

2005 Monitoring Summary



Catoma Creek (Montgomery Co) ~100 ft. upstream of the Norman Bridge Road (32.30736/-86.29941)

BACKGROUND

Catoma Creek at CATM-3a is one of a network of 94 sites monitored annually to identify long-term trends in water quality and to provide data for the development of Total Maximum Daily Loads (TMDLs) and water quality criteria. The site is also a USGS stream flow gaging station (02421000).

The site is downstream of a 23.2 mile segment of Catoma Creek on Alabama's 2006 Clean Water Act (CWA) §303(d) list of impaired waters (Assessment Unit AL03150201-0309-100). This reach, which stretches from the Alabama River to Ramer Creek, was listed for impairments caused by pathogens from urban runoff/storm sewers and agriculture. A TMDL developed to address organic enrichment and low dissolved oxygen impairments caused by pasture grazing and urban runoff/storm sewers was approved by EPA in 2006.

Habitat and macroinvertebrate assessments were conducted at this site because it is located within the Alabama River basin, which was targeted for monitoring during 2005.

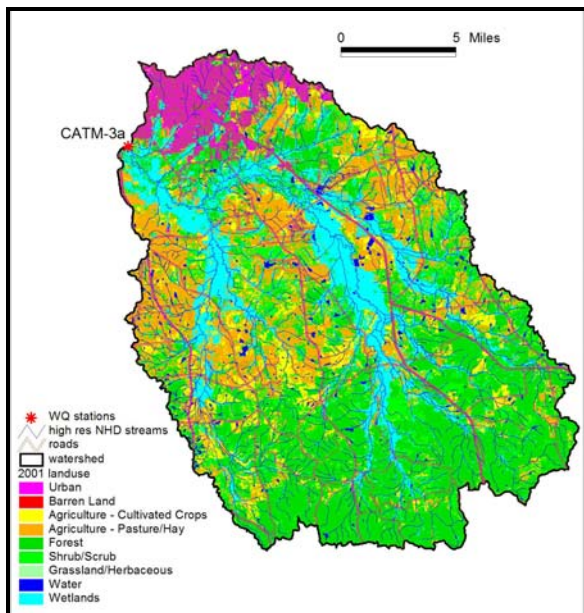


Figure 1. Sampling location and landuse within the Catoma Creek watershed upstream of CATM-3a.

WATERSHED CHARACTERISTICS

The Catoma Creek watershed at CATM-3a lies within the Blackland Prairie (65a) ecoregion. Almost half of the watershed is comprised of forest and wooded wetlands. Twenty-eight percent of the watershed is pasture lands and cultivated crops. The downstream-most portion of the watershed lies within the city of Montgomery. (Table 1)

REACH CHARACTERISTICS

Catoma Creek at CATM-3a is a riffle-run stream reach characterized by bedpan clay, boulder, cobble, gravel and sand substrates (Table 2). The presence of stable substrate and riffles within the stream reach categorized overall habitat quality as *optimal* for a Blackland Prairie stream (Table 3). Bank stability and sinuosity were issues within the stream reach, however.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Drainage Area (mi ²)		291
Ecoregion ^a		65a
% Land cover		
Open water		1
Wetlands	Woody	16
	Emergent herbaceous	1
Development	Open space	4
	Low intensity	3
	Medium intensity	1
Forest	Deciduous	17
	Evergreen	13
	Mixed	3
Scrub/shrub		12
Pasture/hay		20
Cultivated crops		8
# NPDES permits		
	Municipal	3
	Industrial	4

a. Blackland Prairie

Table 2. Physical characteristics and results of a habitat assessment conducted at CATM-3a, July 28, 2005.

Physical Characteristics		
Width (ft)		40
Canopy cover		Mostly Open
Depth (ft)	Riffle	0.8
	Run	1.0
	Pool	2.0
% of Reach	Riffle	30
	Run	30
	Pool	40
% Substrate	Bedrock	20
	Boulder	15
	Cobble	15
	Gravel	10
	Sand	22
	Silt	3
	Organic Matter	5

Table 3a. Results of the habitat assessment conducted at CATM-3a, July 28, 2005.

Habitat Assessment (% Maximum Score)		Rating
Instream habitat quality	72	Optimal (>65)
Sediment deposition	71	Optimal (>65)
Sinuosity	40	Poor (<45)
Bank and vegetative stability	53	Sub-optimal (60-74)
Riparian buffer	90	Sub-optimal (70-90)
Habitat assessment score	161	
% Maximum score	67	Optimal (>65)

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 the score for each metric. The relatively low taxa richness of stoneflies and caddisflies, two pollution-intolerant groups, and high percent dominance of pollution-tolerant organisms indicated the macroinvertebrate community to be in *poor* condition (Table 4).

Table 4. Results of macroinvertebrate bioassessment conducted at CATM-3a, July 28, 2005.

Macroinvertebrate Assessment Results			
	Results	Scores	Rating
Taxa richness measures		(0-100)	
# Ephemeroptera (mayfly) genera	10	83	Good (72-86)
# Plecoptera (stonefly) genera	0	0	Very Poor (<24)
# Trichoptera (caddisfly) genera	4	33	Poor (24-48)
Taxonomic composition measures			
% Non-insect taxa	19	26	Poor (24-48)
% Non-insect organisms	13	67	Fair (48-72)
% Plecoptera	0	0	Very Poor (<24)
Tolerance measures			
Beck's community tolerance index	2	7	Very Poor (<24)
WMB-I Assessment	---	31	Poor (24-48)

WATER CHEMISTRY RESULTS

Median values of monthly water chemistry samples collected March-October of 2005 are presented in Table 4. Median concentrations of hardness, alkalinity, dissolved reactive phosphorus (DRP), and chlorides were above values expected within this ecoregion. Dissolved oxygen concentrations met *Fish & Wildlife* criteria during all three site visits. Two intensive fecal coliform surveys conducted at four other sites within the watershed during 2005 did not show any violations of fecal coliform criteria.

CONCLUSIONS

Bioassessment results indicated the macroinvertebrate community to be in *poor* condition. Parameters of concern included hardness, alkalinity, DRP, and chlorides. Catoma Creek is also characterized by stream flows that rise and fall very quickly (USGS gage 02421000). Combined with the low sinuosity, this could increase scouring impacts to biological communities.

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. Metals results were compared to ADEM's chronic aquatic life use criteria adjusted for hardness.

Parameter	N	Min	Max	Median	Avg	SD
Physical						
Temperature (°C)	3	13.0	29.3	28.0	23.4	9.1
Turbidity (NTU)	3	13.9	46.6	16.9	25.8	18.1
Total dissolved solids (mg/L)	3	116.0	197.0	164.0	159.0	40.7
Total suspended solids (mg/L)	3	19.0	39.0	20.0	26.0	11.3
Specific conductance (µmhos)	3	205.5	270.7	214.2	230.1	35.4
Hardness (mg/L)	3	83.3	125.0	107.0	105.1	20.9
Alkalinity (mg/L)	3	83.6	109.2	88.8	93.9	13.5
Stream Flow (cfs)	3	19.0	177	29.0	75.0	88.5
Chemical						
Dissolved oxygen (mg/L)	3	6.3	7.01	7.0	6.8	0.4
pH (su)	3	7.4	7.9	7.4	7.6	0.3
Ammonia Nitrogen (mg/L)	3	< 0.015	0.154	0.015	0.059	0.083
Nitrate+Nitrite Nitrogen (mg/L)	3	0.022	0.094	0.093	0.070	0.041
Total Nitrogen (mg/L)	3	0.359	1.138	0.648	0.715	0.394
Total Kjeldahl Nitrogen (mg/L)	3	0.337	1.044	0.555	0.645	0.362
Dissolved reactive phosphorus (mg/L)	3	0.040	0.084	0.042	0.055	0.025
Total phosphorus (mg/L)	3	0.012	0.138	0.086	0.079	0.063
^J CBOD-5 (mg/L)	3	< 1.0	5.5	1.4	2.6	2.5
Chlorides (mg/L)	3	10.3	22.2	15.8	16.1	6.0
Total Metals						
Aluminum (mg/L)	1				0.334	
Iron (mg/L)	1				1.04	
Manganese (mg/L)	1				0.042	
Dissolved Metals						
Aluminum (mg/L)	1				0.02	
Antimony (µg/L)	1				< 2	
Cadmium (mg/L)	1				< 0.005	
Chromium (mg/L)	1				< 0.004	
Copper (mg/L)	1				< 0.003	
Iron (mg/L)	1				0.14	
Lead (µg/L)	1				< 1.0	
Manganese (mg/L)	1				< 0.003	
^J Mercury (µg/L)	1				< 0.30	
Nickel (mg/L)	1				< 0.003	
Selenium (µg/L)	1				< 5.0	
Silver (mg/L)	1				< 0.002	
Thallium (µg/L)	1				< 0.5	
Zinc (mg/L)	1				< 0.003	
Biological						
^J Chlorophyll <i>a</i> (µg/L)	3	2.7	6.1	5.3	4.7	1.8
^J Fecal Coliform (col/100 mL)	2	64	> 780	422	422	506

N=# samples; M=value >90% of ADEM's verified reference reaches within the Blackland Prairie; J=value is an estimate

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