

2006 Monitoring Summary



Satilpa Creek at U.S. Hwy 84, Clarke County (31.74444/-88.02133)

BACKGROUND

Satilpa Creek at LT-12 is one of a network of 94 ambient sites monitored annually by the Alabama Department of Environmental Management (ADEM) to identify long-term trends in water quality and to provide data for the development of Total Maximum Daily Loads (TMDL) and water quality criteria.

Satilpa Creek was also selected 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.

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 in Satilpa Creek at LT-12 to be in *good* condition (Table 4).

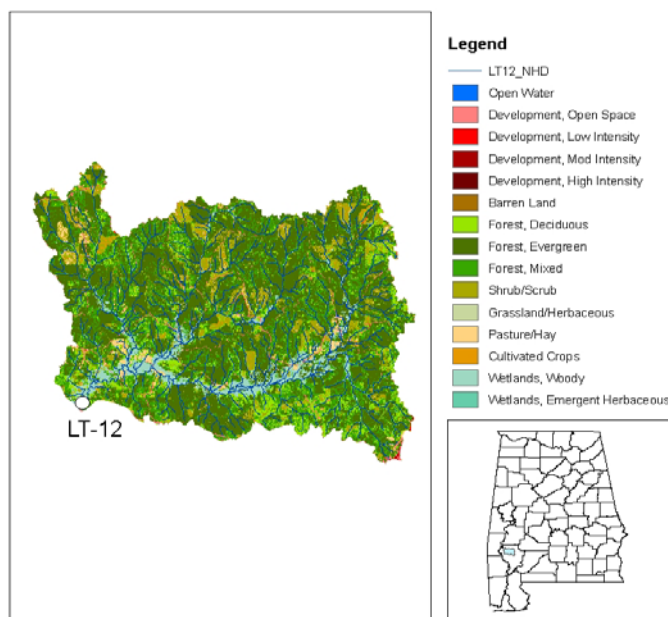


Figure 1. Sampling location and landuse within the Satilpa Creek watershed at LT-12.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Satilpa Creek is a *Swimming/Fish & Wildlife (S/F&W)* stream that drains a large portion of north-central Clarke County along Alabama Highway 154 (Fig.1). Population density is very low, although the communities of McEntyre and Chilton are located within the watershed. As of Sep18, 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. Satilpa Creek at LT-12 is a low gradient, sand-bottomed stream. Overall habitat quality was categorized as *marginal* due to lack of instream habitat (e.g. root banks, submerged logs), a narrow riparian buffer zone, unstable stream banks, and a relatively straight channel.

Table 1. Summary of watershed characteristics.

Watershed Characteristics			
Basin	Lower Tombigbee River		
Drainage Area (mi ²)	163		
Ecoregion ^a	65q		
% Landuse			
Open water			<1
Wetland	Woody		6
	Emergent herbaceous		<1
Forest	Deciduous		9
	Evergreen		49
	Mixed		22
Shrub/scrub			9
Grassland/herbaceous			<1
Pasture/hay			2
Cultivated crops			1
Development	Open space		2
	Low intensity		<1
	Moderate intensity		<1
	High intensity		<1
Population/km ² ^b	2		
# NPDES Permits ^c	TOTAL		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 of Satilpa Creek at LT-12, May 24, 2006.

Physical Characteristics		
Width (ft)		40
Canopy cover		Mostly Open
Depth (ft)	Run	1.5
	Pool	2.5
% of Reach	Run	60
	Pool	40
% Substrate	Sand	72
	Silt	20
	Organic Matter	6

Table 3. Results of the habitat assessment conducted on Satilpa Creek at LT-12, May 24, 2006.

Habitat Assessment (% Maximum Score)		Rating
Instream habitat quality	38	Poor (<40)
Sediment deposition	58	Sub-optimal (53-65)
Sinuosity	35	Poor (<45)
Bank and vegetative stability	38	Marginal (35-59)
Riparian buffer	54	Marginal (50-69)
Habitat assessment score	98	
% Maximum score	45	Marginal (40-52)

Table 4. Results of the macroinvertebrate bioassessment conducted in Satilpa Creek at LT-12, May 24, 2006.

Macroinvertebrate Assessment			
	Results	Scores	Rating
Taxa richness measures			
# EPT genera	19	76	Good (57-78)
Taxonomic composition measures			
% Non-insect taxa	9	78	Fair (61.9-92.7)
% Plecoptera	2	8	Good (5.7-52.8)
% Dominant taxa	15	87	Excellent (>85.2)
Functional composition measures			
% Predators	25	85	Excellent (>72.1)
Tolerance measures			
Beck's community tolerance index	13	59	Good (31.9-65.9)
% Nutrient tolerant organisms	14	93	Excellent (>88.1)
WMB-I Assessment Score	---	70	Good (57-78)

WATER CHEMISTRY

Results of water chemistry 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. In situ measurements showed Satilpa Creek to be meeting temperature, turbidity, dissolved oxygen, and pH criteria for its S/ F&W use classification. Bacteriological results were also below criteria limits (based on one sample). The median concentration of hardness was slightly higher than expected for the ecoregion, based on the 90th percentile of samples collected at least impaired reference reaches.

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 to be in *good* condition. Results of water quality sampling indicated no immediate problems. The primary concern within Satilpa Creek at LT-12 was habitat degradation, precipitated by the disruption of bank stabilizing vegetation, and loss of riparian zone.

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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
Physical						
Temperature (°C)	4	21.0	27.0	25.0	24.5	2.5
Turbidity (NTU)	4	6.8	28.7	8.7	13.2	10.4
Total Dissolved Solids (mg/L)	3	76.0	110.0	97.0	94.3	17.2
Total Suspended Solids (mg/L)	3	<5.0	13.0	5.0	6.8	5.5
Specific Conductance (µmhos)	4	96.0	164.3	144.8	137.5	29.2
Hardness (mg/L)	2	40.0	89.0	64.5 ^M	64.5	34.6
Alkalinity (mg/L)	3	31.0	74.0	68.0	57.7	23.3
Stream Flow (cfs)	4	8.2	50.0	28.0	28.6	18.6
Chemical						
Dissolved Oxygen (mg/L)	4	6.9	9.1	7.1	7.6	1.0
pH (su)	4	7.1	7.7	7.4	7.4	0.2
Ammonia Nitrogen (mg/L)	3	<0.010	0.020	0.008	0.011	0.008
Nitrate+Nitrite Nitrogen (mg/L)	3	0.012	0.279	0.061	0.117	0.142
Total Kjeldahl Nitrogen (mg/L)	3	<0.150	0.830	0.530	0.478	0.380
Total Nitrogen (mg/L)	3	0.136	1.109	0.542	0.596	0.489
Dissolved Reactive Phosphorus (mg/L)	3	<0.004	0.006	0.005	0.004	0.002
Total Phosphorus (mg/L)	3	0.010	0.081	0.034	0.042	0.036
CBOD-5 (mg/L)	3	<1.0	2.0	1.0	1.2	0.8
Chlorides (mg/L)	3	4.8	<6.0	3.0	3.6	1.0
Total Metals						
Aluminum (mg/L)	2	0.12	1.4	0.760	0.760	0.905
Iron (mg/L)	2	1.18	2.27	1.725	1.725	0.771
Manganese (mg/L)	2	0.074	0.098	0.086	0.086	0.017
Dissolved Metals						
Aluminum (mg/L)	2	0.1	0.2	0.150	0.150	0.071
Antimony (µg/L)	2	<7.5	<7.5	3.8	3.8	0.0
Arsenic (µg/L)	2	<5	<5	2.5	2.5	0.0
Cadmium (mg/L)	2	<0.0003	<0.0003	0.0001	0.0001	0.0000
Chromium (mg/L)	2	<0.005	<0.005	0.003	0.003	0.000
Copper (mg/L)	2	<0.005	<0.005	0.003	0.003	0.000
Iron (mg/L)	2	0.238	1.030	0.634	0.634	0.560
Lead (µg/L)	2	<5	<5	2.5	2.5	0.0
Manganese (mg/L)	2	0.064	0.069	0.067	0.067	0.004
Mercury (µg/L)	2	<0.5	<0.5	0.3	0.3	0.0
Nickel (mg/L)	2	0.009	0.015	0.012	0.012	0.004
Selenium (µg/L)	2	<7.5	<7.5	3.8	3.8	0.0
Silver (mg/L)	2	<0.0008	<0.0008	0.0004	0.0004	0.0000
Thallium (µg/L)	2	<9	<9	4.5	4.5	0.0
Zinc (mg/L)	2	<0.005	<0.005	0.003	0.003	0.000
Biological						
^J Chlorophyll a (µg/L)	2	<1.00	1.07	0.79	0.79	0.40
^J Fecal Coliform (col/100 mL)	1	64	64	64	64	---

J=estimate; N= # samples; M=value>90% of all verified ecoregional reference reach data collected in the sub-ecoregion 65q.