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 µmhos, 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.

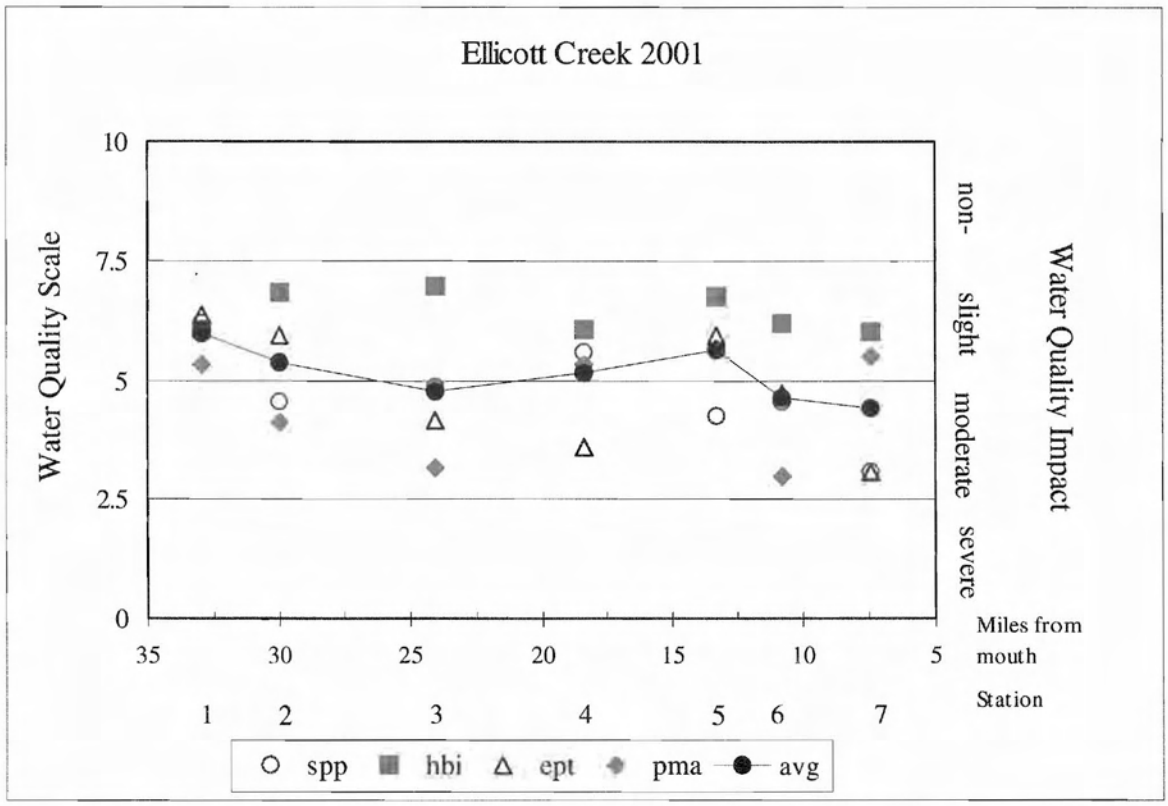


Figure 1b. Biological Assessment Profile of index values, Ellicott Creek, 2001. Values are plotted on a normalized scale of water quality. Comparison of macroinvertebrate and fish assessments.

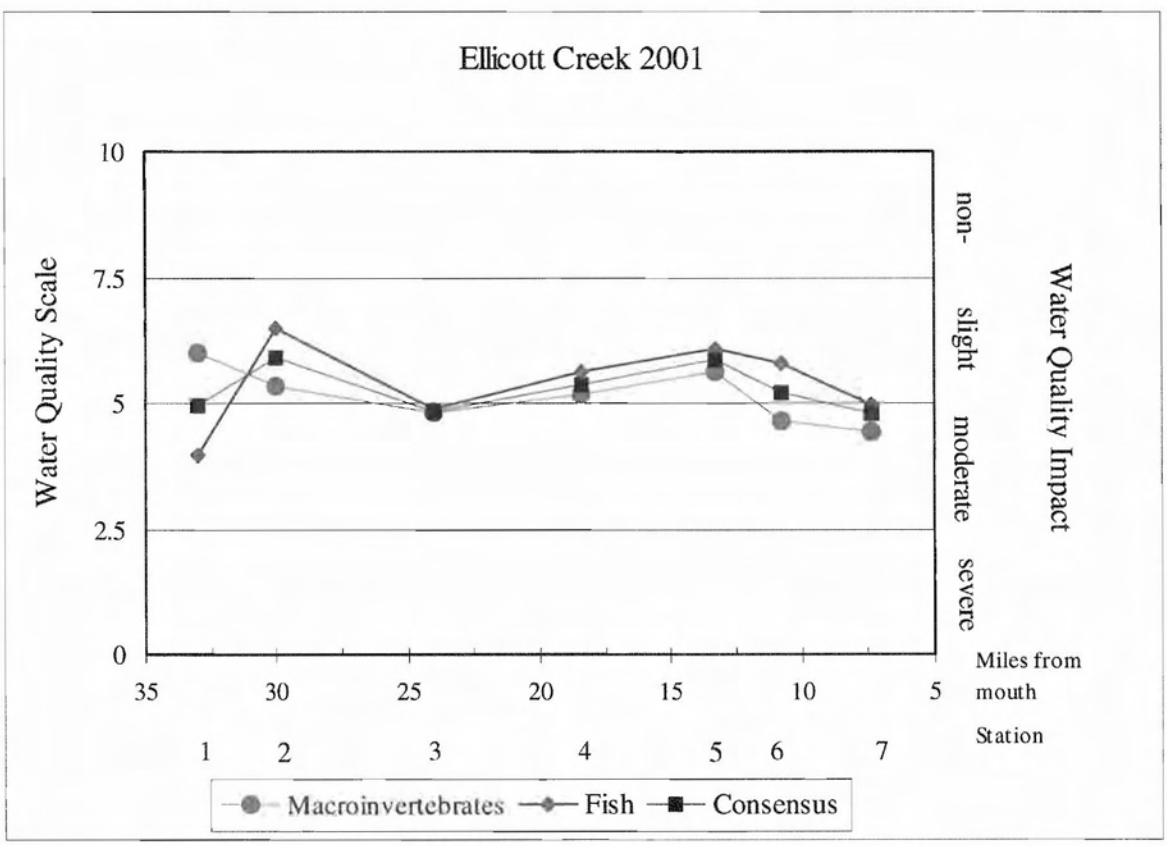


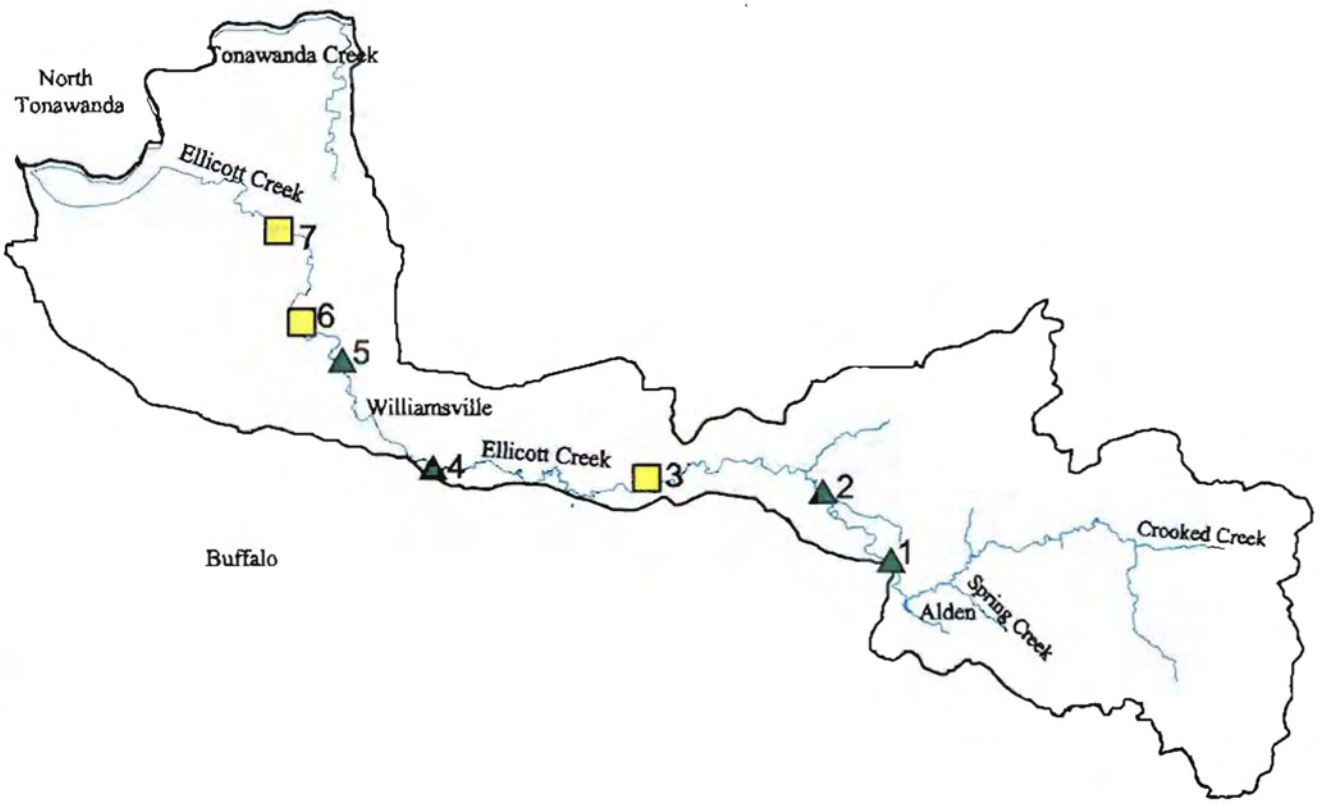
Table 1. Impact Source Determination, Ellicott Creek, 2001. Numbers represent similarity to community type models for each impact category. The highest similarities at each station within approximately 5% are highlighted. Similarities less than 50% are less conclusive.

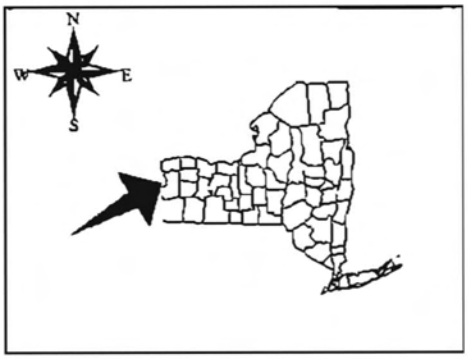
	STATION, ELLICOTT CREEK						
Community Type	1	2	3	4	5	6	7
Natural: minimal human impacts	35	50	42	35	43	32	34
Nutrient additions; mostly nonpoint, agricultural	52	74	68	45	68	52	47
Toxic: industrial, municipal, or urban run-off	49	68	51	39	47	53	44
Organic: sewage effluent, animal wastes	36	51	44	33	46	34	37
Complex: municipal/industrial	46	42	38	49	49	48	57
Siltation	42	55	51	30	44	42	41
Impoundment	42	62	64	45	51	52	50

TABLE 2. STATION LOCATIONS FOR THE ELLICOTT CREEK, ERIE COUNTY, NEW YORK (see map).

STATION	LOCATION
01	Alden Center 20 meters below Sanbridge Rd. bridge 33.0 river miles above the mouth latitude/longitude: 42°54'59"; 78°31'23"
02	Wende 50 meters above Walden Ave. bridge 30.0 river miles above the mouth latitude/longitude: 42°56'05"; 78°33'09"
03	Lancaster Pavement Rd - under bridge 24.0 river miles above the mouth latitude/longitude: 42°56'17"; 78°37'21"
04	Bowmansville 100 meters below Main St. bridge 18.4 river miles above the mouth latitude/longitude: 42°56'32"; 78°41'11"
05	Williamsville in back of Tennis/ Racquet Club, off Mill St. 13.3 river miles above the mouth latitude/longitude: 42°58'06"; 78°44'44"
06	Amherst 50 meters below Sheridan Ave. bridge 10.8 river miles above the mouth latitude/longitude: 42°58'41" 78°45'51"
07	Amherst 30 meters below St. Rita's Lane bridge 7.4 river miles above the mouth latitude/longitude: 43°00'25"; 78°46'34"

Figure 2	Site Overview Map	Ellicott Creek





0 4 8 12 Miles

Water Quality

- non-impacted
- slightly impacted
- moderately impacted
- severely impacted

Figure 3a	Site Location Map	Ellicott Creek

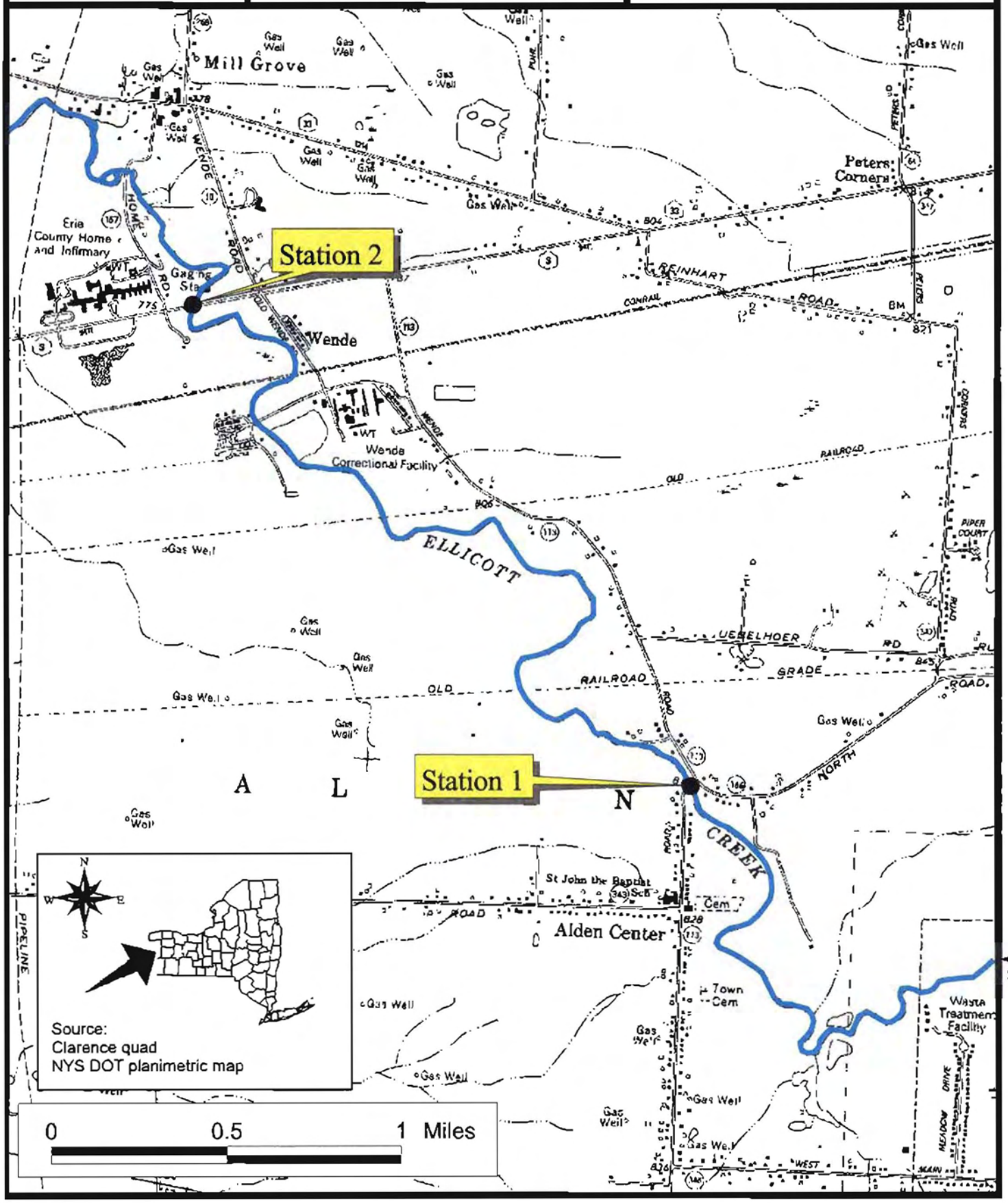


Figure 3b	Site Location Map	Knight Creek

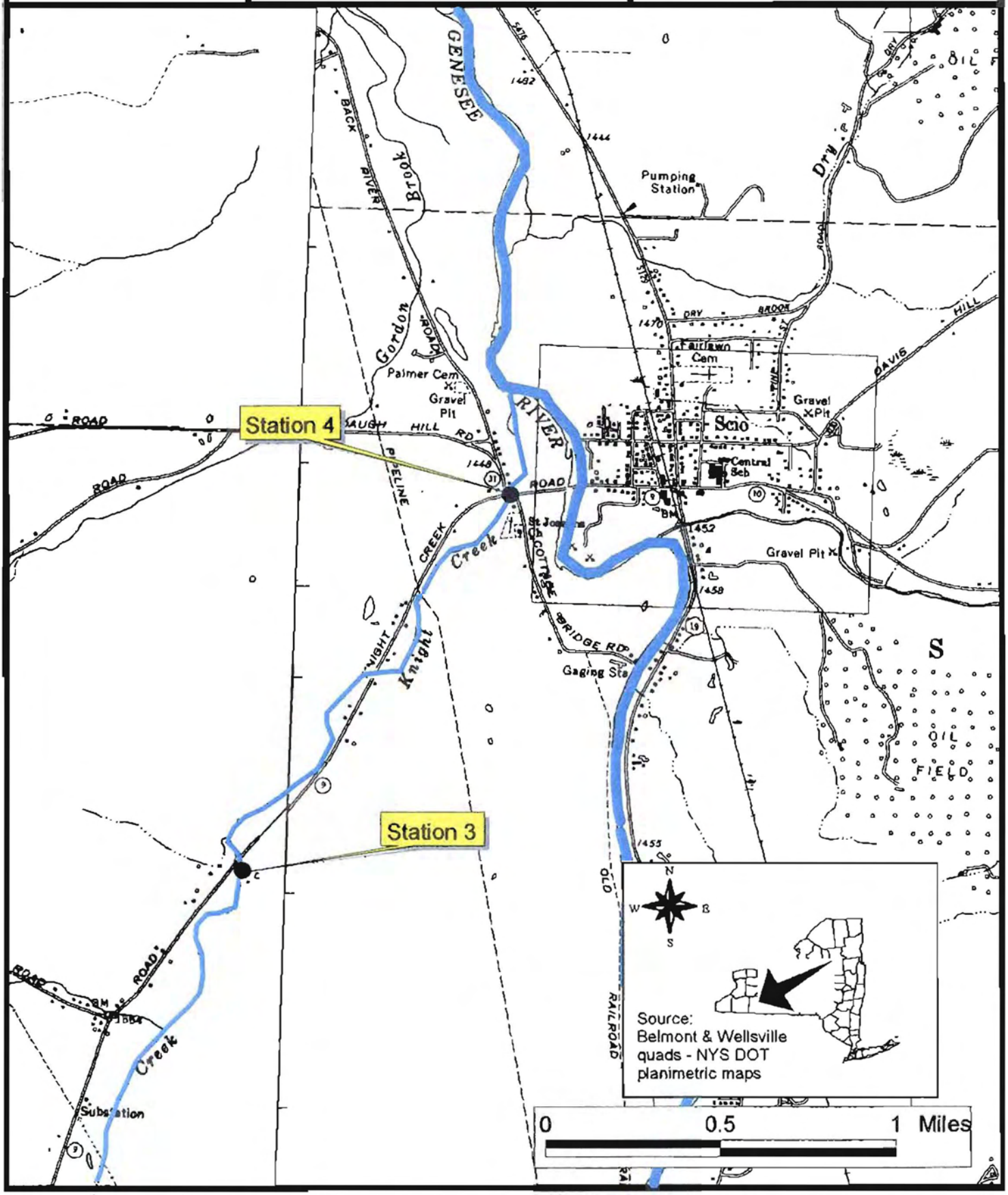


Figure 3c	Site Location Map	Ellicott Creek

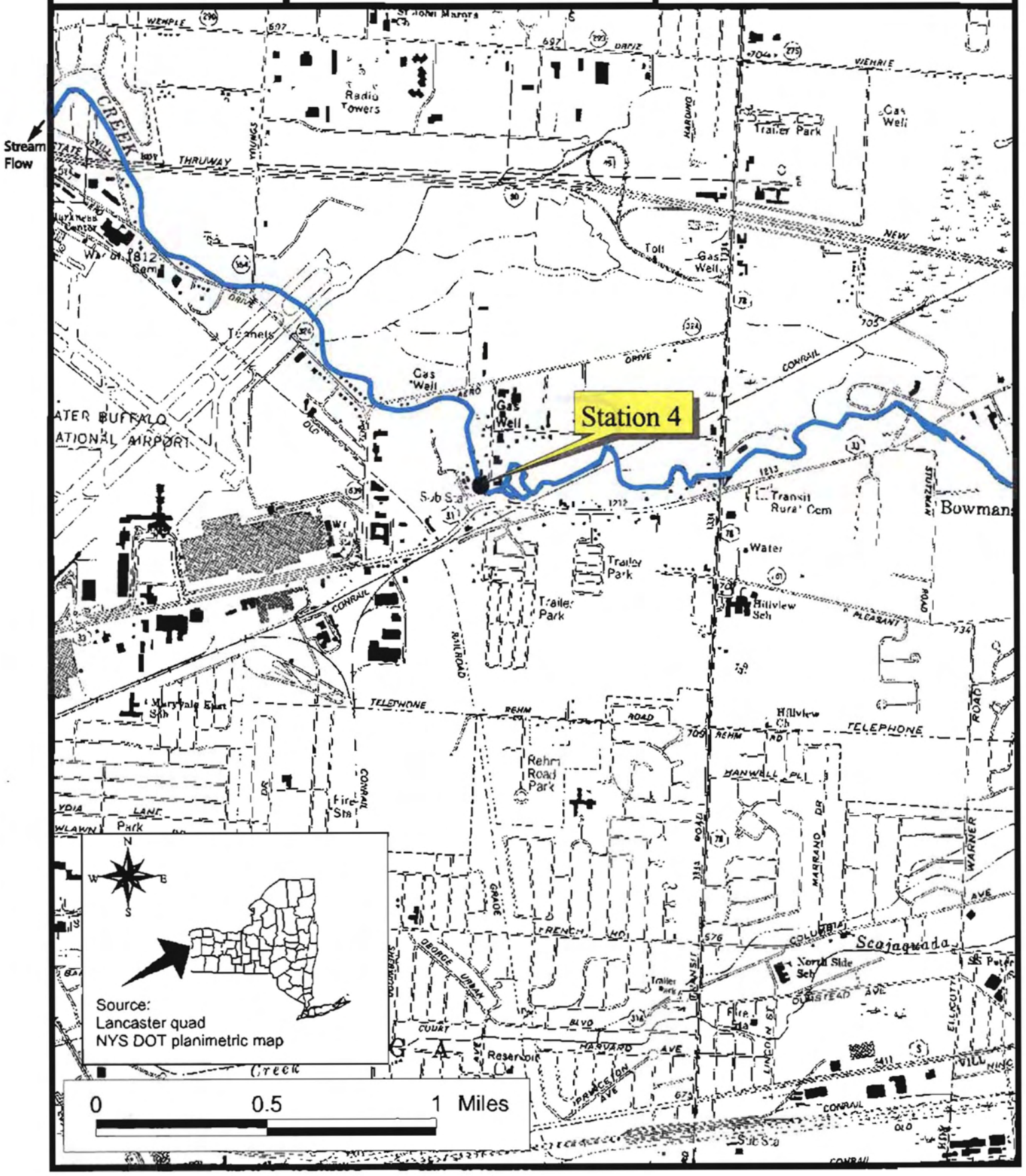


Figure 3d	Site Location Map	Ellicott Creek

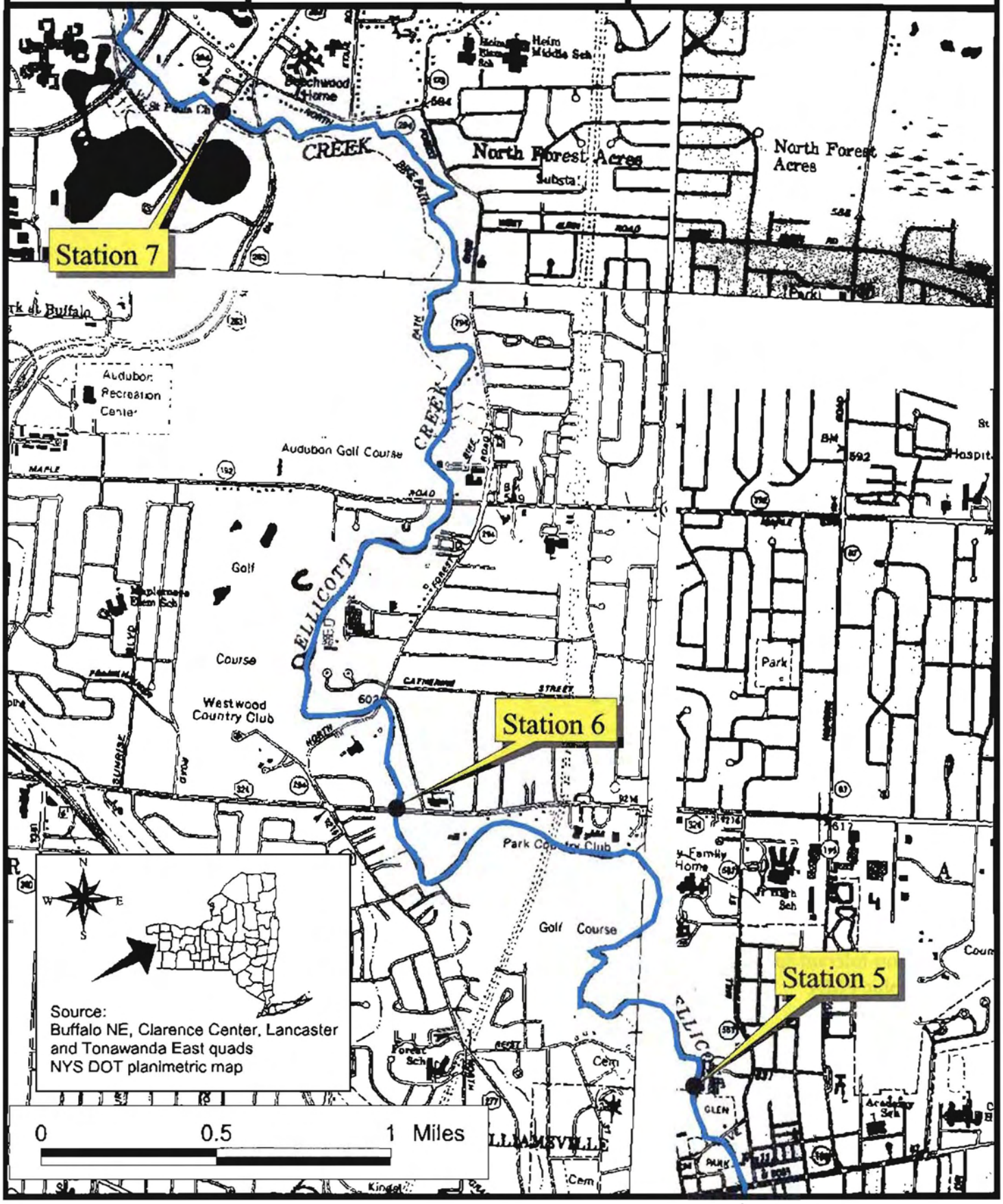


Table 3. Fish collections in Ellicott Creek, August 16 and September 5, 2001

	Station						
Common name	1	2	3	4	5	6	7
Central mudminnow	.	.	.	6	.	.	.
Northern pike	.	.	.	.	1	.	.
Central stoneroller	100	1	4	.	13	4	.
Common carp	.	.	.	.	.	.	4
Hornyhead chub	.	1	125	3	.	.	.
Striped shiner	20	10	98	4	.	15	1
Spotfin shiner	.	.	.	.	.	1	.
Bluntnose minnow	20	2	10	.	.	1	50
Blacknose dace	40	.	.	.	.	.	.
Creek chub	3	.	.	.	.	.	.
White sucker	2	5	3	15	2	2	5
N. hog sucker	.	2	1	12	3	2	5
Stonecat	.	2	.	.	.	.	.
Banded killifish	2	.	.	.	.	.	2
Rock bass	.	50	25	9	7	7	12
Green sunfish	.	.	.	.	1	.	.
Pumpkinseed	.	.	.	2	7	.	18
Bluegill	.	.	.	1	10	.	.
Smallmouth bass	.	.	3	1	4	3	.
Largemouth bass	.	.	.	.	.	1	2
Rainbow darter	20	40	10	40	40	30	25
Johnny darter	2	2	4	1	2	.	3
Logperch	.	.	.	.	1	.	2
Collection method	bbps	bbps	bbps seine	bbps seine	bbps seine	bbps seine	gbps once
Individuals	207	115	283	94	91	66	129
No. species	8	10	10	11	12	10	12
Weighted species	8	10	10	9	10	8	10
% non-tolerant ind.	40	92	54	77	71	88	53
% non-tolerant species	50	70	70	58	67	50	58
Trophic PMA	41	83	35	73	84	81	53
Profile value	5.3	8.6	6.5	7.5	8.1	7.5	6.6
Adjusted profile value (x .75)	4.0	6.5	4.9	5.6	6.1	5.8	5.0
Water quality assessment	mod	slt	mod	slt	slt	slt	mod

bbps=battery backpack shocker (DEC); gbps=gas backpack shocker (Smith Root)
seine= 50' bag seine

TABLE 4. MACROINVERTEBRATE SPECIES COLLECTED IN ELLICOTT CREEK, ERIE COUNTY, NEW YORK, JULY 31, 2001.

PLATYHELMINTHES
Undetermined Turbellaria
ANNELIDA
OLIGOCHAETA
Lumbriculidae
Undetermined Lumbriculidae
Tubificidae
Undet. Tubificidae w/o cap. setae
MOLLUSCA
GASTROPODA
Physidae
Physella sp.
PELECYPODA
Sphaeriidae
Pisidium sp.
Sphaerium sp.
Undetermined Sphaeriidae
ARTHROPODA
CRUSTACEA
ISOPODA
Asellidae
Caecidotea sp.
AMPHIPODA
Gammaridae
Gammarus sp.
DECAPODA
Cambaridae
Undetermined Cambaridae
INSECTA
EPHEMEROPTERA
Baetidae
Baetis flavistriga
Baetis intercalaris
Heptageniidae
Leucrocuta sp.
Stenacron interpunctatum
Stenonema terminatum
Undetermined Heptageniidae
COLEOPTERA
Hydrophilidae
Undetermined Hydrophilidae
Gyrinidae
Dineutus sp.
Psephenidae
Ectopria nervosa
Psephenus herricki
Elmidae
Optioservus fastiditus
Optioservus sp.
Stenelmis concinna
Stenelmis crenata
Stenelmis sp.
TRICHOPTERA
Philopotamidae
Chimarra obscura
Hydropsychidae
Cheumatopsyche sp.
Hydropsyche betteni
Hydropsyche bronta
Hydropsyche sparna
Hydroptilidae
Hydroptila nr. armata
Hydroptila sp.
DIPTERA
Tipulidae
Tipula sp.
Simuliidae
Simulium tuberosum
Simulium vittatum
Simulium sp.
Empididae
Hemerodromia sp.
Chironomidae
Tanypodinae
Thienemannimyia gr. spp.
Diamesinae
Pagastia sp. A
Orthocladiinae
Cricotopus bicinctus
Cricotopus tremulus gr.
Cricotopus trifascia gr.
Eukiefferiella devonica gr.
Nanocladius sp.
Parametriocnemus lundbecki
Tvetenia vitracies
Chironominae
Chironomini
Polypedilum convictum
Polypedilum illinoense
Tanytarsini
Rheotanytarsus exiguus gr.
Tanytarsus glabrescens gr.