

# 2006 Monitoring Summary

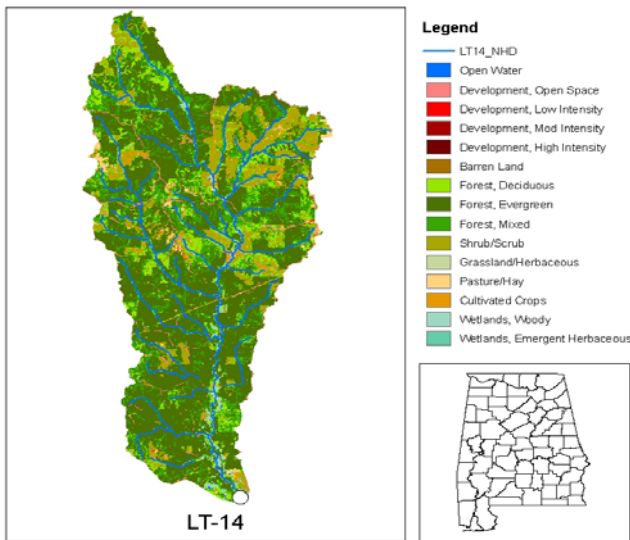


## Okatuppa Creek at Choctaw County Road 18 near Melvin (31.93983/-88.40163)

### BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Okatuppa Creek watershed for biological and water quality monitoring as part of the [2006 Assessment of the Escatawpa, Mobile, and Tombigbee \(EMT\) River Basins](#). The 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.

Additionally, Okatuppa Creek is being evaluated as a possible reference reach for sub-ecoregion 65q.



**Fig. 1.** Sampling location and landuse within the Okatuppa Creek watershed at LT-14.

### WATERSHED CHARACTERISTICS

Okatuppa Creek is a [Fish & Wildlife \(F&W\)](#) stream located within the [Buhrstone/Lime Hills sub-ecoregion](#). It drains approximately 70 mi<sup>2</sup> in Choctaw County before its confluence with Tombigbee River. Landuse within the watershed is primarily forest (83%) and shrub (Fig. 1). Watershed characteristics are summarized in Table 1.

### 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. Okatuppa Creek at LT-14 is a low-gradient stream. In-stream substrates were dominated by sand and gravel, with abundant organic matter (Fig.2). Habitat quality and availability within the reach were rated *sub-optimal* for supporting macroinvertebrate communities. However, unstable banks and sediment were noted as issues during the assessment.

### 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 the average of the score for each metric. Metric results indicated the macroinvertebrate community to be in *good* condition, with very good representation of pollution sensitive taxa and high diversity (Table 4).

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

Watershed Characteristics	
Basin	Lower Tombigbee River
Drainage Area (mi <sup>2</sup> )	70
Ecoregion <sup>a</sup>	65q
% Landuse	
Open water	<1
Wetland	Woody 2 Emergent herbaceous <1
Forest	Deciduous 10 Evergreen 52 Mixed 19
Shrub/scrub	13
Grassland/herbaceous	<1
Pasture/hay	1
Cultivated crops	1
Development	Open space 2 Low intensity <1 Moderate intensity <1 High intensity <1
Population/km <sup>2b</sup>	1
# NPDES Permits <sup>c</sup>	<b>TOTAL</b> 1
	Construction Stormwater 1

a. Buhrstone/Lime Hills

b. 2000 US Census

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

**Table 2.** Physical characteristics at LT-14, May 30, 2006.

Physical Characteristics	
Width (ft)	45
Canopy cover	Mostly Open
Depth (ft)	Riffle 0.3 Run 1.5 Pool 4.0
% of Reach	Riffle 10 Run 60 Pool 30
% Substrate	Cobble 10 Gravel 20 Sand 51 Silt 5 Clay 2 Organic Matter 12



**Fig. 2.** Site photograph of Okatuppa Creek at LT-14, taken Feb 2, 2010.

**Table 3.** Habitat assessment results from LT-14, May 30, 2006.

Habitat Assessment (% Maximum Score)		Rating
Instream habitat quality	54	Sub-optimal (53-65)
Sediment deposition	43	Marginal (40-52)
Sinuosity	83	Sub-optimal (65-84)
Bank and vegetative stability	23	Poor (<35)
Riparian buffer	85	Sub-optimal (70-90)
Habitat assessment score	140	
<b>% Maximum score</b>	<b>58</b>	<b>Sub-optimal (53-65)</b>

**Table 4.** Macroinvertebrate bioassessment results from LT-14, May 30, 2006.

Macroinvertebrate Assessment Results			
	Results	Scores (0-100)	Rating
<b>Taxa richness measures</b>			
# Ephemeroptera (mayfly) genera	12	100	Excellent (>85)
# Plecoptera (stonefly) genera	6	100	Excellent (>75)
# Trichoptera (caddisfly) genera	8	67	Good (67-83)
<b>Taxonomic composition measures</b>			
% Non-insect taxa	5	81	Good (74.2-87.1)
% Non-insect organisms	0	99	Excellent (>97)
% Plecoptera	6	30	Good (19.8-59.8)
<b>Tolerance measures</b>			
Beck's community tolerance index	26	93	Excellent (>80.4)
<b>WMB-I Assessment Score</b>	<b>---</b>	<b>81</b>	<b>Good (73-86)</b>

## WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. [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. Instream pH was slightly acidic. This is typical of streams in this region of Alabama. The fecal coliform count was >2000 colonies/100 ml. The highest fecal count was measured after a series of heavy rains in March. All other parameters were within expected values, based on the 90th percentile of data collected at reference reaches in ecoregion 65q.

## SUMMARY

As part of the [assessment process](#), ADEM will review the monitoring information presented in this report, along with all other available data.

Bioassessment results indicated the macroinvertebrate community in Okatuppa Creek at LT-14 to be in *good* condition. It is scheduled for sampling as reference reach in 2011.

**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.

Parameter	N	Min	Max	Median	Avg	SD
<b>Physical</b>						
Temperature (°C)	9	17.0	27.0	25.0	23.0	3.9
Turbidity (NTU)	9	3.9	132.0	5.6	20.9	41.9
Total Dissolved Solids (mg/L)	8	47.0	114.0	87.5	83.9	22.4
Total Suspended Solids (mg/L)	8	1.0	156.0	3.5	24.1	53.6
Specific Conductance (µmhos)	9	49.5	147.9	94.0	90.2	31.0
Hardness (mg/L)	3	37.0	49.0	44.0	43.3	6.0
Alkalinity (mg/L)	8	4.6	50.2	16.5	20.0	13.9
Stream Flow (cfs)	4	4.6	46.8	24.2	24.9	17.8
<b>Chemical</b>						
Dissolved Oxygen (mg/L)	9	6.7	8.5	7.5	7.6	0.6
pH (su)	9	5.5 <sup>c</sup>	7.0	6.8	6.7	0.5
Ammonia Nitrogen (mg/L)	8	< 0.010	0.251	0.008	0.038	0.086
Nitrate+Nitrite Nitrogen (mg/L)	8	< 0.003	0.045	0.003	0.010	0.015
Total Kjeldahl Nitrogen (mg/L)	8	< 0.150	0.980	0.315	0.440	0.347
Total Nitrogen (mg/L)	8	0.077	0.983	0.339	0.450	0.344
Dissolved Reactive Phosphorus (mg/L)	8	< 0.004	0.013	0.006	0.006	0.004
Total Phosphorus (mg/L)	8	< 0.004	0.051	0.028	0.026	0.017
CBOD-5 (mg/L)	8	< 1.0	3.2	1.6	1.7	1.0
Chlorides (mg/L)	8	1.4	6.0	3.0	3.3	1.5
Atrazine (µg/L)	1	< 0.05	< 0.05	0.03	0.03	---
<b>Total Metals</b>						
Aluminum (mg/L)	3	< 0.1	0.34	0.130	0.173	0.150
Iron (mg/L)	3	0.995	1.53	1.53	1.352	0.309
Manganese (mg/L)	3	0.064	0.113	0.087	0.088	0.025
<b>Dissolved Metals</b>						
Aluminum (mg/L)	3	0.06	0.16	0.100	0.107	0.050
Antimony (µg/L)	3	< 7.5	< 7.5	3.8	3.8	0.0
Arsenic (µg/L)	3	< 5	< 5	2.5	2.5	0.0
Cadmium (mg/L)	3	< 0.0003	< 0.0003	0.0001	0.0001	0.0000
Chromium (mg/L)	3	< 0.005	< 0.005	0.003	0.003	0.000
Copper (mg/L)	3	< 0.005	< 0.005	0.003	0.003	0.000
Iron (mg/L)	3	0.270	1.360	0.630	0.753	0.555
Lead (µg/L)	3	< 5	< 5	2.5	2.5	0.0
Manganese (mg/L)	3	0.052	0.1	0.084	0.079	0.024
Mercury (µg/L)	3	< 0.5	< 0.5	0.3	0.3	0.0
Nickel (mg/L)	3	< 0.005	0.032	0.004	0.013	0.017
Selenium (µg/L)	3	< 7.5	< 7.5	3.8	3.8	0.0
Silver (mg/L)	3	< 0.0008	< 0.0008	0.0004	0.0004	0.000
Thallium (µg/L)	3	< 2.5	< 9	4.5	3.4	1.9
Zinc (mg/L)	3	< 0.005	0.017	0.003	0.007	0.008
<b>Biological</b>						
Chlorophyll a (mg/L)	8	< 0.10	3.20	1.85	1.80	1.09
<sup>J</sup> Fecal Coliform (col/100 mL)	5	10	3100 <sup>c</sup>	130	738	1326

J=estimate; N=# samples; C= value exceeds established criteria for F&W water use classification.

FOR MORE INFORMATION, CONTACT:  
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