

2005 Monitoring Summary

Flint River at Madison Co Rd 28 (Old Hwy 431) (34.65136/-86.44819)

BACKGROUND

Flint River from Hurricane Creek to the Tennessee River was on Alabama's 2004 §303(d) list of impaired waters for only partially supporting its *Fish and Wildlife* (F&W) use classification due to organic enrichment (OE)/ dissolved oxygen (DO) impairment from agricultural and urban runoff. The portion of this segment from Big Cove Creek upstream to Hurricane Creek (where FLIM-5 is located) was also listed separately for only partially supporting its *Public Water Supply* (PWS) use classification. In 2006, both the F&W and PWS segments were delisted because intensive data collected in 2003-2005 by the Alabama Department of Environmental Management (ADEM) did not indicate any OE/DO impairment. The current report summarizes the monthly water quality data collected at FLIM-5 during 2005. The ADEM also attempted habitat and macroinvertebrate assessments of Flint River at Madison County Road 28 (FLIM-5) in 2005 as part of this intensive monitoring effort. However, the assessments could not be conducted due to non-wadeable conditions.

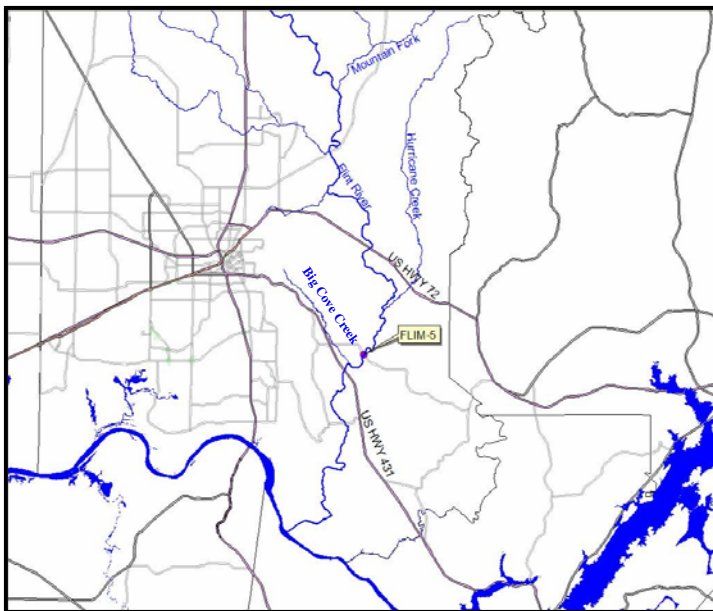


Figure 1. Watershed map: Flint River at FLIM-5.

WATERSHED CHARACTERISTICS

The Flint River at FLIM-5 is part of a large watershed located within the Interior Plateau (Eastern Highland Rim) Ecoregion. Over half of the watershed is comprised of pasture and cultivated crops (Table 1). The low intensity and open development within the watershed are generally single-farm residences on the outskirts of Huntsville.

Table 1. Summary of watershed characteristics

Watershed Characteristics	
Drainage Area (mi ²) in AL	441
Ecoregion ^a	71g
% Landuse	
Open water	<1
Development	
Open space	6
Low intensity	2
Medium intensity	<1
High intensity	<1
Forest	
Deciduous	27
Evergreen	1
Mixed	2
Shrub/scrub	4
Grassland/herbaceous	1
Pasture/hay	28
Cultivated Crops	25
Woody Wetlands	4

a. Interior Plateau (Eastern Highland Rim)

WATER CHEMISTRY

Median values of monthly water chemistry samples collected March-October of 2005 are presented in Table 2. Dissolved oxygen concentrations and the median five-day biochemical oxygen demand (CBOD-5), which is a measure of organic enrichment, were similar to the 90th percentile of concentrations measured at verified reference reaches in the Interior Plateau Ecoregion. *In situ* measurements indicated that Flint River at FLIM-5 generally met water quality criteria for its PWS water use classification. However, median concentrations of nutrients (total phosphorus, nitrate+nitrite nitrogen, and total Kjeldahl nitrogen), total suspended solids, alkalinity, hardness, and chloride concentrations were higher than expected. Fecal coliform counts were >200 colonies/100mL during the site visits in June and July, when flows were above normal. Also, in June, the turbidity criteria was exceeded at 384 NTU, the highest turbidity measured at the site in 2005.

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)	8	13.0	25.4	21.5	19.8	4.8
Turbidity (NTU)	8	5.2	384.0	8.8	58.3	132.1
Total dissolved solids (mg/L)	7	101.0	126.0	107.0 ^M	109.7	8.6
Total suspended solids (mg/L)	8	5.0	223.0	10.5	39.1	74.9
Specific conductance (µmhos)	8	120.0	200	183.0	176.5	24.4
Hardness (mg/L)	7	53.2	90.3	86.5 ^M	81.7	12.8
Alkalinity (mg/L)	8	47.6	91.6	81.1 ^M	77.2	13.3
Chemical						
Dissolved oxygen (mg/L)	8	6.6	10.9	8.3	8.7	1.6
pH (su)	8	7.4	8.3	7.8	7.8	0.3
Ammonia Nitrogen (mg/L)	8	< 0.015	< 0.015	< 0.015	< 0.015	0.0
Nitrate+Nitrite Nitrogen (mg/L)	8	0.861	1.710	1.391 ^M	1.349	0.286
Total Kjeldahl Nitrogen (mg/L)	8	< 0.150	1.360	0.236 ^M	0.345	0.429
Total nitrogen (mg/L)	8	1.192	2.511	1.649	1.694	0.395
Dissolved reactive phosphorus (mg/L)	8	< 0.004	0.036	0.016	0.017	0.013
Total phosphorus (mg/L)	8	< 0.100	0.356	0.050 ^M	0.088	0.108
CBOD-5 (mg/L)	8	0.1	1.6	0.8	0.9	0.6
Chlorides (mg/L)	8	1.8	5.4	4.2 ^M	4.1	1.1
Biological						
^J Chlorophyll <i>a</i> (µg/L)	8	< 1.00	7.12	1.34	2.69	2.5
^J Fecal Coliform (col/100 mL)	8	2	600	38	153	236

N=# samples; J=estimate; M=value > 90% of ADEM's ecoregion 71 reference reaches

CONCLUSIONS

In 2006, Flint River from Hurricane Creek to the Tennessee River was de-listed for OE/DO impairment based on intensive data collected in 2003-2005 by ADEM. However, results of intensive water quality sampling suggest nutrient enrichment to be a concern at FLIM-5.

FOR MORE INFORMATION, CONTACT:
 Hugh Cox ADEM Aquatic Assessment Unit
 1350 Coliseum Boulevard Montgomery, AL 36110
 (334) 260-2753 hec@adem.state.al.us