Alabama Department of Environmental Management

Basin Assessment Site

Rivers and Streams Monitoring Program

2014 Monitoring Summary

Osanippa Creek downstream of I-85 in Chambers County (32.79526/-85.23520)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Osanippa Creek watershed for biological and water quality monitoring as part of the 2014 Assessment of the Southeast Alabama (SEAL) River Basin. The objectives of the SEAL Basin Assessments were to assess the biological integrity of each monitoring site to estimate overall water quality within the basin. Additionally, data from Osanippa Creek at OSCC-2 was conducted to more fully characterize water quality conditions within the upper reaches of the watershed.

Figure 1. Osanippa Creek at OSCC-2, May 7, 2014.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Chattahoochee R
Drainage Area (mi^2)		77
Ecoregion[a]		45B
% Landuse[b]		
Open water		1%
Wetland	Woody	5%
	Emergent herbaceous	<1%
Forest	Deciduous	34%
	Evergreen	27%
	Mixed	1%
Shrub/scrub		12%
Grassland/herbaceous		6%
Pasture/hay		11%
Cultivated crops		<1%
Development	Open space	3%
	Low intensity	<1%
	Moderate intensity	<1%
	High intensity	<1%
Barren		<1%
Population/km^2[c]		5

a. Southern Outer Piedmont
b. 2011 National Land Cover Dataset
c. 2010 US Census

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Osanippa Creek is a *Fish & Wildlife (F&W)* stream located near Valley in the Chattahoochee River basin. Based on the 2011 National Land Cover Dataset, landuse within the watershed is primarily forested areas (62%) with some pasture. As of April 1, 2016, there are no outfalls active in this watershed.

Table 2. Physical characteristics of Osanippa Creek at OSCC-2, July 10, 2014.

Physical Characteristics		
Width (ft)		30
Canopy Cover		Mostly Open
Depth (ft)		
	Run	2.0
	Pool	4.0
% of Reach		
	Run	20
	Pool	80
% Substrate		
	Mud/Muck	2
	Gravel	5
	Sand	42
	Silt	34
	Organic Matter	17

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.

Osanippa Creek at OSCC-2 (Figure 1) is a low-gradient, predominantly sand bottomed stream in the Southern Outer Piedmont ecoregion. Overall habitat quality was categorized as *marginal* due to sediment deposition, eroding stream banks, and a lack of riparian buffers.

BIOASSESSMENT RESULTS

The fish community in Osanippa Creek at OSCC-2 was sampled using Alabama's Fish Community Index of Biotic Integrity (AL-IBI), developed through a multi-agency (GSA, ADCNR, ADEM) project to establish a comprehensive fish community bioassessment tool for wadeable streams and rivers across the State. The data collected during this survey were used to score the overall health of the fish community, based on conditions expected for wadeable streams and rivers in the Ridge & Valley Piedmont Ichthyoregion. The AL-IBI uses twelve measures of species richness and diversity, tolerance/intolerance, and abundance, condition, and reproduction to assess the overall health of the fish community. The final IBI score is the sum of all individual metrics on a 60 point scale. The IBI score for Osanippa Creek at OSCC-2 was 28, indicating the fish community to be in *poor* condition.

Table 3. Results of the habitat assessment conducted on Osanippa Creek at OSCC-2, July 10, 2014.

Habitat Assessment	Maximum Score	Rating
Instream Habitat Quality	**50**	Marginal (31-55)
Sediment Deposition	**48**	Marginal (31-55)
Sinuosity	**43**	Marginal (31-55)
Bank and Vegetative Stability	**43**	Marginal (31-57)
Riparian Buffer	**30**	Poor <31
Habitat Assessment Score	**77**	
% Maximum Score	**43**	**Marginal (41-58)**

Table 4. Results of the fish community bioassessment conducted in the Osanippa Creek at OSCC-2, July 10, 2014.

Fish Community Assessment		
	Results	**Score**
Species Richness & Diversity		
Total native species	19	3
Number shiner species	3	3
Number of Lepomis species	5	3
Number of darter+madtom species	2	1
Tolerance & Intolerance Measures		
Number of intolerant species	0	1
Percent of tolerant species	20.91	3
Percent Lepomis	46.36	1
Trophic Measures		
Percent omnivores	1.82	5
Percent insectivorous cyprinids	5.45	1
Percent top carnivores	8.18	5
Abundance, Condition & Reproductive Measures		
Percent DELT+hybrids	0.91	1
Percent simple miscellaneous	10	1
IBI Assessment Score		**28**
Condition		**Poor**

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. In situ measurements and water samples were collected during March through October of 2014 to help identify any stressors to the biological communities.

E. coli exceeded the summer single sample *F&W* use classification criterion during the July sampling event.

Specific conductance and hardness were higher than the median concentration of all verified ecoregional reference reach data collected in ecoregion 45b. Alkalinity, nutrients, and concentrations of some metals were greater than 90% of all verified ecoregional reference reach data collected in the Southern Outer Piedmont ecoregion.

SUMMARY

Bioassessment results indicated the fish community in Osanippa Creek at OSCC-2 to be in *poor* condition. Overall habitat quality was categorized as *marginal*. Conductivity, hardness, nutrients and concentrations of some metals were elevated as compared to data from ADEM's least-impaired reference reaches in ecoregion 45b. The data presented in this report and all other available data will be reviewed to fully assess the stream reach for the 2016 Integrated Report.

FOR MORE INFORMATION, CONTACT:
Brien Diggs, ADEM Aquatic Assessment Unit
1350 Coliseum Boulevard Montgomery, AL 36110
(334) 260-2750 lod@adem.state.al.us

Table 5. Summary of water quality data collected March through October 2014. 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)	9	12.8	23.9	19.6	19.4	4.1	
Turbidity (NTU)	8	14.7	30.2	16.4	18.6	5.0	
Total Dissolved Solids (mg/L)	8	42.0	68.0	60.5	59.0	9.5	
Total Suspended Solids (mg/L)	8	4.0	24.0	9.0	11.0	6.2	
Specific Conductance (µmhos)	9	51.1	81.7	71.2[G]	67.5	12.6	
Hardness (mg/L)	4	15.5	30.1	27.1[G]	25.0	6.8	
Alkalinity (mg/L)	8	22.7	40.2	33.8[M]	33.0	6.1	
Stream Flow (cfs)	7	3.5	93.1	38.3	35.2	31.8	
Chemical							
Dissolved Oxygen (mg/L)	9	6.5	9.6	8.0	7.9	1.1	
pH (su)	9	6.6	7.1	7.0	6.9	0.2	
[J]Ammonia Nitrogen (mg/L)	8	<0.006	0.072	0.010	0.024	0.029	
Nitrate+Nitrite Nitrogen (mg/L)	8	0.069	0.154	0.123[M]	0.114	0.033	
Total Kjeldahl Nitrogen (mg/L)	8	<0.049	0.691	0.306[M]	0.326	0.186	
Total Nitrogen (mg/L)	8	<0.094	0.834	0.416[M]	0.440	0.208	
[J]Dissolved Reactive Phosphorus (mg/L)	8	0.005	0.010	0.007	0.007	0.002	
Total Phosphorus (mg/L)	8	0.015	0.027	0.018	0.019	0.004	
CBOD-5 (mg/L)	8	<2.0	<2.0	1.0	1.0	0.0	
Chlorides (mg/L)	8	2.0	2.4	2.2	2.2	0.2	
Atrazine (µg/L)	1				0.11		
Total Metals							
[J]Aluminum (mg/L)	4	0.112	0.805	0.214[M]	0.336	0.317	
Iron (mg/L)	4	1.160	1.770	1.455[M]	1.460	0.346	
Manganese (mg/L)	4	0.227	0.464	0.296[M]	0.321	0.107	
Dissolved Metals							
[J]Aluminum (mg/L)	4	<0.050	0.058	0.025	0.033	0.016	
Antimony (µg/L)	4	<0.2	<0.4	0.1	0.1	0.1	
Arsenic (µg/L)	4	<0.2	<0.3	0.1	0.1	0.0	
Cadmium (µg/L)	4	<0.246	<0.390	0.124	0.142	0.036	
[J]Chromium (µg/L)	4	0.440	0.630	0.532	0.534	0.095	
[J]Copper (mg/L)	4	0.0004	0.0008	0.0006	0.0006	0.0002	
Iron (mg/L)	4	0.643	1.220	0.694[M]	0.813	0.275	
Lead (µg/L)	4	<0.2	<0.5	0.1	0.2	0.1	
Manganese (mg/L)	4	0.166	0.404	0.236[M]	0.260	0.112	
Nickel (mg/L)	4	<0.0001	<0.0003	0.0002	0.0003	0.0002	
Selenium (µg/L)	4	<0.4	<0.5	0.2	0.2	0.0	
Silver (µg/L)	4	<0.252	<0.460	0.126	0.152	0.052	
Thallium (µg/L)	4	<0.2	<0.6	0.1	0.2	0.1	
[J]Zinc (mg/L)	4	0.002	0.009	0.002	0.004	0.003	
Biological							
Chlorophyll a (ug/L)	8	<0.10	3.20	0.80	1.08	1.09	
E. coli (col/100mL)	8	91	1046[C]	253	338	302	1

C=*F&W* criterion violated; G=value higher than median concentration of all verified ecoregional reference reach data collected in the ecoregion 45b; E=# samples that exceeded criteria; J=estimate; M=value >90% of all verified ecoregional reference reach data collected in the ecoregion 45b; N=#