Alabama Department of Environmental Management

Use Support Assessment

Rivers and Streams Monitoring Program

2013 Monitoring Summary

Fair

Gulf Creek at St. Clair County Road 295 near Steele, AL (33.91800/-86.25233)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) monitored Gulf Creek at GLFS-25 as part of its 2005 Assessment of the Alabama, Coosa, and Tallapoosa (ACT) River Basins. Monitoring of Gulf Creek at GLFS-25 continued in 2013 to provide additional biological, chemical, and physical data to fully support the use support status for the 2016 Integrated Report.

Figure 1. Gulf Creek at GLFS-25, April 17, 2013.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Coosa River
Drainage Area (mi^2)		10
Ecoregion[a]		67f
% Landuse		
Open water		4
Wetland	Woody	1
	Emergent herbaceous	<1
Forest	Deciduous	26
	Evergreen	6
	Mixed	8
Shrub/scrub		5
Grassland/herbaceous		2
Pasture/hay		24
Cultivated crops		19
Development	Open space	2
	Low intensity	2
	Moderate intensity	<1
	High intensity	<1
Barren		1
Population/km^2[b]		9

a.Southern Limestone/Dolomite Valleys and Low Rolling Hills

b.2000 US Census

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Fig. 1 and Table 1. Gulf Creek is a *Fish and Wildlife (F&W)* stream located within the *Southern Limestone/Dolomite Valleys and Low Rolling Hills* subecoregion. It drains approximately ten square miles in St Clair County. Based on the 2011 National Land Cover Dataset, landuse within the watershed is primarily forest (40%), pasture, and cultivated crops. Population density is relatively low and less than four percent of the area is developed. As of May 13, 2013, there are no NPDES permitted outfalls active 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. Gulf Creek at GLFS-25 is a shallow, high-gradient site with boulder, cobble, and gravel substrates. Habitat quality was rated as *sub-optimal*.

Table 2. Physical characteristics of Gulf Creek at GLFS-25, May 21, 2013.

Physical Characteristics		
Width (ft)		25
Canopy Cover		Estimate 50/50
Depth (ft)		
	Riffle	1.0
	Run	2.5
	Pool	1.5
% of Reach		
	Riffle	60
	Run	35
	Pool	5
% Substrate		
	Boulder	45
	Cobble	40
	Gravel	7
	Sand	3
	Silt	2
	Organic Matter	3

TM Graphics provided by Florida Dept. of Environmental Protection (FDEP); used with permission results.

Table 3. Results of the habitat assessment conducted on Gulf Creek at GLFS-25, May 21, 2013.

Habitat Assessment	%Maximum Score	Rating
Instream Habitat Quality	80	Optimal >79
Sediment Deposition	80	Optimal >79
Sinuosity	78	Sub-optimal (55-79)
Bank and Vegetative Stability	73	Sub-optimal (58-79)
Riparian Buffer	25	Poor <31
Habitat Assessment Score	**135**	
% Maximum Score	**67**	**Sub-optimal (57-79)**

BIOASSESSMENT RESULTS

Benthic macroinvertebrate communities were sampled using ADEM's Intensive Multi-habitat Bioassessment methodology (WMB-I). Measures of taxonomic richness, community composition, and community tolerance are used to assess the overall health of the macroinvertebrate community in comparison to conditions expected in north Alabama's streams and rivers. Each site is placed in one of six levels, ranging from 1, or *natural* to 6, or *highly altered*. The macroinvertebrate survey conducted in Gulf Creek at GLFS-25 rated the site as *fair*, with moderate changes in community structure due to replacement of some sensitive taxa by more tolerant taxa (Table 4).

Table 4. Results of the macroinvertebrate biossessment conducted in Gulf Creek at GLFS-25, May 21, 2013.

Macroinvertebrate Assessment	
	Results
Taxa richness and diversity measures	
Total # Taxa	39
# EPT taxa	6
Shannon Diversity	3.32
# Highly-sensitive and Specialized Taxa	1
Taxonomic composition measures	
% EPT minus Baetidae and Hydropsychidae	2
% Non-insect taxa	10
Tolerance measures	
# Sensitive EPT	2
% Sensitive taxa	7
% Tolerant taxa	28
WMB-I Assessment Score	**4**
WMB-I Assessment Rating	**Fair**

WATER CHEMISTRY

Results for water chemistry analyses are presented in Table 5. In situ measurements and water samples were scheduled to be collected monthly during March through October of 2013 to help identify any stressors to the biological communities. However, Gulf Creek at GLFS-25 was dry at the September and October sampling dates and could not be sampled. Median values of collected water quality data were compared against the 90th percentile of data collected at least impaired reference reaches in subecoregion 67f and all results were within expected ranges. No metals or organic samples were collected.

Table 5. Summary of water quality data collected March-October, 2013. 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)	7	11.8	25.3	21.6	20.7	4.4
Turbidity (NTU)	7	3.1	10.5	4.9	6.2	2.8
Total Dissolved Solids (mg/L)	6	45.0	77.0	66.5	63.5	13.3
Total Suspended Solids (mg/L)	6	< 1.0	10.0	3.5	3.9	3.4
Specific Conductance (µmhos)	7	75.8	102.0	84.0	85.0	9.5
Alkalinity (mg/L)	6	8.3	13.8	11.1	11.1	2.4
Stream Flow (cfs)	7	5.0	35.0	22.6	21.2	11.0
Chemical						
Dissolved Oxygen (mg/L)	7	8.5	12.0	9.0	9.5	1.2
pH (su)	7	7.4	8.3	7.8	7.8	0.3
J Ammonia Nitrogen (mg/L)	6	< 0.015	0.048	0.014	0.018	0.015
Nitrate+Nitrite Nitrogen (mg/L)	6	0.110	0.312	0.209	0.204	0.074
J Total Kjeldahl Nitrogen (mg/L)	6	0.136	0.509	0.393	0.360	0.151
J Total Nitrogen (mg/L)	6	0.377	0.692	0.602	0.564	0.115
J Dissolved Reactive Phosphorus (mg/L)	6	< 0.007	0.014	0.010	0.009	0.005
J Total Phosphorus (mg/L)	6	0.015	0.035	0.019	0.021	0.007
CBOD-5 (mg/L)	6	< 2.0	< 2.0	1.0	1.0	0.0
J Chlorides (mg/L)	6	3.0	3.7	3.2	3.3	0.2
Biological						
Chlorophyll a (µg/L)	6	< 1.00	6.41	2.49	3.14	2.50
E. coli (col/100 mL)	6	14	58	27	31	16

J=estimate; N= # of samples;

SUMMARY

The habitat at Gulf Creek at GLFS-25 was assessed and found to be *sub-optimal* in its ability to support healthy and divers aquatic macroinvertebrate communities. The overall macroinvertebrate community condition was rated as *fair*. Water chemistry analyses of samples collected March through August indicated no immediate concerns. Gulf Creek was dry during attempted sampling events in September and October. Monitoring at Gulf Creek at GLFS-25 should continue to ensure that conditions remain stable.

FOR MORE INFORMATION, CONTACT:
Amanda L. Farrell, Birmingham Field Office
110 Vulcan Road, Birmingham AL 35209
(205) 942-6168 afarrell@adem.state.al.us