

2005 Monitoring Summary

Basin Assessment Site

Johnsons Creek at Montgomery County Road 2 (32.30211/-85.97858)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Johnsons Creek watershed 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 assess the biotic integrity of each monitoring site and to estimate overall water quality within the ACT basin group. Habitat and macroinvertebrate assessments were attempted, but could not be completed as there was no flow in the creek.

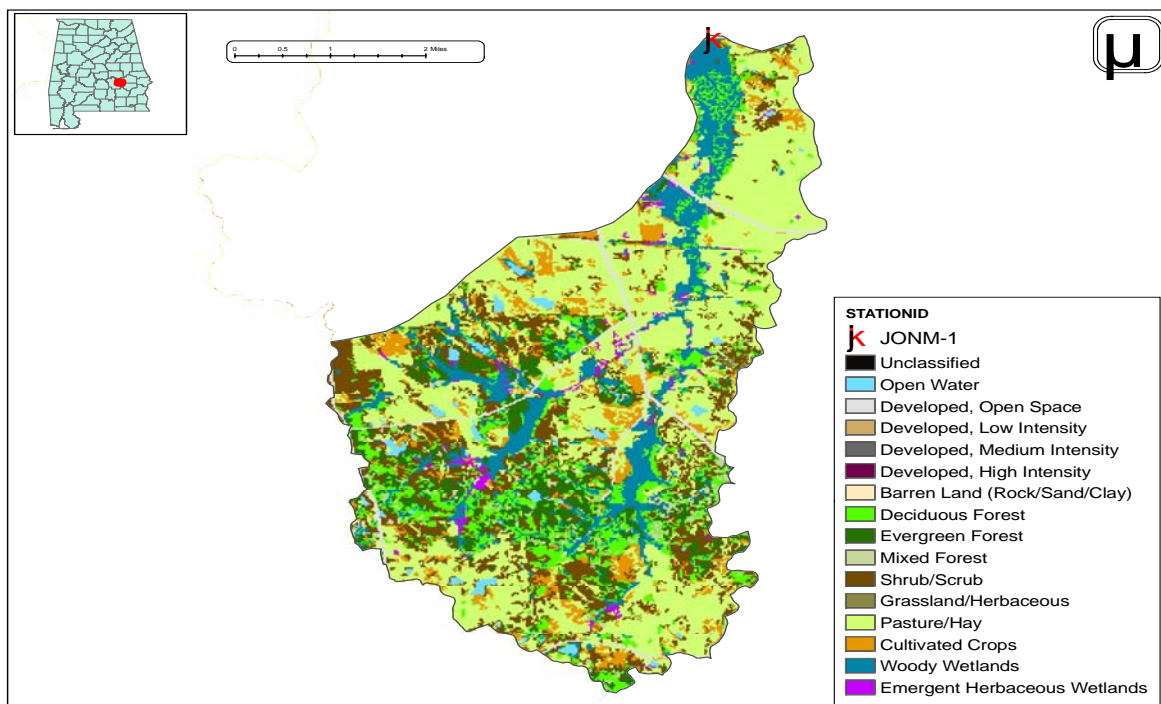


Figure 1. Sampling location and landuse within the Johnsons Creek watershed at JONM-1.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Johnsons Creek at JONM-1 is a small *Fish & Wildlife* (F&W) stream located in the Flatwood/Blackland Prairie Margins ecoregion (65b). Landuse within the watershed is primarily agriculture/pasture (48%), forest (31%), and wetlands (12%). There are also a few permitted discharges and residential areas.

WATER CHEMISTRY

Results of intensive water quality sampling are presented in Table 2. In situ measurements and water samples were collected monthly, semi-monthly (metals), or quarterly (pesticides, herbicides (atrazine), and semi-volatile organics) during March through October of 2005 to help identify any stressors to the biological communities. The fecal coliform count was above 2,000 colonies/100 mL criteria for its F&W use classification on 7/14/2005 after a heavy rain on 7/13/2005. Median values of hardness, alkalinity, dissolved reactive phosphorus and chlorides were higher than expected based on the 90th percentile of data from reference reaches in ecoregions 65a and 65b. Dissolved oxygen concentrations were <5mg/L in four out of six sampling events. Flow could not be measured on six of eight sampling events because of no flow or unwadeable conditions. Atrazine, one of the most commonly used herbicide in the United States was present at a measurable level (0.07µg/L) in April, 2005.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Drainage Area (mi ²)		24
Ecoregion ^a		65b
% Landuse		
Open water		2
Wetland	Woody	11
	Emergent herbaceous	1
Forest	Deciduous	10
	Evergreen	7
	Mixed	2
Shrub/scrub		17
Grassland/herbaceous		<1
Pasture/hay		41
Cultivated crops		7
Development	Open space	2
	Low intensity	<1
	Moderate intensity	<1
Population/km ^{2b}		6
# NPDES Permits ^c	TOTAL	4
Construction Stormwater		2
Mining General Permit (old)		2

a.Flatwood/Blackland Prairie Margins

b.2000 US Census data

c.#NPDES permits downloaded from ADEM's NPDES Management System database, 9 Jun 2008

CONCLUSIONS

Habitat and macroinvertebrate assessments could not be conducted because of no flow conditions during 2005. Intensive water quality sampling indicated low dissolved oxygen in the reach during four of six sampling events, but these may be attributed to the low/no flow conditions at the site.

Table 2. 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
Physical						
Temperature (°C)	6	16.0	26.4	22.5	21.5	4.3
Turbidity (NTU)	6	4.3	25.5	14.9	15.0	7.7
Total dissolved solids (mg/L)	6	94.0	222.0	132.5	148.5	50.8
Total suspended solids (mg/L)	6	9.0	32.0	19.5	20.5	8.5
Specific conductance (µmhos)	6	188.2	414.2	318.7 ^M	307.1	94.1
Hardness (mg/L)	4	124.0	206.0	158.0 ^M	161.5	36.2
Alkalinity (mg/L)	6	85.2	182.6	136.0 ^M	134.9	39.8
Stream Flow (cfs)	2	8.1	12.5	10.3	10.3	---
Chemical						
Dissolved oxygen (mg/L)	6	2.1 ^C	7.3	4.6	4.7	2.1
pH (su)	5	6.6	7.59	7.2	7.2	0.4
Ammonia Nitrogen (mg/L)	6	< 0.015	0.035	0.019	0.020	0.012
Nitrate+Nitrite Nitrogen (mg/L)	6	< 0.003	0.075	0.028	0.036	0.028
Total Kjeldahl Nitrogen (mg/L)	6	0.291	0.915	0.767	0.710	0.218
Total nitrogen (mg/L)	6	0.292	0.940	0.815	0.746	0.235
Dissolved reactive phosphorus (mg/L)	6	0.025	0.126	0.036 ^M	0.059	0.045
Total phosphorus (mg/L)	6	0.057	0.159	0.108	0.110	0.038
CBOD-5 (mg/L)	6	1.5	5.5	3.2	3.3	1.5
^J Chlorides (mg/L)	6	3.9	13.5	10.0 ^M	9.5	3.3
Atrazine (µg/L)	2	< 0.05	0.07	0.05	0.05	---
Total Metals						
Aluminum (mg/L)	3	0.027	0.572	0.067	0.222	0.3
Iron (mg/L)	3	0.4	0.901	0.417	0.573	0.3
Manganese (mg/L)	3	< 0.005	0.144	0.073	0.073	0.1
Dissolved Metals						
Aluminum (mg/L)	3	< 0.015	0.154	0.0075	0.056	0.1
Antimony (µg/L)	3	< 2	< 2	1	1	0.0
Arsenic (µg/L)	3	< 10	< 10	5	5	0.0
Cadmium (mg/L)	3	< 0.005	< 0.005	0.0025	0.0025	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	0.055	0.21	0.079	0.1147	0.1
Lead (µg/L)	3	< 2	< 2	1	1	0.0
Manganese (mg/L)	3	< 0.005	0.133	0.01	0.049	0.1
^J Mercury (µg/L)	3	< 0.3	< 0.3	0.15	0.2	0.1
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	0.0015	0.0015	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
Biological						
^J Chlorophyll a (µg/L)	6	0.53	10.15	2.14	3.38	3.6
^J Fecal Coliform (col/100 mL)	6	5	> 5000 ^C	120	911	2004

^J=estimate; N= # samples; M=value > 90% of all verified ecoregional reference reach data collected in the subecoregions 65a & 65b; C=value exceeds established criteria for *Fish & Wildlife* water use classification.

FOR MORE INFORMATION, CONTACT:

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