

2005 Monitoring Summary



Basin Assessment Site

Timbergut Creek at Highway 22 in Tallapoosa Co (33.02458/-85.79323)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) selected the Timbergut Creek watershed for biological and water quality monitoring as part of the 2005 Assessment of the Alabama, Coosa, and Tallapoosa (ACT) River Basins. The objectives of the ACT Basin Assessments were to assess the biological integrity of each monitoring site and to estimate overall water quality within the ACT basin group.

Table 1. Summary of Watershed Characteristics.

| Watershed Characteristics | |
|----------------------------------|-----------------------|
| Drainage Area (mi ²) | 9 |
| Ecoregion ^a | 45a |
| % Landuse | |
| Open water | <1 |
| Wetland | Woody 1 |
| Forest | Deciduous 42 |
| | Evergreen 21 |
| | Mixed <1 |
| Shrub/scrub | 1 |
| Grassland/herbaceous | 11 |
| Pasture/hay | 17 |
| Cultivated crops | <1 |
| Development | Open space 6 |
| | Low intensity <1 |
| | Moderate intensity <1 |
| Barren | 1 |
| Population/km ^{2b} | 8 |

a. Southern Inner Piedmont

b. 2000 U.S. Census Data

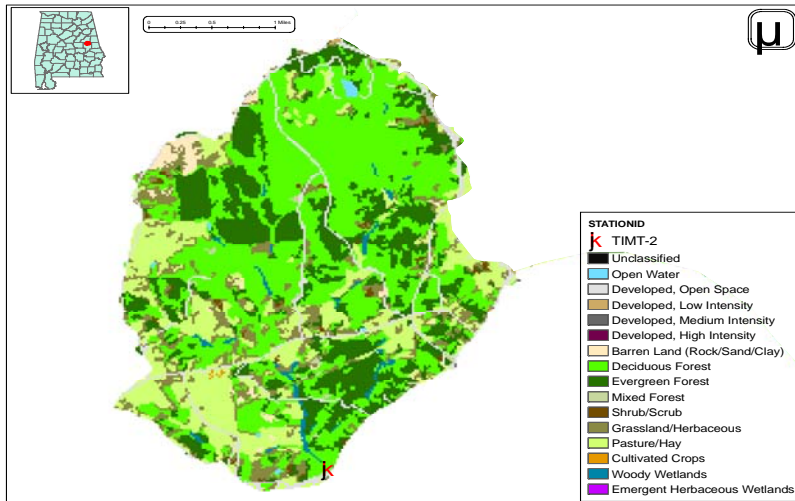


Figure 1. Sampling location and landuse within the Timbergut Creek watershed at TIMT-2

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Timbergut Creek at TIMT-2 is a *Fish & Wildlife (F&W)* stream located in the Tallapoosa River Basin (Fig. 1). It is located within the Southern Inner Piedmont (45a) (Table 1). Landuse in the watershed is primarily forest (63%), the rest consists mainly of pasture, and grasslands. Records show that no permitted discharges exist in the watershed.

Table 2. Physical characteristics of Timbergut Creek at TIMT-2, May 9, 2005.

| Physical characteristics | |
|--------------------------|------------------|
| Width (ft) | 35 |
| Canopy cover | Shaded |
| Depth (ft) | |
| | Run 1.0 |
| | Pool 2.5 |
| % of Reach | |
| | Run 40 |
| | Pool 60 |
| % Substrate | |
| | Bedrock 1 |
| | Boulder 5 |
| | Cobble 5 |
| | Gravel 5 |
| | Sand 60 |
| | Silt 15 |
| | Clay 1 |
| | Organic Matter 3 |
| | Mud/Muck 5 |

REACH CHARACTERISTICS

General observations (Table 2) and habitat assessments (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. Streams in ecoregion 45a are characterized as being low to moderate gradient with mostly cobble, gravel and sand substrates. Timbergut Creek at TIMT-2 is a low-gradient, glide pool stream with a bottom substrate consisting mostly of sand. Habitat quality and availability was rated as *sub-optimal* for supporting diverse aquatic macroinvertebrate communities.

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 all individual metric scores. The final score indicated the biological community at TIMT-2 to be in *fair* condition (Table 4).

Table 3. Results of the habitat assessment conducted on Timbergut Creek at TIMT-2, May 9, 2005.

| Habitat Assessment (% Maximum Score) | | Rating |
|--------------------------------------|-----------|----------------------------|
| Instream habitat quality | 53 | Marginal (41-58) |
| Sediment deposition | 59 | Marginal (41-58) |
| Sinuosity | 38 | Poor (<45) |
| Bank and vegetative stability | 33 | Poor (<35) |
| Riparian buffer | 90 | Sub-optimal (70-90) |
| Habitat assessment score | 131 | |
| % Maximum score | 59 | Sub-optimal (59-70) |

Table 4. Results of the macroinvertebrate bioassessment of Timbergut Creek at TIMT-2 conducted on May 9, 2005.

| Macroinvertebrate Assessment | | | |
|--|------------|-----------|---------------------|
| | Results | Scores | Rating |
| | | (0-100) | |
| Taxa richness measures | | | |
| # EPT genera | 14 | 56 | Fair (37-56) |
| Taxonomic composition measures | | | |
| % Non-insect taxa | 6 | 94 | Good (92.7-96.3) |
| % Plecoptera | 3 | 23 | Good (5.6-52.8) |
| % Dominant taxa | 16 | 85 | Good (70.5-85.2) |
| Functional composition measures | | | |
| % Predators | 15 | 16 | Poor (15.1-30.1) |
| Tolerance measures | | | |
| Beck's community tolerance index | 8 | 36 | Good (31.8-65.9) |
| % Nutrient tolerant organisms | 31 | 66 | Fair (50.8-76.2) |
| WMB-I Assessment Score | --- | 54 | Fair (37-56) |

WATER CHEMISTRY

Results of water chemistry are presented in Table 5. In situ measurements and water samples were collected monthly, semi-monthly (metals), or quarterly (pesticides, herbicides (atrazine), and semi-volatile organics) during March through October of 2005 to help identify any stressors to the biological communities. Nitrate+Nitrite Nitrogen levels were slightly higher than expected values for this ecoregion. All other physical and chemical analyses results were within ecoregional guidelines based on 90th percentile of all verified reference data within ecoregion 45a.

CONCLUSIONS

Habitat assessment results were scored as *sub-optimal* due to a lack of bank stability and sinuosity. Bioassessment results indicated the macroinvertebrate community to be in *fair* condition. Intensive water quality sampling indicated a slightly higher than expected value for Nitrate+Nitrite Nitrogen. All other results were within ecoregional guidelines based on 90th percentile of all verified reference data within the Sothern Inner Piedmont (45a).

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 | Median | Avg | SD |
|--------------------------------------|---|---------|---------|--------------------|-------|-------|
| Physical | | | | | | |
| Temperature (°C) | 8 | 13.0 | 22.0 | 19.3 | 18.3 | 3.2 |
| Turbidity (NTU) | 8 | 4.7 | 14.1 | 6.2 | 7.1 | 3.0 |
| Total Dissolved Solids (mg/L) | 6 | 19.0 | 51.0 | 36.0 | 34.0 | 11.1 |
| Total Suspended Solids (mg/L) | 6 | 5.0 | 14.0 | 7.0 | 7.8 | 3.4 |
| Specific Conductance (µmhos) | 8 | 14.9 | 40.5 | 31.9 | 30.8 | 8.9 |
| Hardness (mg/L) | 4 | 6.8 | 8.2 | 7.6 | 7.6 | 0.6 |
| Alkalinity (mg/L) | 6 | 7.2 | 9.0 | 8.1 | 8.1 | 0.8 |
| Stream Flow (cfs) | 7 | 4.5 | 23.4 | 12.5 | 13.6 | --- |
| Chemical | | | | | | |
| Dissolved Oxygen (mg/L) | 8 | 7.2 | 9.5 | 8.8 | 8.7 | 0.8 |
| pH (su) | 8 | 6.4 | 7.74 | 7.1 | 7.1 | 0.5 |
| Ammonia Nitrogen (mg/L) | 6 | < 0.015 | 0.079 | 0.008 | 0.021 | 0.029 |
| Nitrate+Nitrite Nitrogen (mg/L) | 6 | 0.087 | 0.149 | 0.121 ^M | 0.121 | 0.022 |
| Total Kjeldahl Nitrogen (mg/L) | 6 | < 0.150 | 0.294 | 0.075 | 0.145 | 0.109 |
| Total Nitrogen (mg/L) | 6 | 0.162 | 0.443 | 0.196 | 0.274 | 0.121 |
| Dissolved Reactive Phosphorus (mg/L) | 6 | < 0.004 | 0.034 | 0.007 | 0.011 | 0.012 |
| Total Phosphorus (mg/L) | 6 | 0.015 | 0.094 | 0.034 | 0.050 | 0.034 |
| CBOD-5 (mg/L) | 6 | < 1.0 | 4.5 | 1.8 | 2.1 | 1.4 |
| Chlorides (mg/L) | 6 | 4.2 | 9.2 | 4.4 | 5.2 | 2.0 |
| Atrazine (µg/L) | 2 | < 0.05 | < 0.05 | 0.03 | 0.03 | 0.00 |
| Total Metals | | | | | | |
| Aluminum (mg/L) | 4 | < 0.015 | 0.221 | 0.064 | 0.089 | 0.103 |
| Iron (mg/L) | 4 | 0.426 | 0.619 | 0.577 | 0.550 | 0.089 |
| Manganese (mg/L) | 4 | < 0.005 | 0.013 | 0.003 | 0.005 | 0.005 |
| Dissolved Metals | | | | | | |
| Aluminum (mg/L) | 4 | < 0.015 | 0.123 | 0.008 | 0.036 | 0.058 |
| Antimony (µg/L) | 4 | < 2 | < 2 | 1 | 1 | 0 |
| Arsenic (µg/L) | 4 | < 10 | < 10 | 5 | 5 | 0 |
| Cadmium (mg/L) | 4 | < 0.005 | < 0.005 | 0.003 | 0.003 | 0.000 |
| Chromium (mg/L) | 4 | < 0.004 | < 0.004 | 0.002 | 0.002 | 0.000 |
| Copper (mg/L) | 4 | < 0.005 | < 0.005 | 0.003 | 0.003 | 0.000 |
| Iron (mg/L) | 4 | < 0.005 | 0.200 | 0.124 | 0.112 | 0.090 |
| Lead (µg/L) | 4 | < 2 | 2.66 | 1 | 1.42 | 0.80 |
| Manganese (mg/L) | 4 | < 0.005 | 0.018 | 0.006 | 0.008 | 0.007 |
| Mercury (µg/L) | 4 | < 0.3 | < 0.3 | 0.15 | 0.15 | 0.00 |
| Nickel (mg/L) | 4 | < 0.006 | < 0.006 | 0.003 | 0.003 | 0.000 |
| Selenium (µg/L) | 4 | < 10 | < 10 | 5 | 5 | 0 |
| Silver (mg/L) | 4 | < 0.003 | < 0.003 | 0.002 | 0.002 | 0.000 |
| Thallium (µg/L) | 4 | < 1 | < 1 | 0.5 | 0.5 | 0.0 |
| Zinc (mg/L) | 4 | < 0.006 | < 0.006 | 0.003 | 0.003 | 0.000 |
| Biological | | | | | | |
| ^J Chlorophyll a (µg/L) | 8 | 0.53 | 7.12 | 2.76 | 3.02 | 2.18 |
| Fecal Coliform (col/100 mL) | 6 | 140 | 1100 | 255 | 385 | 365 |

J=estimate; N=#of samples; Min=Minimum; Max=Maximum; M=value > 90% of all verified ecoregional reference data within ecoregion 45a

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