

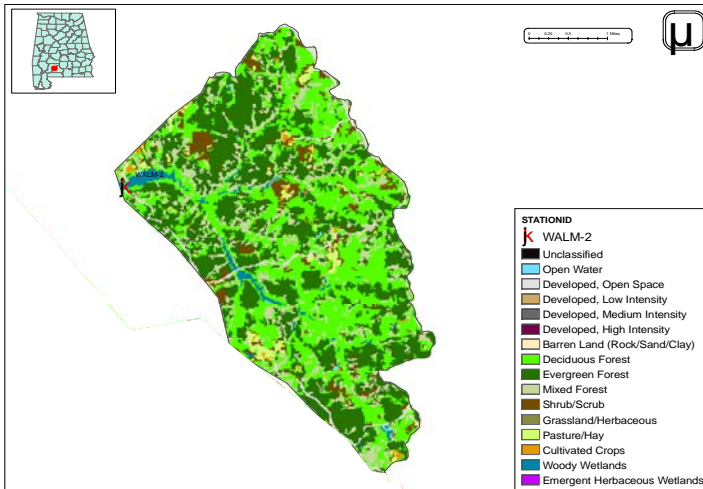
# 2005 Monitoring Summary



**Walkers Creek** at unnamed Co. Road, 2 miles upstream of Limestone Creek (31.55345/-87.25245)

## BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Walkers Creek watershed for biological and water quality monitoring as part of the 2005 Assessment of the Alabama, Coosa, and Tallapoosa (ACT) River Basins. The objectives of the ACT Basin Assessments were to assess the biological integrity of each monitoring site and to estimate overall water quality within the ACT basin group.



**Figure 1.** Sampling location and landuse within the Walkers Creek watershed at WALM-2.

## WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Walkers Creek is a *Fish & Wildlife (F&W)* stream located in the Burhstone/Lime Hills ecoregion (65q) near Monroeville. Landuse within the watershed is primarily forest (87%) (Fig. 1).

## REACH CHARACTERISTICS

General observations (Table 2) and habitat assessments (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. Walkers Creek at WALM-2 is a low-gradient stream with mostly sand substrates (55%) and a large amount of organic matter. The reach was largely pool and run habitat. Overall habitat quality was categorized as *sub-optimal* due to low sinuosity, and a lack of bank and vegetative stability. River bends provide an important habitat in low-gradient streams, as a well as a refuge during high flow events.

## 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 *fair* condition.

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

Watershed Characteristics		
Drainage Area (mi <sup>2</sup> )		13
Ecoregion <sup>a</sup>		65q
% Landuse		
Open water		<1
Wetland	Woody	2
	Emergent herbaceous	<1
Forest	Deciduous	36
	Evergreen	36
	Mixed	15
Shrub/scrub		6
Pasture/hay		2
Cultivated crops		1
Development	Open space	2
	Low intensity	<1
Population/km <sup>2</sup>		5

a. Burhstone/Lime Hills

b. 2000 U.S. Census Data

c. #NPDES permits downloaded from ADEM's NPDES Management System database, 9 Jun 2008

**Table 2.** Physical characteristics of Walkers Creek at WALM-2 on May 25, 2005.

Physical characteristics		
Width (ft)		20
Canopy cover		Mostly Shaded
Depth (ft)		
	Run	1.5
	Pool	2.5
% of Reach		
	Run	30
	Pool	70
% Substrate		
	Cobble	2
	Gravel	5
	Sand	55
	Silt	5
	Clay	2
	Organic Matter	31

**Table 3.** Results of the habitat assessment conducted on Walkers Creek at WALM-2 on May 25, 2005.

Habitat Assessment (% Maximum Score)		Rating
Instream habitat quality	67	Optimal (>65)
Sediment deposition	73	Optimal (>65)
Sinuosity	43	Poor (<45)
Bank and vegetative stability	33	Poor (<35)
Riparian buffer	85	Sub-optimal (70-90)
Habitat assessment score	141	
<b>% Maximum score</b>	<b>64</b>	<b>Sub-optimal (53-65)</b>

**Table 4.** Results of the macroinvertebrate bioassessment conducted on Walkers Creek at WALM-2 on May 25, 2005.

Macroinvertebrate Assessment			
	Results Scores		Rating
<b>Taxa richness measures</b>			
# EPT genera	13	52	Fair (37-56)
<b>Taxonomic composition measures</b>			
% Non-insect taxa	3	100	Excellent (>96.34)
% Plecoptera	2	9	Good (5.6-52.8)
% Dominant taxa	24	65	Fair (47.0-70.5)
<b>Functional composition measures</b>			
% Predators	9	6	Very Poor (<15.1)
<b>Tolerance measures</b>			
Beck's community tolerance index	3	14	Poor (10.6-21.2)
% Nutrient tolerant organisms	52	29	Poor (25.4-50.8)
<b>WMB-I Assessment Score</b>	<b>---</b>	<b>39</b>	<b>Fair (37-56)</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 2005 to help identify any stressors to the biological communities. The median value of dissolved manganese concentrations were higher than expected in this ecoregion based on the 90th percentile of data from least impaired reference reach.

## CONCLUSIONS

Bioassessment results indicated the macroinvertebrate community to be in *fair* condition. Overall habitat quality was categorized as *suboptimal* due lack of sinuosity and lack of bank and vegetative stability. Intensive water quality and habitat assessment results suggest scouring as a potential causes of the degraded biological assessment results. Dissolved manganese was also a parameter of concern.

**Table 5.** Summary of water quality data collected March-October, 2005. 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)	8	17.0	24.0	20.5	20.6	2.6
Turbidity (NTU)	9	9.3	196.0	17.1	37.0	60.0
Total Dissolved Solids (mg/L)	7	60.0	119.0	88.0	87.4	22.0
Total Suspended Solids (mg/L)	7	6.0	153.0	19.0	35.9	52.4
Specific Conductance (µmhos)	8	50.8	129.5	110.6	103.4	25.4
Hardness (mg/L)	4	46.3	63.8	52.6	53.8	7.8
Alkalinity (mg/L)	7	20.1	57.9	50.3	45.8	13.3
Stream Flow (cfs)	7	5.6	54.6	20.6	21.6	---
<b>Chemical</b>						
Dissolved Oxygen (mg/L)	8	7.8	12.05	8.6	9.1	1.4
pH (su)	8	7.0	8.2	7.5	7.5	0.4
Ammonia Nitrogen (mg/L)	7	0.015	0.031	0.008	0.015	0.011
Nitrate+Nitrite Nitrogen (mg/L)	7	0.057	0.210	0.085	0.110	0.054
Total Kjeldahl Nitrogen (mg/L)	7	0.150	0.685	0.241	0.281	0.233
Total Nitrogen (mg/L)	7	0.132	0.751	0.369	0.391	0.222
Dissolved Reactive Phosphorus (mg/L)	7	< 0.004	0.017	0.013	0.010	0.007
Total Phosphorus (mg/L)	7	0.007	0.071	0.042	0.043	0.022
CBOD-5 (mg/L)	6	< 1.0	2.2	1.3	1.3	0.7
<sup>J</sup> Chlorides (mg/L)	7	3.8	10.6	4.8	5.7	2.3
Atrazine (µg/L)	2	< 0.05	< 0.05	0.03	0.03	---
<b>Total Metals</b>						
Aluminum (mg/L)	4	0.015	0.171	0.049	0.069	0.100
Iron (mg/L)	4	1.58	2.35	1.965	1.965	0.400
Manganese (mg/L)	4	0.31	0.439	0.328	0.351	0.100
<b>Dissolved Metals</b>						
Aluminum (mg/L)	4	< 0.015	0.081	0.008	0.026	---
Antimony (µg/L)	4	< 2	< 2	1	1	---
Arsenic (µg/L)	4	< 10	< 10	5	5	---
Cadmium (mg/L)	4	< 0.005	< 0.005	0.003	0.003	---
Chromium (mg/L)	4	< 0.004	< 0.004	0.002	0.002	---
Copper (mg/L)	4	< 0.005	< 0.005	0.003	0.003	---
Iron (mg/L)	4	0.286	0.469	0.392	0.385	0.100
Lead (µg/L)	4	< 2	< 2	1	1	---
Manganese (mg/L)	4	0.181	0.309	0.294 <sup>M</sup>	0.269	0.100
Mercury (µg/L)	4	< 0.3	< 0.3	0.15	0.15	---
Nickel (mg/L)	4	< 0.006	< 0.006	0.003	0.003	---
Selenium (µg/L)	3	< 10	< 10	5	5	---
Silver (mg/L)	4	< 0.003	< 0.003	0.002	0.002	---
Thallium (µg/L)	4	< 1	< 1	0.5	0.500	---
Zinc (mg/L)	4	< 0.006	< 0.006	0.003	0.003	---
<b>Biological</b>						
<sup>J</sup> Chlorophyll a (µg/L)	6	0.53	5.34	1.34	1.96	1.70
<sup>J</sup> Fecal Coliform (col/100 mL)	5	70	1300	100	400	524

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

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