



New York State
Department of Environmental Conservation

Division of Water

Ellicott Creek

Biological Assessment

2001 Survey



GEORGE E. PATAKI, *Governor*

ERIN M. CROTTY, *Commissioner*

BIOLOGICAL STREAM ASSESSMENT

Ellicott Creek
Erie County, New York

Survey date: July 31, 2001
Report date: March 15, 2002

Robert W. Bode
Margaret A. Novak
Lawrence E. Abele
Diana L. Heitzman
Alexander J. Smith
Douglas Carlson

Stream Biomonitoring Unit
Bureau of Watershed Assessment and Research
Division of Water
NYS Department of Environmental Conservation
Albany, New York 12233-3502

CONTENTS

Background.....	1
Results and Conclusions.....	1
Discussion.....	2
Literature Cited.....	3
Overview of filed data.....	3
Figure 1a-b. Biological Assessment Profile.....	4
Table 1. Impact Source Determination.....	5
Table 2. Station locations.....	6
Figure 2. Site overview map.....	7
Figure 3a-b. Station location maps.....	8
Table 3. Fish collection data report.....	12
Table 4. Macroinvertebrates species collected.....	13
Macroinvertebrate data reports: raw data and site descriptions.....	14
Field data summary.....	21
Laboratory data summary.....	23
Appendices (Click each for a link to an external document).....	25
I. Biological methods for kick sampling	
II. Macroinvertebrate community parameters	
III. Levels of water quality impact in streams	
IV. Biological Assessment Profile derivations	
V. Water quality assessment criteria	
VI. Traveling kick sample illustration	
VII. Macroinvertebrate illustrations	
VIII. Rationale for biological monitoring	
IX. Glossary	
X. Methods for Impact Source Determination	
XI. Method for assessment of water quality using fish	
XII. Effects of impoundment on aquatic invertebrates communities	
XIII. Biological impacts of waters with high conductivity	

Stream: Ellicott Creek, Erie County, New York

Reach: Alden Center to Amherst, New York

Background:

The Stream Biomonitoring Unit conducted biological sampling on Ellicott Creek on July 31, 2001. The purpose of the sampling was to assess general water quality, and determine the cause and spatial extent of any water quality problems. Traveling kick samples for macroinvertebrates were taken in riffle areas at 7 sites, using methods described in the Quality Assurance document (Bode et al., 1996) and summarized in Appendix I. The contents of each sample were field-inspected to determine major groups of organisms present, and then preserved in alcohol for laboratory inspection of a 100-specimen subsample. Macroinvertebrate community parameters used in the determination of water quality included species richness, biotic index, EPT value, and percent model affinity (see Appendices II and III). Table 2 provides a listing of sampling sites, and Table 4 provides a listing of all macroinvertebrate species collected in the present survey. This is followed by macroinvertebrate data reports, including individual site descriptions and raw invertebrate data from each site.

Thanks are extended to Michael Wilkinson, DEC Region 9 Fisheries, for his assistance in this survey.

Results and Conclusions:

1. Based on macroinvertebrate indicators, water quality in Ellicott Creek ranged from slightly impacted to moderately impacted, reflecting water quality mid-way between good and poor.
2. Specific conductance was high for most of the length of the creek. The cause of impact at most sites was nonpoint source runoff. Municipal/industrial sources were indicated at sites in Amherst. Several golf courses in this area also likely contribute nutrients and pesticides to the stream.
3. Fish sampling at the macroinvertebrate sampling sites showed similar trends. Based on the consensus assessments combining fish and macroinvertebrate results, most sites on Ellicott Creek are assessed as slightly impacted; sites in Lancaster and Amherst are assessed as moderately impacted.

Discussion

Previous macroinvertebrate sampling of Ellicott Creek by the Stream Biomonitoring Unit has documented water quality ranging from slightly impacted to moderately impacted. The creek was sampled in 1993 and 1994 in Amherst, (New York State Department of Environmental Conservation, 1997), and in 2000 in Amherst and Williamsville as part of the RIBS (Rotating Intensive Basin Studies) ambient water quality monitoring program. The 1993 and 1994 samplings documented moderate impact, while in 2000 only slight impact was found at both locations. The present survey was designed to document any spatial water quality trends in the creek.

Based on macroinvertebrate indicators, water quality in Ellicott Creek ranged from slightly impacted to moderately impacted (Figure 1a). The upper portion of the stream was characterized by slow-moving water, with long reaches of near-standing water resulting in impoundment effects on the resident invertebrate fauna at Stations 2-4 (see Table 1 and Appendix XII). Upstream of the Bowmansville site (Station 4), a tributary from a nearby quarry enters Ellicott Creek, augmenting the flow of the stream with cool, well-oxygenated water, although also contributing higher conductivity (2572 μmhos). Appendix XIII lists possible impacts of high conductivity. The net effect on the downstream invertebrate fauna was small, but sufficient to improve water quality in Ellicott Creek from moderately impacted at Station 3 to slightly impacted at Station 4.

Impacts detected in the lower portion of Ellicott Creek may be attributable to a variety of sources. Municipal/industrial sources were indicated at Stations 6-7 in Amherst. Several golf courses in this area also likely contribute nutrients and pesticides to the stream.

Results of the present survey may be compared to results of Erie County stream surveys conducted in 1973 (Puleo et al., 1974). In the 1973 study, odiferous sludge beds were common in the lower portion of Ellicott Creek. At Maple Road in Amherst (1.3 miles downstream of Station 6), oxygen levels dropped to 1 mg/l, reflecting the heavy influence of sewage discharges on the stream. Macroinvertebrate communities at this site were heavily dominated by tubificid worms and tolerant midge larvae. The Sheridan Avenue site (Station 6) contained many snails, black fly larvae, and alderfly larvae. The fauna at this site in the present survey shows substantial improvement, with invertebrates such as riffle beetles, water pennies, and caddisflies at Station 6. Overall, the stream appears to have improved from severely impacted to slightly impacted.

Fish sampling in Ellicott Creek at the macroinvertebrate sampling sites suggest similar trends (Figure 1b). For these assessments, a correction factor of 0.75 was applied, to offset the increased diversity exhibited by streams in western New York State compared to streams in central and eastern New York. Station 1 metrics were considered negatively influenced by low habitat diversity, and Station 2 metrics were somewhat inflated because of pond-like conditions, which increased diversity. Fish-based assessments and macroinvertebrate assessments were combined, in an attempt to represent the overall biological condition of the waterbody. Assessments for each site, represented by a ten-scale value, were averaged to form a consensus assessment. Based on the consensus assessments, most sites on Ellicott Creek are assessed as slightly impacted; sites in Lancaster and Amherst are assessed as moderately impacted.

Literature Cited:

Bode, R. W., M. A. Novak, and L. E. Abele. 1996. Quality assurance work plan for biological stream monitoring in New York State. New York State Department of Environmental Conservation, Technical Report, 89 pages.

New York State Department of Environmental Conservation. 1997. The Niagara River - Lake Erie Drainage Basin, Biennial Report, 1993-94. Rotating Intensive Basin Studies. New York State Department of Environmental Conservation, Technical Report. 109 pages + appends.

Puleo, J., M.C. Lanighan, and C.O. Masters. 1974. 1973 Erie County Stream Survey. Erie County Public Health Division, Buffalo, New York. 294 pages.

Overview of field data

On the date of sampling, July 31, 2001, Ellicott Creek at the sites sampled was 5-20 meters wide, 0.1-0.2 meters deep, and had current speeds of 50-110 cm/sec in riffles. Dissolved oxygen was 5.5-8.2 mg/l, specific conductance was 1022-2430 μ mhos, pH was 7.8-8.0, and the temperature was 19.0-23.3 °C (66-74 °F). Measurements for each site are found on the field data summary sheets.

Figure 1a. Biological Assessment Profile of index values, Ellicott Creek, 2001. Values are plotted on a normalized scale of water quality. The line connects the mean of the four values for each site, representing species richness, EPT richness, Hilsenhoff Biotic Index, and Percent Model Affinity. See Appendix IV for more complete explanation.

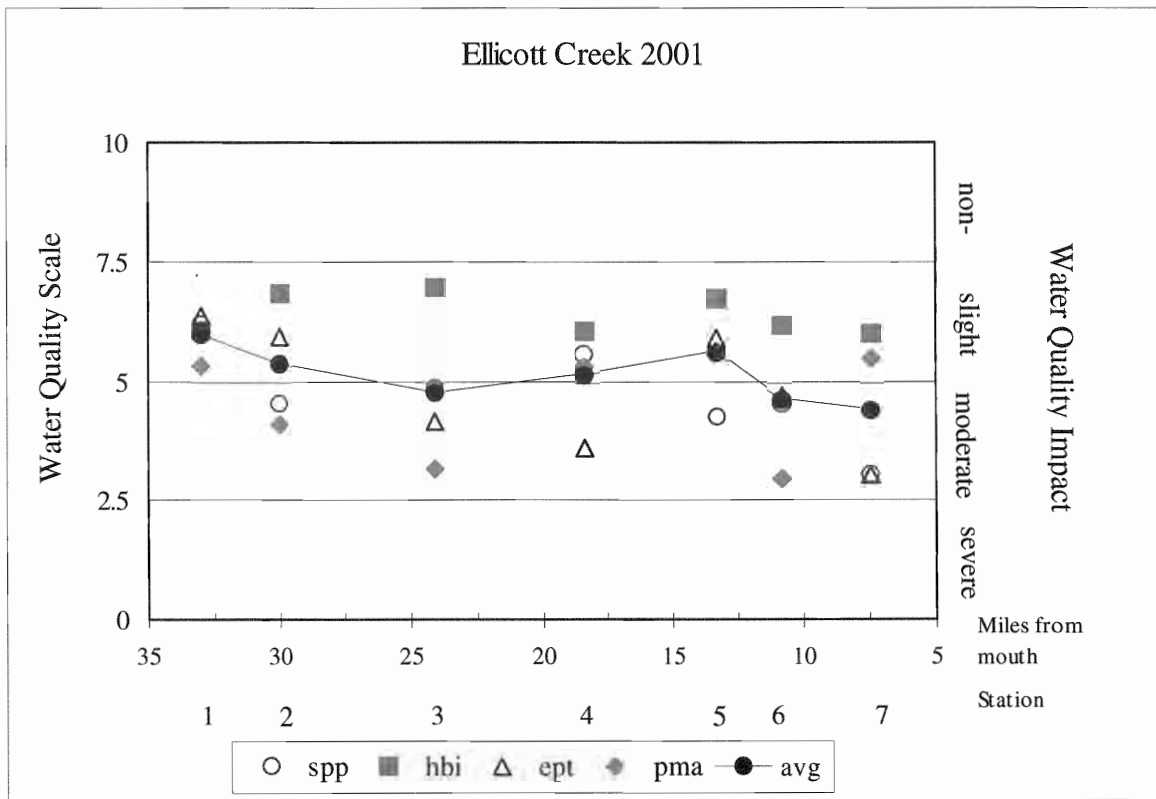


Figure 1b. Biological Assessment Profile of index values, Ellicott Creek, 2001. Values are plotted on a normalized scale of water quality. Comparison of macroinvertebrate and fish assessments.

