

Newfound Creek
2008 Benthic Macroinvertebrate Assessment

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This report presents the results of three benthic macroinvertebrate assessments from Newfound Creek (tributary to Five Mile Creek near Birmingham, AL) that were collected during June 2008. Benthic macroinvertebrates were collected and analyzed at three locations according to the protocol set forth by the Alabama Department of Environmental Management's (ADEM) Freshwater Macroinvertebrate Biological Assessment Standard Operating Procedures and Quality Control Assurance Manual (2004). Specifically, the WMB-I method (Wadeable Multihabitat Bioassessment – Intensive Macroinvertebrate Survey) was utilized. A multihabitat approach ensures that all available habitat types within the stream reach are sampled in order to obtain a more accurate estimate of macroinvertebrate diversity. Please keep in mind while reviewing the following results that variations in benthic macroinvertebrate community structure between locations could just as easily result from the availability of habitat as they could from differences in water quality.

Possible stream habitats include riffles, coarse particulate organic matter (CPOM), rocks/logs, submerged roots/undercut banks, macrophyte beds, and sand/bottom substrate. ADEM's use of reference conditions for different bioregions has allowed each site to be placed in one of the following five assessment categories: excellent, good, fair, poor, or very poor.

Final scores for each site are based on the cumulative score from five benthic metrics, which measure different components of the community structure and have different ranges of sensitivity to disturbance. The five benthic metrics used in the calculation of the final score include total taxa richness, Ephemeroptera/Plecoptera/Trichoptera (EPT) taxa richness, percent EPT organisms, North Carolina Biotic Index (NCBI), and percent dominant taxon. Total taxa richness is the total number of distinct taxa and generally increases with increasing water quality

and habitat diversity/quality. EPT taxa richness is the total number of distinct taxa within the generally pollution-sensitive orders Ephemeroptera, Plecoptera, and Trichoptera and typically increases with increasing water quality. Percent EPT is the percent contribution of the number of EPT individuals to the total number individuals in the sample and generally increases with increasing water quality. The NCBI uses tolerance values to weight abundance in an estimate of overall pollution and decreases with increasing water quality. Percent dominant taxon is the percent contribution of individuals in the numerically dominant taxon to total number of individuals in the sample and generally decreases with increasing water quality. Scores for the value of each metric for Bioregion 68 are found in Table 1 and the assessment categories for the final score for Bioregion 68 are found in Table 2.

Table 1: Benthic Macroinvertebrate Metric Values for Bioregion 68

Metric	Score			
	0	1	3	5
Total Taxa Richness	<26	26-52	53-72	>72
EPT Taxa Richness	<5	5-10	11-16	>16
% EPT Organisms	<12	12-24	25-41	>41
NCBI	>7.63	5.26-7.63	4.47-5.26	<4.46
% Dominant Taxon	>48	24-48	11-24	<11

Table 2: Assessment Categories for Bioregion 68

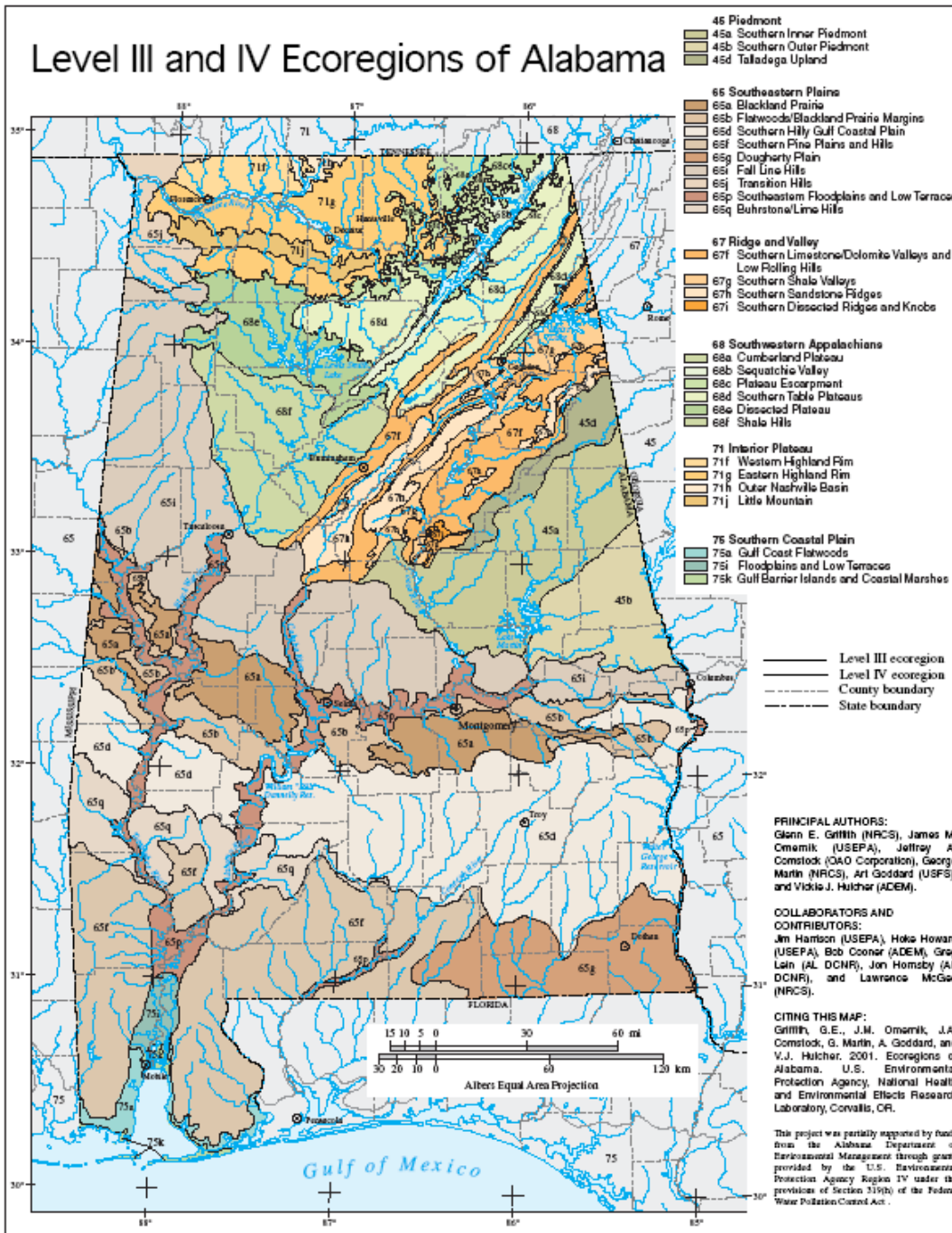
Assessment	Score
Excellent	22-25
Good	16-21
Fair	11-15
Poor	5-10
Very Poor	<5

Each of the three collections will be discussed, beginning with the most upstream location and working downstream. Stream scores are ranked according to the stream's macroinvertebrate bioregion (Figure 1). Newfound Creek is located entirely in Bioregion 68 (Southwestern Appalachians).

Newfound Creek immediately below Baines Dam was collected on June 12, 2008 approximately 100 meters downstream of the dam. In-stream habitats available for sampling were rocks/logs, riffles, submerged roots/undercut banks, and sand/bottom substrate. Random subsampling of the collection in the laboratory produced 460 organisms for identification. Forty-four (44) total taxa were represented with six (6) taxa belonging to the EPT orders. Of the 460 total organisms, 22% were EPTs and at 32% was the fingernail clam family Sphaeriidae, making it the dominant taxon. The NCBI was 6.73. After calculation of the five metrics previously discussed, the final score for this location was a 5, which places it in the "poor" category.

Newfound Creek at Newfound Road was collected on June 10, 2008 approximately 100 meters upstream of the bridge. Habitats available for sampling were macrophyte beds, rocks/logs, submerged roots/undercut banks, and sand/bottom substrate. Random subsampling of the collection in the laboratory produced 792 organisms for identification. Fifty-four (54) total taxa were represented with eight (8) taxa belonging to the EPT orders. Of the 792 total organisms, approximately 44% were EPTs with the caddisfly, *Cheumatopsyche* sp., making up 21% of the total and also making it the dominant taxon. The NCBI was 6.30. After calculation of the five metrics, the final score for this location was a 13, which places it in the "fair" category.

Figure 1: Alabama Ecoregions



The most downstream location on Newfound Creek was collected on June 12, 2008 approximately 100 meters upstream of its confluence with Five Mile Creek. Habitats available for sampling were submerged roots/undercut banks, rocks/logs, riffles, and sand/bottom substrate. Random subsampling of the collection in the laboratory produced 378 organisms for identification. Forty-one (41) total taxa were represented with eight (8) taxa belonging to the EPT orders. Of the 378 total organisms, 71% were EPTs and the dominant taxon, at 28%, was again the caddisfly, *Cheumatopsyche* sp. The NCBI was 5.69. After calculation of the five metrics previously discussed, the final score for this location was a 9, which places it in the “poor” category. Table 3 provides a summary of each location’s final score and classification.

Table 3: Site Comparison

Location	2008	
	Score	Classification
Baines Dam	5	Poor
Newfound Road	13	Fair
Confluence	9	Poor

References

Alabama Department of Environmental Management. 2004. (Draft) Standard operating procedures and quality control assurance manual, vol. 2: Freshwater macroinvertebrate biological assessment. ADEM, Field Operations Div., Ecological Studies Section, Montgomery, AL.