

# 2005 Assessment Summary



Jones Creek at Coosa County Road 18 (32.90492/-86.29758)

## BACKGROUND

Jones Creek is one of the streams the Alabama Department of Environmental Management (ADEM) monitors as a “best attainable condition” reference watershed for comparison with streams throughout the Piedmont ecoregion. For more information about ADEM’s Ecoregional Reference Reach Program.

Additionally, Jones Creek was selected for biological and water quality monitoring as part of the 2005 Assessment of the Alabama, Coosa, and Tallapoosa (ACT) River Basins. The objectives of the ACT Basin Assessments were to fully assess each monitoring site as meeting or not meeting its use classifications and to estimate overall water quality within the ACT basin group. For more details concerning ADEM’s Basin Assessment Program.



**Figure 1.** Sampling location and land use within the Jones Creek watershed at JNSC-16.

## WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Jones Creek at JNSC-16 is a small *Fish & Wildlife* stream located in the Southern Inner Piedmont Ecoregion. Land cover within the watershed is approximately 77% forested and 17% grassland and shrub/scrub, concentrated in the north-east corner of the watershed (Fig. 1). As of June 9, 2008, ADEM’s NPDES Management System database did not show any permitted discharges located within the watershed.

## REACH CHARACTERISTICS

Jones Creek at JNSC-16 is a low-gradient, riffle-run stream (Table 2). Overall habitat quality was rated as *sub-optimal* for supporting macroinvertebrate communities (Table 3). Sedimentation, as evidenced by the high percentage of gravel and sand substrates, was an issue in the reach, limiting in-stream habitat availability.

## 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. The final score is an average of all individual metric scores. The final score indicated the biological community to be in *good* condition (Table 4).

**Table 1.** Summary of watershed characteristics.

Watershed Characteristics		
Drainage Area (mi <sup>2</sup> )		5
Ecoregion <sup>a</sup>		45a
% Landuse		
Forest	Deciduous	37
	Evergreen	40
Shrub/scrub		5
Grassland/herbaceous		12
Pasture/hay		1
Development	Open space	4
Population/km <sup>2</sup>		9

a.Southern Inner Piedmont

**Table 2.** Physical characteristics at JNSC-16, June 23, 2005.

Physical Characteristics		
Width (ft)		15
Canopy cover		Mostly Shaded
Depth (ft)		
	Riffle	0.3
	Run	0.8
	Pool	1.0
% of Reach		
	Riffle	20
	Run	75
	Pool	5
% Substrate		
	Bedrock	2
	Boulder	5
	Cobble	3
	Gravel	23
	Sand	60
	Silt	4
	Organic Matter	3

**Table 3.** Results of habitat assessment conducted at JNSC-16 on June 23, 2005.

Habitat Assessment (% Maximum Score)		Rating
Instream habitat quality	60	Sub-optimal (59-70)
Sediment deposition	46	Marginal (41-58)
Sinuosity	78	Sub-optimal (65-84)
Bank and vegetative stability	73	Sub-optimal (60-74)
Riparian buffer	80	Sub-optimal (70-90)
Habitat assessment score	162	
<b>% Maximum score</b>	<b>67</b>	<b>Sub-optimal (59-70)</b>

TM Graphics provided by Florida Dept. of Environmental Protection (FDEP); used with permission and in this report pertain only to the Macro invertebrate

**Table 4.** Results of macroinvertebrate assessment conducted at JNSC

Macroinvertebrate Assessment Results			
	Results	Scores (0-100)	Rating
<b>Taxa richness measures</b>			
# Ephemeroptera (mayfly) genera	14	100	Excellent (>86)
# Plecoptera (stonefly) genera	6	100	Excellent (>86)
# Trichoptera (caddisfly) genera	6	50	Fair (48-72)
<b>Taxonomic composition</b>			
% Non-insect taxa	3	89	Excellent (>86)
% Non-insect organisms	2	95	Excellent (>86)
% Plecoptera	15	74	Good (72-86)
<b>Tolerance measures</b>			
Beck's community tolerance index	26	93	Excellent (>86)
<b>WMB-I Assessment Score</b>	<b>---</b>	<b>86</b>	<b>Good (72-86)</b>

## WATER CHEMISTRY

Results of water chemistry are presented in Table 5. Samples were collected monthly or semi-monthly (metals) during March through October of 2005. *In situ* parameters indicated that Jones Creek at JNSC-16 was meeting water quality criteria for its *Fish & Wildlife* use classification. Dissolved oxygen concentrations ranged from 7.2-11.7 mg/L. Individual fecal coliform counts did not exceed 150 colonies/100 ml of sample. Median concentrations of nutrients, total and dissolved solids, and chlorides were well within the expected limit for streams in the Southern Inner Piedmont. Metals concentrations were generally below detection limits. Median concentrations of metals that were detected (total aluminum, iron, and manganese and dissolved iron) were below concentrations in 90% of verified ecoregional reference reach samples. Atrazine, a common herbicide, was detected in the only sample analyzed for atrazine.

## CONCLUSIONS

Landuse, road density, and population density categorize Jones Creek among the least-disturbed watersheds in the ACT basin group. ADEM has monitored it as a "best attainable" condition reference watershed since 2000. Water quality data indicate the site to be typical of other reference reaches in the Piedmont ecoregion. Bioassessment results show the macroinvertebrate community to be in *good* condition. However, habitat assessment results suggest sedimentation and substrate smothering to be an issue. Comparison with habitat assessments conducted in 2000 and 2004 also suggest a gradual increase in percent gravel and sand within the reach.

### FOR MORE INFORMATION, CONTACT:

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**Table 5.** Summary of water quality data collected March-October, 2005. 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
<b>Physical</b>						
Temperature (°C)	8	9.0	24.0	21.5	20.2	4.8
Turbidity (NTU)	8	1.9	8.9	4.7	5.0	2.3
Total dissolved solids (mg/L)	7	34.0	335.0	66.0	119.0	110.7
Total suspended solids (mg/L)	7	3.0	27.0	6.0	9.7	8.7
Specific conductance (µmhos)	8	34.4	51.6	39.6	41.2	6.0
Hardness (mg/L)	4	9.5	12.3	10.8	10.8	1.2
Alkalinity (mg/L)	7	7.6	15.5	10.6	11.0	2.7
Stream Flow (cfs)	7	2.6	11.8	6.7	6.4	---
<b>Chemical</b>						
Dissolved oxygen (mg/L)	8	7.2	11.7	8.7	8.9	1.3
pH (su)	8	6.7	7.8	7.2	7.2	0.4
Ammonia Nitrogen (mg/L)	7	< 0.015	< 0.015	0.008	0.009	0.003
Nitrate+Nitrite Nitrogen (mg/L)	7	< 0.003	0.053	0.042	0.032	0.022
Total Kjeldahl Nitrogen (mg/L)	7	< 0.150	< 0.150	0.075	0.075	0.000
Total nitrogen (mg/L)	7	0.077	0.128	0.119	0.107	0.024
Dissolved reactive phosphorus (mg/L)	7	< 0.004	0.008	0.002	0.004	0.003
Total phosphorus (mg/L)	7	< 0.004	0.067	0.024	0.023	0.022
CBOD-5 (mg/L)	7	1.4	3.5	1.8	2.2	0.8
COD (mg/L)	6	< 2.0	< 2.0	1.0	1.0	0.0
Chlorides (mg/L)	6	3.7	4.2	4.0	4.0	0.2
Atrazine (µg/L)	1				0.06	
<b>Total Metals</b>						
Aluminum (mg/L)	3	0.03	0.071	0.044	0.048	0.02
Iron (mg/L)	3	0.164	0.274	0.205	0.214	0.1
Manganese (mg/L)	3	< 0.005	0.06	0.0025	0.022	0.03
<b>Dissolved Metals</b>						
Aluminum (mg/L)	3	< 0.015	< 0.015	0.0075	0.008	0.0
Antimony (µg/L)	3	< 2	< 2	1	1	0.0
Cadmium (mg/L)	3	< 0.005	< 0.005	0.002	0.002	0.0
Chromium (mg/L)	3	< 0.004	< 0.004	0.002	0.002	0.0
Copper (mg/L)	3	< 0.005	< 0.005	0.0025	0.003	0.0
Iron (mg/L)	3	< 0.005	0.035	0.019	0.019	0.016
Lead (µg/L)	3	< 2	< 2	1	1	0.0
Manganese (mg/L)	3	< 0.005	< 0.005	0.002	0.003	0.0
Mercury (µg/L)	3	< 0.3	< 0.3	0.15	0.15	0.0
Nickel (mg/L)	3	< 0.006	< 0.006	0.003	0.003	0.0
Selenium (µg/L)	3	< 10	< 10	5	5	0.0
Silver (mg/L)	3	< 0.003	< 0.003	0.002	0.002	0.0
Thallium (µg/L)	3	< 1	< 1	0.5	0.500	0.0
Zinc (mg/L)	3	< 0.006	< 0.006	0.003	0.003	0.0
<b>Biological</b>						
<sup>J</sup> Chlorophyll <i>a</i> (µg/L)	7	< 0.10	9.88	0.80	1.95	3.5
<sup>J</sup> Fecal Coliform (col/100 mL)	7	9	150	70	66	51

J=estimate; N=number of samples