous 4
	Evergreen 31
	Mixed 28
Shrub/scrub	20
Grassland/herbaceous	<1
Pasture/hay	6
Cultivated crops	3
Development	Open space 3
	Low intensity <1
	Moderate intensity <1
Population/km <sup>2b</sup>	5
# NPDES Permits <sup>c</sup>	<b>TOTAL</b> 1
Construction Stormwater	1

a. Southern Pine Plains & Hills

b. 2000 US Census

c. #NPDES permits downloaded from ADEM's NPDES Management System database, 18 Sep 2009

**Table 2.** Physical characteristics at LITW-1, May 24, 2006.

Physical Characteristics	
Width (ft)	6
Canopy cover	Mostly Shaded
Depth (ft)	Run 0.3
	Pool 2.0
% of Reach	Run 5
	Pool 95
% Substrate	Gravel 5
	Sand 80
	Silt 10
	Organic Matter 5

**Table 3.** Results of the habitat assessment conducted May 24, 2006.

Habitat Assessment (% Maximum Score)		Rating
Instream habitat quality	27	Poor (<40)
Sediment deposition	60	Sub-optimal (53-65)
Sinuosity	45	Marginal (45-64)
Bank and vegetative stability	46	Marginal (35-59)
Riparian buffer	88	Sub-optimal (70-90)
Habitat assessment score	110	
<b>% Maximum score</b>	<b>50</b>	<b>Marginal (40-52)</b>

**Table 4.** Results of the macroinvertebrate bioassessment conducted May 24, 2006.

Macroinvertebrate Assessment			
	Results	Scores	Rating
<b>Taxa richness measures</b>			
# EPT genera	6	24	Poor (19-37)
<b>Taxonomic composition measures</b>			
% Non-insect taxa	5	99	Excellent (>96.34)
% Plecoptera	1	4	Fair (3.8-5.6)
% Dominant taxa	13	93	Excellent (>85.2)
<b>Functional composition measures</b>			
% Predators	32	100	Excellent (>72.1)
<b>Tolerance measures</b>			
Beck's community tolerance index	2	9	Very Poor (<10.6)
% Nutrient tolerant organisms	14	93	Excellent (>88.1)
<b>WMB-I Assessment Score</b>	<b>---</b>	<b>60</b>	<b>Good (57-78)</b>

## WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. When possible, In situ measurements and water samples were collected monthly, semi-monthly (metals), or quarterly (pesticides, herbicides (atrazine), and semi-volatile organics) during March through October of 2006 to help identify any stressors to the biological communities. However, samples could not be collected June through September because drought conditions had reduced the stream reach to intermittent pools.

Data collected March, April, May, and October showed median concentrations of total phosphorus, CBOD-5, total organic carbon, and chlorophyll *a* to be higher than expected, based on the 90th percentile of data collected at reference reaches in ecoregion 65f. Median turbidity values were also higher than expected. The fecal coliform count was 4,400 colonies/100mL on May 11, 2006. However, the maximum stream flow was also measured on this date. Stream pH measurements were <6.0 standard units during all five sampling events, but Alabama Coastal plain streams tend to be slightly tannic/acidic.

## SUMMARY

As part of the assessment process, ADEM will review the monitoring information presented in this report, along with all other available data. Water samples could not be collected from Little Creek at LITW-1 during four of eight sampling months due to drought conditions. Bioassessment results indicated the macroinvertebrate community in Little Creek at LITW-1 to be in *good* condition. Overall habitat quality was categorized as *marginal* due to unstable stream banks and a lack of instream habitat.

FOR MORE INFORMATION, CONTACT:  
Hugh Cox, ADEM Aquatic Assessment Unit  
1350 Coliseum Boulevard Montgomery, AL 36110  
(334) 260-2753 hec@adem.state.al.us

**Table 5.** Summary of water quality data collected March-October, 2006. Minimum (Min) and maximum (Max) values calculated using minimum detection limits (MDL) when results were less than this value. Median, average (Avg), and standard deviations (SD) values were calculated by multiplying the MDL by 0.5 when results were less than this value. Metals results were compared to ADEM's chronic aquatic life use criteria adjusted for hardness.

Parameter	N	Min	Max	Median	Avg	SD
<b>Physical</b>						
Temperature (°C)	5	20.0	21.0	21.0	20.8	0.4
Turbidity (NTU)	5	4.8	14.6	11.7 <sup>M</sup>	10.6	3.7
Total Dissolved Solids (mg/L)	4	13.0	65.0	54.0	46.5	23.3
Total Suspended Solids (mg/L)	4	4.0	19.0	13.0	12.3	6.2
Specific Conductance (µmhos)	5	27.5	78.9	34.2	41.8	21.1
Hardness (mg/L)	1				33.0	
Alkalinity (mg/L)	4	< 1.0	1.7	0.5	0.8	0.6
Stream Flow (cfs)	4	0.3	26.2	5.1	9.2	12.2
<b>Chemical</b>						
Dissolved Oxygen (mg/L)	5	5.1	8.2	5.7	6.4	1.4
pH (su)	5	4.5 <sup>C</sup>	5.4 <sup>C</sup>	5.0 <sup>C</sup>	5.0	0.4
Ammonia Nitrogen (mg/L)	4	< 0.015	0.067	0.033	0.035	0.026
Nitrate+Nitrite Nitrogen (mg/L)	4	< 0.003	0.060	0.021	0.026	0.027
Total Kjeldahl Nitrogen (mg/L)	4	0.369	0.676	0.520	0.521	0.150
Total Nitrogen (mg/L)	4	0.371	0.682	0.568	0.547	0.148
Dissolved Reactive Phosphorus (mg/L)	4	< 0.004	0.013	0.002	0.005	0.006
Total Phosphorus (mg/L)	4	< 0.004	0.064	0.051 <sup>M</sup>	0.042	0.027
CBOD-5 (mg/L)	4	1.1	3.7	2.4 <sup>M</sup>	2.4	1.1
COD (mg/L)	1				<2.0	
TOC (mg/L)	2	3.5	11.4	7.5 <sup>M</sup>	7.5	5.6
Chlorides (mg/L)	1				6.7	
Atrazine (µg/L)	1				0.10	
<b>Total Metals</b>						
Aluminum (mg/L)	1				0.550	
Iron (mg/L)	1				3.310	
Manganese (mg/L)	1				0.068	
<b>Dissolved Metals</b>						
Aluminum (mg/L)	1				0.160	
Antimony (µg/L)	1				<7.5	
Arsenic (µg/L)	1				<5	
Cadmium (mg/L)	1				<0.0003	
Chromium (mg/L)	1				<0.005	
Copper (mg/L)	1				<0.005	
Iron (mg/L)	1				0.491	
Lead (µg/L)	1				<5	
Manganese (mg/L)	1				0.066	
Mercury (µg/L)	1				<0.5	
Nickel (mg/L)	1				<0.005	
Selenium (µg/L)	1				<7.5	
Silver (mg/L)	1				<0.0008	
Thallium (µg/L)	1				<9	
Zinc (mg/L)	1				<0.006	
<b>Biological</b>						
Chlorophyll <i>a</i> (µg/L)	4	1.42	18.69	3.21 <sup>M</sup>	6.63	8.13
<sup>JH</sup> Fecal Coliform (col/100 mL)	4	9	4400 <sup>C</sup>	20	1112	2192

JH=estimate; N= # samples; M=value > 90th percentile of all verified ecoregional reference reach data collected within eco-region 65f; C= value exceeds established criteria for F&W water use classification.