

# 2010 Monitoring Summary



Basin Assessment Site

## Sturdivant Creek at AL Hwy 10 in Wilcox County (31.83803/-86.90902)

### BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Sturdivant Creek watershed for biological and water quality monitoring as part of the 2010 Alabama Coosa Tallapoosa (ACT) Basin Assessment Monitoring Project. 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 basins.



Figure 1. Sturdivant Creek at STVW-1, July, 13, 2010.

### WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Sturdivant Creek is a *Fish & Wildlife (F&W)* stream located in Wilcox County, within the Southern Hilly Gulf Coastal Plain (65d), which is characterized by low to moderate gradient, mostly sand bottomed streams (Griffith et al. 2001). Based on the 2006 National Land Cover Dataset, landuse within the watershed is primarily forest (63%) with some shrubs/scrub, pasture, and cultivated crops. Population density is relatively low in this area. As of September 1, 2012, three outfalls were active within 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. Typical of ecoregion 65d, Sturdivant Creek at STVW-1 is a low gradient, sand bottomed stream (Figure 1). Overall habitat quality was categorized as *marginal* for supporting 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 that the biological community at STVW-1 was in *fair* condition (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		Alabama River
<b>Basin</b>		Alabama River
<b>Drainage Area (mi<sup>2</sup>)</b>		53
<b>Ecoregion<sup>a</sup></b>		65d
<b>% Landuse</b>		
Open water		<1
Wetland	Woody	7
	Emergent herbaceous	<1
Forest	Deciduous	22
	Evergreen	32
	Mixed	9
Shrub/scrub		14
Grassland/herbaceous		<
Pasture/hay		8
Cultivated crops		5
Development	Open space	2
	Low intensity	<1
	Moderate intensity	<1
<b>Population/km<sup>2</sup><sup>b</sup></b>		9
<b># NPDES Permits<sup>c</sup></b>	<b>TOTAL</b>	3
	Construction Stormwater	2
	Industrial General	1

a.Southern Hilly Gulf Coastal Plain

b.2000 US Census

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

Table 2. Physical Characteristics of Sturdivant Creek at STVW-1, May 12, 2010.

Physical Characteristics	
<b>Width (ft)</b>	30
<b>Canopy Cover</b>	Shaded
<b>Depth (ft)</b>	
	Run 3.0
	Pool 4.5
<b>% of Reach</b>	
	Run 70
	Pool 30
<b>% Substrate</b>	
	Mud/Muck 2
	Sand 65
	Silt 5
	Organic Matter 28

**Table 3.** Results of the habitat assessment conducted on Sturdivant Creek at STVW-1, May 12, 2010.

Habitat Assessment	% Maximum Score	Rating
Instream Habitat Quality	43	Marginal (40-<53)
Sediment Deposition	60	Sub-Optimal (53-65)
Sinuosity	58	Marginal (45-<65)
Bank Vegetative Stability	49	Marginal (35-<59)
Riparian Buffer	80	Sub-Optimal (70-90)
<b>Habitat Assessment Score</b>	<b>114</b>	
<b>% of Maximum Score</b>	<b>52</b>	<b>Marginal (40-&lt;53)</b>

**Table 4.** Results of the macroinvertebrate bioassessment conducted in Sturdivant Creek at STVW-1, May 12, 2010.

Macroinvertebrate Assessment		Results
<b>Taxa richness and diversity measures</b>		
	# EPT taxa	14
<b>Taxonomic composition measures</b>		
	% Non-insect taxa	13
	% Plecoptera	0
	% Dominant taxon	24
<b>Functional feeding group</b>		
	% Predators	12
<b>Community tolerance</b>		
	Becks community tolerance index	4
	% Nutrient tolerant individuals	26
	<b>WMB-I Assessment Score</b>	<b>46</b>
	<b>WMB-I Assessment Rating</b>	<b>Fair (37-55)</b>

## WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. *In situ* measurements and water samples were collected in May, July, September, and November 2010 to help identify any stressors to the biological communities. *In situ* parameters suggested that Sturdivant Creek at STVW-1 was meeting its *F&W* use classification. Samples were collected on November 2, 2010 for analysis of pesticides, semi-volatile organics, and atrazine. All concentrations were below detection limits. Collected metals were generally below detection limits as well.

## SUMMARY

As part of the assessment process, ADEM will review the monitoring information presented in this report along with all other available data. Results of the habitat assessment suggested that instream habitat was *marginal* for supporting biological communities. Bioassessment data indicated the macroinvertebrate community in Sturdivant Creek at STVW-1 to be in *fair* condition.

**Table 5.** Summary of water quality data collected May-November, 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	Q
<b>Physical</b>							
Temperature (°C)	5	16.7	26.1	20.4	21.1	3.5	
Turbidity (NTU)	5	7.4	30.6	15.4	16.3	9.1	
<sup>J</sup> Total Dissolved Solids (mg/L)	4	52.0	92.0	58.0	65.0	18.3	
<sup>J</sup> Total Suspended Solids (mg/L)	4	< 1.0	16.0	5.5	6.9	6.5	
Specific Conductance (µmhos)	5	55.5	66.3	58.9	59.9	4.3	
Hardness (mg/L)	4	17.4	20.1	18.8	18.8	1.1	
Alkalinity (mg/L)	4	11.7	20.7	13.6	14.9	4.0	
Stream Flow (cfs)	5	4.1	49.6	8.0	17.3	18.7	
<b>Chemical</b>							
Dissolved Oxygen (mg/L)	5	6.4	7.8	7.2	7.2	0.5	
pH (su)	5	6.4	6.7	6.6	6.6	0.2	
Ammonia Nitrogen (mg/L)	4	< 0.021	0.043	0.010	0.019	0.016	
Nitrate+Nitrite Nitrogen (mg/L)	4	0.204	0.648	0.475	0.450	0.191	
Total Kjeldahl Nitrogen (mg/L)	4	< 0.080	1.050	0.256	0.400	0.447	
Total Nitrogen (mg/L)	4	< 0.582	1.254	0.784	0.851	0.320	
<sup>J</sup> Dissolved Reactive Phosphorus (mg/L)	4	0.005	0.018	0.014	0.013	0.006	
Total Phosphorus (mg/L)	4	0.015	0.035	0.026	0.025	0.009	
CBOD-5 (mg/L)	4	< 2.0	2.1	1.0	1.3	0.6	
Chlorides (mg/L)	4	3.4	5.0	4.1	4.2	0.7	
Atrazine (µg/L)	1			<	0.02		
<b>Total Metals</b>							
<sup>J</sup> Aluminum (mg/L)	4	< 0.043	1.170	0.360	0.478	0.526	
Iron (mg/L)	4	0.935	2.420	1.455	1.566	0.691	
<sup>J</sup> Manganese (mg/L)	4	0.047	0.158	0.103	0.103	0.050	
<b>Dissolved Metals</b>							
<sup>J</sup> Aluminum (mg/L)	4	< 0.033	0.071	0.028	0.036	0.025	
Antimony (µg/L)	4	< 1.9	< 1.9	0.9	0.9	0.0	
<sup>J</sup> Arsenic (µg/L)	4	< 0.6	2.1 <sup>H</sup>	1.0	0.9	0.2	1
Cadmium (mg/L)	4	< 0.000	< 0.014	0.001	0.002	0.003	
Chromium (mg/L)	4	< 0.009	< 0.013	0.006	0.006	0.001	
Copper (mg/L)	4	< 0.013	< 0.020	0.006	0.007	0.002	
Iron (mg/L)	4	0.305	0.466	0.388	0.387	0.072	
Lead (µg/L)	4	< 1.7	< 1.7	0.8	0.8	0.0	
<sup>J</sup> Manganese (mg/L)	4	0.041	0.125	0.082	0.083	0.037	
Mercury (µg/L)	4	< 0.1	< 0.1	0.0	0.0	0.0	
Nickel (mg/L)	4	< 0.019	< 0.042	0.010	0.012	0.006	
Selenium (µg/L)	4	< 1.7	< 1.7	0.8	0.8	0.0	
Silver (mg/L)	4	< 0.000	< 0.002	0.000	0.000	0.001	
Thallium (µg/L)	4	< 0.6	< 0.6	0.3	0.3	0.0	
Zinc (mg/L)	4	< 0.012	< 0.030	0.015	0.013	0.004	
<b>Biological</b>							
Chlorophyll a (ug/L)	4	< 0.10	1.78	0.29	0.60	0.82	
E. coli (col/100mL)	4	79	236	186	172	66	

H= (*F&W*) human health criterion exceeded; J=estimate; N=# samples; Q=# uncertain exceedances.

FOR MORE INFORMATION, CONTACT:

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