

2010 Monitoring Summary



Knokes Creek at Randolph County Road 37 (33.47123/-85.37715)

BACKGROUND

Knokes Creek at KNSR-9 was selected for sampling during the 2010 Tallapoosa Nutrient Criteria project. Data collected will be used to develop and implement nutrient criteria in Wadeable, Flowing Streams in the Tallapoosa River Basin, as well as statewide.



Figure 1. Knokes Creek at KNSR-9, August 10, 2010.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Knokes Creek at KNSR-9 is a *Fish & Wildlife (F&W)* stream located in Randolph County. Based on the 2006 National Land Cover Dataset, landuse in the watershed is primarily forest (61%) and pasture/hay. Population density in the area is low, and less than 6% of the watershed is developed. 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. Knokes Creek is a riffle-run stream with a benthic substrate that consists primarily of sand and gravel (Figure 1). Despite unstable banks and a limited riparian buffer, instream habitat was in *optimal* condition. Overall habitat quality was categorized as *sub-optimal*.

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 KNSR-9 was in *good* condition (Table 4).

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Tallapoosa River
Drainage Area (mi ²)		16
Ecoregion ^a		45a
% Landuse		
Open water		<1
Wetland	Woody	<1
Forest	Deciduous	43
	Evergreen	17
	Mixed	1
Shrub/scrub		3
Grassland/herbaceous		10
Pasture/hay		20
Development	Open space	3
	Low intensity	1
	Moderate intensity	<1
	High intensity	<1
Barren		1
Population/km ^{2b}		9

a.Southern Inner Piedmont

b.2000 US Census

Table 2. Physical characteristics of Knokes Creek at KNSR-9, May 19, 2010.

Physical Characteristics		
Width (ft)		30
Canopy cover		Mostly Shaded
Depth (ft)		
	Riffle	0.5
	Run	1.5
	Pool	2.0
% of Reach		
	Riffle	20
	Run	75
	Pool	5
% Substrate		
	Bedrock	15
	Boulder	10
	Cobble	12
	Gravel	25
	Sand	30
	Silt	5
	Organic Matter	3

Table 3. Results of the habitat assessment conducted in Knoles Creek at KNSR-9 on May 19, 2010.

Habitat Assessment	% Maximum Score	Rating
Instream Habitat Quality	74	Optimal > 70
Sediment Deposition	69	Sub-optimal (59-70)
Sinuosity	93	Optimal ≥84
Bank and Vegetative Stability	54	Marginal (35-59)
Riparian Buffer	46	Poor <50
Habitat Assessment Score	156	
% Maximum score	65	Sub-optimal (59-70)

Table 4. Results of the macroinvertebrate bioassessment conducted in Knoles Creek at KNSR-9 on May 19, 2010.

Macroinvertebrate Assessment		
	Results	Scores
Taxa richness and diversity measures		(0-100)
# EPT taxa	22	78
Shannon Diversity	4.07	64
Taxonomic composition measures		
% EPT minus Baetidae and Hydropsychidae	20	21
% Non-insect taxa	3	98
Tolerance measures		
% Tolerant taxa	15	100
WMB-I Assessment Score	---	72
WMB-I Assessment Rating		Good (70-85)

WATER CHEMISTRY

Results of water chemistry are presented in Table 5. In situ measurements and water samples were collected March through October of 2010 to help identify any stressors to the biological communities. Turbidity was 142 NTU on October 27th and 88.5 NTU on November 30th, above ecoregional guidelines. However, high stream flow conditions caused by a large rain event prior to sampling may be the cause of the elevated turbidity readings. Median ammonia and nitrate+nitrite nitrogen were above the 90th percentile of data collected from reference reach streams in the Southern Inner Piedmont ecoregion (45a).

SUMMARY

Bioassessment results indicated the macroinvertebrate community at KNSR-9 to be in *good* condition. Median ammonia and nitrate+nitrite nitrogen were elevated as compared to data from other reference reaches in ecoregion 45a. Monitoring should continue to ensure that water quality and biological conditions remain stable. Data collected at this site may be useful in establishing nutrient criteria for streams in the Tallapoosa River Basin and statewide.

Table 5. Summary of water quality data collected March-October, 2010. 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)	9	12.4	25.5	19.3	19.9	3.8
Turbidity (NTU)	9	3.3	142.0 ^T	8.5	31.3	49.5
^J Total Dissolved Solids (mg/L)	8	< 1.0	100.0	30.0	35.8	29.1
Total Suspended Solids (mg/L)	8	< 1.0	1710.0	2.5	220.6	601.9
Specific Conductance (µmhos)	9	27.2	38.6	33.6	32.7	3.4
Alkalinity (mg/L)	8	3.8	12.4	6.8	7.3	3.3
Stream Flow (cfs)	7	0.1	25.3	6.3	9.4	10.1
Chemical						
Dissolved Oxygen (mg/L)	9	5.2	9.8	8.2	8.2	1.4
pH (su)	9	6.0	7.1	6.6	6.6	0.3
Ammonia Nitrogen (mg/L)	8	< 0.021	0.184	0.010 ^M	0.032	0.061
^J Nitrate+Nitrite Nitrogen (mg/L)	8	0.025	0.398	0.214 ^M	0.214	0.115
Total Kjeldahl Nitrogen (mg/L)	8	< 0.080	0.841	0.254	0.304	0.285
^J Total Nitrogen (mg/L)	8	< 0.253	1.239	0.412	0.518	0.317
^J Dissolved Reactive Phosphorus (mg/L)	8	0.004	0.016	0.009	0.009	0.004
Total Phosphorus (mg/L)	8	0.011	0.502	0.018	0.080	0.171
CBOD-5 (mg/L)	8	< 2.0	4.6	1.0	1.4	1.3
Chlorides (mg/L)	8	2.0	2.6	2.3	2.3	0.2
Biological						
Chlorophyll a (µg/L)	8	< 0.10	5.34	1.24	1.72	1.75

^J=estimate; ^M=value >90% of all verified ecoregional reference reach data collected in the ecoregion 45a; N=# samples; ^T=value exceeds 50 NTU above the 90th percentile of all verified ecoregional reference reach data collected in the ecoregion 45a.

FOR MORE INFORMATION, CONTACT:

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