

2008 Monitoring Summary



Little Choctawhatchee River upstream of Little Choctawhatchee WWTP in Houston County (31.24882/-85.50681)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) monitored Little Choctawhatchee River at LCHH-2 and several other locations upstream to obtain water quality data to determine permit limits for the Dothan Little Choctawhatchee River Waste Water Treatment Plant after its proposed expansion. The parameters of interest were nutrients (nitrogen and phosphorous), organic enrichment, and dissolved oxygen. Habitat and macroinvertebrate assessments were conducted to verify possible impairment to aquatic communities. Additionally, samples were collected September 9-11, 2008 for an intensive survey. Results from these data may also be used in the determination of Total Maximum Daily Load (TMDL) needs and priorities.



Figure 1. Little Choctawhatchee River at LCHH-2, February 8, 2008.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Little Choctawhatchee River is a *Fish and Wildlife (F&W)* stream that drains approximately 67 square miles in Dale and Houston Counties. Based on the 2006 National Land Cover Dataset, landuse within the watershed is primarily development (34%), cultivated crops, and forest (17%). As of September 1, 2012 ADEM has issued 263 NPDES permits in this watershed, mainly for construction/stormwater.

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. Little Choctawhatchee River at LCHH-2 is a shaded, low gradient stream (Figure 1). Instream substrates were dominated by sand with little other substrate available. Habitat quality and availability were rated *sub-optimal* for supporting macroinvertebrate communities.

TM Graphics provided by Florida Dept. of Environmental Protection (FDEP); used with permis-

Table 1. Summary of watershed characteristics.

Watershed Characteristics		Choctawhatchee River
Basin		Choctawhatchee River
Drainage Area (mi²)		67
Ecoregion^a		65g
% Landuse		
Open water		<1
Wetland	Woody	5
	Emergent herbaceous	<1
Forest	Deciduous	4
	Evergreen	12
	Mixed	1
Shrub/scrub		9
Grassland/herbaceous		<1
Pasture/hay		11
Cultivated crops		23
Development	Open space	16
	Low intensity	11
	Moderate intensity	4
	High intensity	3
Population/km^{2b}		236
# NPDES Permits^c	TOTAL	263
	401 Water Quality Certification	3
	Construction Stormwater	236
	Mining	2
	Industrial General	11
	Industrial Individual	3
	Municipal Individual	6
	Underground Injection Control	2

a. Dougherty Plain

b. 2000 US Census

c. #NPDES permits downloaded from ADEM's NPDES Management System database September 1, 2012

Table 2. Physical characteristics of Little Choctawhatchee River at LCHH-2, May 28, 2008.

Physical Characteristics	
Width (ft)	35
Canopy Cover	Shaded
Depth (ft)	
	Run 2.0
	Pool 3.5
% of Reach	
	Run 60
	Pool 40
% Substrate	
	Mud/Muck 1
	Gravel 1
	Sand 86
	Silt 5
	Organic Matter 7

Table 3. Results of the habitat assessment conducted on Little Choctawhatchee River at LCHH-2, May 28, 2008.

Habitat Assessment	%Maximum Score	Rating
Instream Habitat Quality	50	Marginal (40-52)
Sediment Deposition	60	Sub-optimal (53-65)
Sinuosity	60	Marginal (45-64)
Bank and Vegetative Stability	60	Sub-optimal (60-74)
Riparian Buffer	86	Sub-optimal (70-89)
Habitat Assessment Score	139	
% Maximum Score	63	Sub-optimal (53-65)

Table 4. Results of the macroinvertebrate bioassessment conducted in Little Choctawhatchee River at LCHH-2, May 28, 2008.

Macroinvertebrate Assessment			
	Results	Scores	Rating
Taxa richness measures			
# EPT genera	9	36	Poor (19-37)
Taxonomic composition			
% Non-insect taxa	11	72	Fair (61.9-92.7)
% Plecoptera	0	0	Very Poor
% Dominant taxa	20	74	Good (70.6-85.2)
Functional composition measures			
% Predators	4	15	Poor (15.1-30.1)
Tolerance measures			
Beck's community tolerance	2	9	Very Poor
% Nutrient tolerant organisms	47	38	Poor (25.4-50.8)
WMB-I Assessment Score	-	35	Poor (19-37)

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 the average of all individual metric scores. Metric results indicated the macroinvertebrate community to be in *poor* condition overall (Table 4), with a high percentage of nutrient tolerant organisms.

WATER CHEMISTRY

In situ measurements and water samples were collected semi-monthly during April through November 2008 to help identify any stressors to the biological communities. Additional samples were collected in September for the intensive survey. Water chemistry results are summarized in Table 5. *In situ* pH measurements fell below *F&W* criteria during two site visits. However, stream pH measurements were normal for streams in this ecoregion, based on the median value of reference reach data collected in ecoregion 65g. Several nutrients were higher than the 90th percentile of reference reach data collected in ecoregion 65g. Median chlorophyll *a* concentration, which is used as an index of in-stream algal biomass, was also higher than expected. No bacteriological (fecal coliform) samples or organics were collected.

Table 5. Summary of water quality data collected April-November, 2008. 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	Med	Avg	SD	E
Physical							
Temperature (°C)	10	8.8	27.0	23.5	20.8	6.2	
Turbidity (NTU)	10	4.9	21.5	8.3	9.3	4.6	
Total Dissolved Solids (mg/L)	7	< 1.0	90.0	50.0	52.9	33.9	
Total Suspended Solids (mg/L)	7	< 1.0	5.0	3.0	2.6	1.6	
Specific Conductance (µmhos)	10	114.3	154.3	139.2 ^G	135.1	12.7	
Alkalinity (mg/L)	4	31.6	39.6	33.5 ^M	34.6	3.7	
Stream Flow (cfs)	8	44.0	77.9	47.2	53.3	13.1	
Chemical							
Dissolved Oxygen (mg/L)	10	6.3	9.9	6.8	7.3	1.2	
pH (su)	10	5.9 ^C	7.1	6.7	6.6	0.5	2
Ammonia Nitrogen (mg/L)	7	< 0.014	0.048	0.008	0.013	0.015	
Nitrate+Nitrite Nitrogen (mg/L)	7	1.120	1.560	1.150 ^M	1.260	0.202	
Total Kjeldahl Nitrogen (mg/L)	7	< 0.141	0.659	0.282	0.303	0.181	
Total Nitrogen (mg/L)	7	< 1.344	1.842	1.474 ^M	1.563	0.198	
Dissolved Reactive Phosphorus (mg/L)	7	0.027	0.142	0.085 ^M	0.079	0.041	
Total Phosphorus (mg/L)	7	0.069	0.195	0.128 ^M	0.128	0.043	
CBOD-5 (mg/L)	7	< 1.0	<2	0.5	0.6	0.2	
Chlorides (mg/L)	4	7.7	12.2	10.7 ^M	10.3	1.9	
Biological							
Chlorophyll <i>a</i> (ug/L)	5	1.07	4.27	2.14	2.14	1.31	

C= Fish and Wildlife criterion exceeded ; E= samples that exceed criteria; G= value higher than median concentration of all verified ecoregional reference reach data collected in ecoregion 65g; M=value > 90th percentile of all verified ecoregional reference reach data collected in the subecoregion/ecoregion 65g; N=# samples

SUMMARY

As part of the assessment process, ADEM will review the monitoring information presented in this report, along with all other available data. Little Choctawhatchee River was sampled at LCHH-2 to obtain water quality data to determine permit limits for the Dothan Little Choctawhatchee River Waste Water Treatment Plant after its proposed expansion. Several nutrients and chlorophyll *a* concentrations were higher than expected. Results of the 2008 bioassessment indicated the macroinvertebrate communities at this location to be in *poor* condition, possibly due to marginal instream habitat quality and high nutrient concentrations.

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