

2013 Monitoring Summary



Washington Creek at Highway 183 in Perry County (32.56997/-87.39136)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) monitored Washington Creek at WASP-1 as part of its 2005 and 2010 Basin Assessments of the Alabama, Coosa, and Tallapoosa Rivers Basins. Monitoring of Washington Creek continued in 2013 to provide additional biological, chemical and physical data to fully assess the use support status of Washington Creek for the 2016 Integrated Water Quality Report.



Figure 1. Washington Creek at WASP-1, May 15, 2013.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Washington Creek at WASP-1 is a *Fish and Wildlife (F&W)* stream located in Perry County northeast of the town of Marion, Alabama within the Blackland Prairie ecoregion (65a). Based on the 2011 National Land Cover Dataset, landuse within the watershed is primarily forest (36%) and pasture/hay with some cultivated crops. No NPDES outfalls are located within the Washington Creek watershed as of April 1, 2016.

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. Washington Creek at WASP-1 is characterized primarily by hard pan clay and sand substrates (Figure 1). In-stream habitat quality, sinuosity, and bank stability were categorized as *marginal* for this stream type.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		Alabama R
Basin		
Drainage Area (mi ²)		16
Ecoregion ^a		65A
% Landuse ^b		
Open water		5%
Wetland	Woody	5%
	Emergent herbaceous	1%
Forest	Deciduous	14%
	Evergreen	10%
	Mixed	12%
Shrub/scrub		9%
Grassland/herbaceous		2%
Pasture/hay		30%
Cultivated crops		9%
Development	Open space	3%
	Low intensity	<1%
	Moderate intensity	<1%
	High intensity	
Barren		<1%
Population/km ^{2c}		5

a. Blackland Prairie

b. 2011 National Land Cover Dataset

c. 2010 US Census

Table 2. Physical characteristics of Washington Creek at WASP-1, May 15, 2013.

Physical Characteristics		
Width (ft)		25
Canopy Cover		Shaded
Depth (ft)		
	Run	1.0
	Pool	2.5
% of Reach		
	Run	60
	Pool	40
% Substrate		
	Clay	5
	Cobble	2
	Gravel	5
	Hard Pan Clay	40
	Sand	38
	Silt	5
	Organic Matter	5

Table 3. Results of the habitat assessment conducted on Washington Ck at WASP-1, May 15, 2013.

Habitat Assessment	% Maximum Score	Rating
Instream Habitat Quality	43	Marginal (31-<55)
Sediment Deposition	65	Sub-Optimal (55-79)
Sinuosity	38	Marginal (31-<55)
Bank Vegetative Stability	48	Marginal (31-<58)
Riparian Buffer	90	Optimal (>84)
Habitat Assessment Score	101	
% of Maximum Score	59	Sub-optimal (57-80)

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 the macroinvertebrate community to be in *poor* condition (Table 4).

Table 4. Results of macroinvertebrate bioassessment conducted in Washington Creek at WASP-1, May 15, 2013.

Macroinvertebrate Assessment		Results
Taxa richness and diversity measures		
# EPT taxa		8
Taxonomic composition measures		
% Non-insect taxa		23
% Plecoptera		3
% Dominant taxon		20
Functional feeding group		
% Predators		16
Community tolerance		
Becks community tolerance index		0
% Nutrient tolerant individuals		32
WMB-I Assessment Score		35
WMB-I Assessment Rating		Poor (19-37)

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. In situ measurements and water samples were collected monthly during March through October of 2013 to help identify any stressors to the biological communities. *E. coli* samples collected in June, July, August, and September exceeded the summer single sample maximum criterion. Median chlorophyll *a* was slightly higher than values expected based on data collected at reference reaches within the Blackland Prairie ecoregion (65a).

Table 5. Summary of water quality data collected March-October 2013. Minimum (Min) and maximum (Max) values calculated using minimum detection limits (MDL). Median (Med), 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	Ma	Med	Avg	SD	E	Q
Physical								
Temperature (°C)	9	11.8	24.6	19.0	19.8	4.8		
Turbidity (NTU)	9	4.3	40.5	19.0	20.5	11.4		
Total Dissolved Solids (mg/L)	8	24.0	116.0	91.0	80.8	28.2		
Total Suspended Solids (mg/L)	8	< 1.0	36.0	11.0	12.6	11.6		
Specific Conductance (µmhos)	9	68.7	171.2	83.8	97.8	36.6		
Alkalinity (mg/L)	8	22.8	70.3	27.8	34.4	16.3		
Stream Flow (cfs)	9	0.5	73.4	16.0	20.0	22.1		
Chemical								
Dissolved Oxygen (mg/L)	9	7.4	11.0	8.6	8.6	1.1		
pH (su)	9	6.8	7.7	7.1	7.2	0.3		
Ammonia Nitrogen (mg/L)	8	< 0.018	0.039	0.014	0.019	0.012		
Nitrate+Nitrite Nitrogen (mg/L)	8	0.042	0.342	0.054	0.120	0.109		
Total Kjeldahl Nitrogen (mg/L)	8	< 0.041	1.430	0.382	0.602	0.536		
Total Nitrogen (mg/L)	8	< 0.062	1.742	0.461	0.722	0.587		
Dissolved Reactive Phosphorus (mg/L)	8	0.017	0.073	0.030	0.035	0.019		
Total Phosphorus (mg/L)	8	0.068	0.244	0.132	0.137	0.066		
CBOD-5 (mg/L)	8	< 2.0	< 2.0	1.0	1.0	0.0		
Chlorides (mg/L)	8	3.4	12.4	4.9	5.7	2.9		
Biological								
Chlorophyll <i>a</i> (µg/L)	8	< 0.10	10.68	5.34 ^M	5.41	3.87		
<i>E. coli</i> (col/100mL)	8	70	2420 ^H	765	1073	1025	4	1

E = # samples that exceeded criteria; H = F&W human health criterion exceeded; J = estimate; N = # samples; M = value >90% of all verified ecoregional reference reach data collected in ecoregion 65a; Q = # of uncertain exceedances.

SUMMARY

Bioassessment results indicated the macroinvertebrate community to be in *poor* condition. Instream habitat quality, sinuosity, and bank stability were categorized as *marginal* for this stream type. *E. coli* samples collected in June, July, August, and September exceeded the summer single sample maximum criterion. Median chlorophyll *a* was slightly higher than values expected based on data collected at reference reaches within the Blackland Prairie ecoregion (65a). The results from this report will be used to fully assess the use support status of Washington Creek for the 2016 Integrated Water Quality Report.

FOR MORE INFORMATION, CONTACT:
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