



Line Creek (Oakfuskee Creek) at Macon County Road 4 (32.37300/ -86.00460)

BACKGROUND

Line Creek has been on Alabama's Clean Water Act (CWA) §303(d) list of impaired waters since 1998. It is listed for siltation from agricultural sources. The Alabama Department of Environmental Management (ADEM) monitored Line Creek at OAKM-1a to verify and document impairment caused by siltation from agricultural sources. Macroinvertebrate and habitat assessments were conducted at the site to verify impairment to aquatic communities. The assessments were conducted on June 14, 2005.

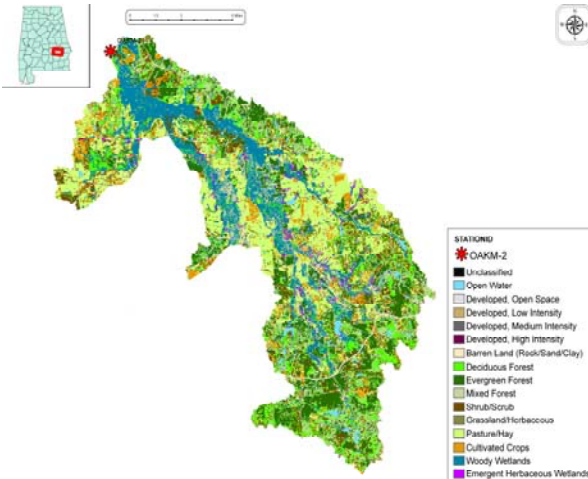


Figure 1. Sampling location and landuse within the Line Creek watershed at OAKM -2.

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Line Creek at OAKM-1a is a *Fish & Wildlife* stream in Macon County (Figure 1). It is located near Shorter, Alabama and is within the Southeastern Plains (65b) ecoregion. Line Creek is formerly known as Oakfuskee Creek. Its name was formally changed in 1984. Based on the 2000 National Landcover Dataset, landuse in the watershed is mostly forest and pasture. ADEM has issued four NPDES permits in the watershed as of February 23, 2011.

REACH CHARACTERISTICS

General observations (Table 2) and a habitat assessment (Table 3) were completed during the macroinvertebrate assessment. Line Creek at OAKM-1A is a low-gradient, mostly sand-bottomed stream in the Tallapoosa River floodplain (Table 2). The presence of wetland and swamp areas are characteristic of streams in the Southeastern Floodplains and Low Terraces (Table 1). Overall habitat quality was categorized as *sub-optimal*, the score lowered by a lack of sinuosity due to possible channelization projects and due to sedimentation, bank erosion, and a lack of stable in-stream

Table 1. Summary of watershed characteristics.

| Watershed Characteristics | | |
|----------------------------------|---------------------|------------------|
| Basin | | Tallapoosa River |
| Drainage Area (mi ²) | | 75 |
| Ecoregion ^a | | 65b |
| % Landuse | | |
| Open water | | 1 |
| Wetland | Woody | 11 |
| | Emergent herbaceous | 2 |
| Forest | Deciduous | 16 |
| | Evergreen | 17 |
| | Mixed | 16 |
| Shrub/scrub | | 10 |
| Grassland/herbaceous | | <1 |
| Pasture/hay | | 18 |
| Cultivated crops | | 7 |
| Development | Open space | 3 |
| | Low intensity | <1 |
| | Moderate intensity | <1 |
| Population/km ^{2b} | | 3 |
| # NPDES Permits ^c | TOTAL | 4 |
| Construction Stormwater | | 4 |

a.Flatwoods/Blackland Prairie Margins

b.2000 US Census

c.#NPDES permits downloaded from ADEM's NPDES Management System database, February 23, 2011

Table 2. Physical characteristics of Line Creek at OAKM-1A, June 14, 2005

| Physical Characteristics | |
|--------------------------|----------------|
| Width (ft) | 30 |
| Canopy Cover | Estimate 50/50 |
| Depth (ft) | |
| Run | 1.3 |
| Pool | 2.3 |
| % of Reach | |
| Run | 65 |
| Pool | 35 |
| % Substrate | |
| Clay | 8 |
| Gravel | 10 |
| Sand | 70 |
| Silt | 5 |
| Organic Matter | 7 |

Table 3. Results of the habitat assessment conducted on Oakfuskee Ck at OAKM-1A, June 14, 2005.

| Habitat Assessment | %Maximum Score | Rating |
|---------------------------------|----------------|---------------------|
| Instream Habitat Quality | 52 | Marginal (40-52) |
| Sediment Deposition | 64 | Sub-optimal (53-65) |
| Sinuosity | 38 | Poor <45 |
| Bank and Vegetative Stability | 35 | Marginal (35-59) |
| Riparian Buffer | 88 | Sub-optimal (70-89) |
| Habitat Assessment Score | 123 | |
| % Maximum Score | 56 | Sub-optimal (53-65) |

Table 4. Results of the macroinvertebrate bioassessment of OAKM-1A conducted on June 14, 2005.

| Macroinvertebrate Assessment | | | | |
|--|--------|-----------|-----------------------|--|
| | Result | Score | Rating | |
| Taxa Richness Measures | | | | |
| # EPT genera | 13 | 52 | Fair (38 - 56) | |
| Taxonomic composition | | | | |
| % Non-Insect Taxa | 17 | 40 | Poor (30.9-61.8) | |
| % Plecoptera | 1 | 3 | Poor (1.86-3.7) | |
| % Dominant Taxon | 21 | 72 | Good (70.6-85.2) | |
| Functional composition measures | | | | |
| % Predators | 9 | 30 | Fair (30.2 - 45.2) | |
| Tolerance measures | | | | |
| Becks community tolerance | 7 | 32 | Good (31.9-65.9) | |
| % Nutrient tolerant organisms | 43 | 45 | Poor (25.4-50.8) | |
| WMB-I Assessment Score | --- | 39 | Fair (38 - 56) | |

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. The final score indicated the biological community to be in *fair* condition (Table 4).

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. Samples were collected monthly, semi-monthly (metals), or quarterly (pesticides, herbicides, and semi-volatile organics) during March through October of 2005. No metals were collected in the creek the entire sampling season. On October 27, 2005, the pH level during the sampling event exceeded F&W water use classification criteria.

SUMMARY

Bioassessment results indicated the macroinvertebrate community to be in *fair* condition. Overall habitat quality was categorized as *sub-optimal* due to sedimentation, bank erosion, and a lack of stable in-stream habitat. On October 27, 2005, the pH level during the sampling event exceeded F&W water use classification criteria.

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.

| Parameter | N | Min | Max | Med | Avg | SD | E |
|--------------------------------------|---|--------|-------|-------|-------|-------|---|
| Physical | | | | | | | |
| Temperature (°C) | 8 | 10.0 | 29.0 | 23.0 | 21.2 | 6.2 | |
| Turbidity (NTU) | 8 | 14.7 | 43.7 | 20.6 | 25.3 | 11.4 | |
| Total Dissolved Solids (mg/L) | 7 | 21.0 | 108.0 | 96.0 | 83.0 | 29.8 | |
| Total Suspended Solids (mg/L) | 7 | 11.0 | 103.0 | 18.0 | 33.1 | 33.4 | |
| Specific Conductance (µmhos) | 8 | 81.3 | 156.6 | 123.0 | 118.9 | 22.4 | |
| Hardness (mg/L) | 5 | 32.4 | 57.7 | 42.9 | 43.8 | 9.6 | |
| Alkalinity (mg/L) | 7 | 18.2 | 45.7 | 43.3 | 37.8 | 10.2 | |
| Stream Flow (cfs) | 4 | 7.1 | 72.1 | 16.4 | 28.0 | 29.7 | |
| Chemical | | | | | | | |
| Dissolved Oxygen (mg/L) | 8 | 5.8 | 8.9 | 6.6 | 7.0 | 1.0 | |
| pH (su) | 7 | 7.1 | 8.6 | 7.3 | 7.5 | 0.5 | 1 |
| Ammonia Nitrogen (mg/L) | 7 | <0.015 | 0.035 | 0.008 | 0.014 | 0.011 | |
| Nitrate+Nitrite Nitrogen (mg/L) | 7 | <0.003 | 0.068 | 0.062 | 0.042 | 0.030 | |
| Total Kjeldahl Nitrogen (mg/L) | 7 | <0.150 | 0.944 | 0.567 | 0.524 | 0.308 | |
| Total Nitrogen (mg/L) | 7 | <0.081 | 1.006 | 0.632 | 0.565 | 0.329 | |
| Dissolved Reactive Phosphorus (mg/L) | 7 | 0.018 | 0.068 | 0.029 | 0.037 | 0.016 | |
| Total Phosphorus (mg/L) | 7 | 0.071 | 0.123 | 0.110 | 0.105 | 0.019 | |
| CBOD-5 (mg/L) | 7 | <1.0 | 2.7 | 2.0 | 2.0 | 0.8 | |
| Chlorides (mg/L) | 7 | 6.5 | 9.7 | 7.0 | 7.4 | 1.1 | |
| Biological | | | | | | | |
| Fecal Coliform (col/100 mL) | 7 | 51 | 230 | 77 | 101 | 62 | |

C = value exceeds established criteria for F&W water use classification; J = estimate; N = # of samples.

FOR MORE INFORMATION, CONTACT:
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