

2013 Monitoring Summary



Bennett Mill Creek at Henry County Road 47 (31.52586/-85.07152)

BACKGROUND

In 2008, the Alabama Department of Environmental Management (ADEM) monitored Bennett Mill Creek at BMCH-1 as part of its 2008 Basin Assessment of the Southeast Alabama River Basins. Stream flows during the 2008 sampling period were unusually low, ranging from 0.1 cfs in September to 3.7 cfs in July. During 2013, the ADEM re-sampled Bennett Mill Creek at BMCH-1 to assess biological, chemical, and physical conditions during typical stream flow conditions.



Figure 1. Bennett Mill Creek at BMCH-1, May 7, 2013.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Bennett Mill Creek is a *Fish and Wildlife (F&W)* stream that drains approximately seven square miles in Henry County. Based on the 2006 National Land Cover Dataset, landuse within the watershed is primarily forest (61%), shrub/scrub, and cultivated crops. Population density is very low, as is the percentage of developed land (<3%). As of September 1, 2012, ADEM has issued no NPDES permits 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. Bennett Mill Creek at BMCH-1 is a medium gradient stream (Figure 1). Instream substrates were dominated by hardpan clay, sand, and organic matter. Habitat quality and availability were rated *optimal* for supporting the macroinvertebrate community.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin	Chattahoochee River	
Drainage Area (mi²)	7	
Ecoregion^a	65d	
% Landuse		
Open water		<1
Wetland	Woody	<1
Forest	Deciduous	9
	Evergreen	27
	Mixed	25
Shrub/scrub		20
Pasture/hay		2
Cultivated crops		14
Development	Open space	2
	Low intensity	<1
Population/km^{2b}	1	

a. Southern Hilly Gulf Coastal Plain
b. 2000 US Census

Table 2. Physical characteristics of Bennett Mill Creek at BMCH-1, May 7, 2013.

Physical Characteristics		
Width (ft)	12	
Canopy Cover	Mostly Shaded	
Depth (ft)	Riffle	0.5
	Run	1.0
	Pool	0.8
% of Reach	Riffle	5
	Run	80
	Pool	15
% Substrate	Cobble	2
	Gravel	5
	Hard Pan Clay	20
	Sand	48
	Silt	1
	Organic Matter	24

BIOASSESSMENT RESULTS

The benthic macroinvertebrate community was 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 all individual metric scores. Metric results indicated the macroinvertebrate community to be in *good* condition overall (Table 4), with good representation of pollution sensitive organisms and high diversity.

Table 3. Results of the habitat assessment conducted on Bennett Mill Creek at BMCH-1, May 7, 2013.

Habitat Assessment	%Maximum Score	Rating
Instream Habitat Quality	63	Sub-optimal (53-65)
Sediment Deposition	83	Optimal (>65)
Simosity	85	Optimal (>84)
Bank and Vegetative Stability	83	Optimal (>74)
Riparian Buffer	89	Sub-optimal (70-89)
Habitat Assessment Score	191	
% Maximum Score	79	Optimal (>65)

WATER CHEMISTRY

Water samples and in situ measurements were collected monthly, from March through October 2013, to help identify an stressors to the biological community of Bennett Mill Creek at BMCH-1. Water chemistry results are summarized in Table 5. Stream flows were much higher than in 2008, ranging from 6.0 cfs in July and October to 11.8 cfs in August. The median nitrate+nitrite-nitrogen concentration was higher than the 90th percentile of reference reach data collected in ecoregion 65d.

SUMMARY

In 2008, the ADEM monitored Bennett Mill Creek at BMCH-1 as part of its 2008 Basin Assessment of the Southeast Alabama River Basins. Stream flows during the 2008 sampling period were unusually low, ranging from 0.1 cfs in September to 3.7 cfs in July. The site was re-sampled in 2013 to assess biological, chemical, and physical conditions during typical stream flow conditions.

Stream flows ranged from 6.0 cfs to 11.8 cfs during 2103, and provide biological, chemical, and physical data collected during more typical stream flow conditions. Results of the macroinvertebrate bioassessment indicated the community at this location to be in *good* condition. However, the median nitrate+nitrite-nitrogen concentration was the higher than the 90th percentile of reference reach data collected in ecoregion 65d. Monitoring should continue to ensure the conditions within the reach remain stable.

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Table 4. Results of the macroinvertebrate bioassessment conducted in Bennett Mill Creek at BMCH-1, May 7, 2013.

Macroinvertebrate Assessment		Results
Taxa richness and diversity measures		
Total # Taxa		65
# EPT taxa		18
# Highly-sensitive and Specialized Taxa		5
Taxonomic composition measures		
% EPC taxa		32
% EPT minus Baetidae and Hydropsychidae		7
% Chironomidae Individuals		60
% Dominant Taxon		32
% Individuals in Dominant 5 Taxa		67
Functional feeding group		
# Collector Taxa		24
% Tolerant Filterer Taxa		11
Community tolerance		
# Sensitive EPT		8
% Sensitive taxa		32
% Nutrient Tolerant individuals		37
WMB-I Assessment Score		50
WMB-I Assessment Rating		Good (48-74)

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	Med	Avg	SD
Physical						
Temperature (°C)	9	10.8	22.4	17.9	18.4	3.9
Turbidity (NTU)	9	3.6	14.6	7.7	7.8	3.3
Total Dissolved Solids (mg/L)	8 <	1.0	113.0	48.0	48.7	35.1
Total Suspended Solids (mg/L)	8 <	1.0	14.0	8.5	7.4	4.5
Specific Conductance (µmhos)	9	43.2	51.8	48.2	47.4	2.9
Alkalinity (mg/L)	8	7.0	44.6	10.2	14.4	12.3
Stream Flow (cfs)	8	6.0	11.8	7.2	8.1	2.2
Chemical						
Dissolved Oxygen (mg/L)	9	8.5	10.6	9.4	9.2	0.7
pH (su)	9	6.2	7.3	6.9	6.9	0.4
Ammonia Nitrogen (mg/L)	8 <	0.008	< 0.018	0.008	0.008	0.002
Nitrate+Nitrite Nitrogen (mg/L)	8	0.303	0.588	0.358 ^M	0.392	0.089
Total Kjeldahl Nitrogen (mg/L)	8 <	0.058	0.415	0.128	0.162	0.143
Total Nitrogen (mg/L)	8	0.384	0.760	0.541	0.554	0.111
^J Dissolved Reactive Phosphorus (mg/L)	8	0.005	0.012	0.010	0.009	0.003
Total Phosphorus (mg/L)	8	0.016	0.031	0.028	0.025	0.005
^J CBOD-5 (mg/L)	8 <	2.0	< 2.0	1.0	1.0	0.0
Chlorides (mg/L)	8	3.0	3.4	3.3	3.3	0.2
Biological						
Chlorophyll a (µg/L)	8 <	0.10	2.14	1.07	0.82	0.73

N=# samples; J=estimate; M=value > 90th percentile of all verified ecoregional reference reach data collected in the ecoregion 65d.