

BIOASSESSMENT OF INTERSTATE STREAMS

Abbreviations for water quality standards are provided in Table 19. Summaries of all stations include WQI scores, parameters that exceeded water quality standards, and parameters that exceeded the 90th percentile at each station. RBP III biological and habitat data also are provided, along with graphs depicting historical water quality and biological conditions over the past five years. A white bar indicates fiscal year 2004 WQI scores, and black bars in all WQI graphs indicate previous WQI scores.

New York-Pennsylvania Border Streams

Apalachin Creek (APAL 6.9)

Apalachin Creek at Little Meadows, Pa., (APAL 6.9) showed a nonimpaired biological community during fiscal year 2004, after being slightly impaired for two years. Habitat was rated supporting, with low scores for frequency of riffles and riparian vegetative zone width.

Total iron exceeded water quality standards during August 2003, as in previous summers 1999-2002. The WQI again decreased slightly

from the previous year, reaching its lowest value in five years (Table 20).

Bentley Creek (BNTY 0.9)

A slightly impaired biological community existed at Bentley Creek in Wellsburg, N.Y., (BNTY 0.9) after a rating of nonimpaired the previous year. This site received a low rating for percent Chironomidae, which was the dominant taxon. Habitat was rated supporting, with low scores given for channel alteration, instream cover, and sediment deposition. Scour marks from a previous high flow event were noted, as was abundant algae covering the streambed. The Bradford County Conservation District in Pennsylvania and the U.S. Fish and Wildlife Service conducted a stream stabilization project on this stream. Rock structures, such as cross vanes and single rock vanes, have been constructed in portions of the stream to redirect the force of the flow.

During fiscal year 2000, water quality sampling at BNTY 0.9 was increased to quarterly sampling, and the stream was added to the Group 1 stations. Total iron and total aluminum concentrations exceeded New York standards during December 2003; otherwise, water quality was comparable to preceding years (Table 21).

Table 19. Abbreviations Used in Tables 20 Through 51

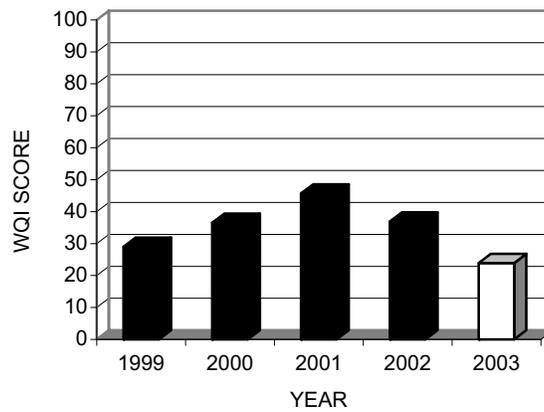
Abbreviation	Parameter	Abbreviation	Parameter
ALK	Alkalinity	DNO3	Dissolved Nitrate
COND	Conductivity	TNO3	Total Nitrate
DAI	Dissolved Aluminum	DN	Dissolved Nitrogen
TAI	Total Aluminum	TN	Total Nitrogen
TCa	Total Calcium	DO	Dissolved Oxygen
TCI	Total Chloride	DP	Dissolved Phosphorus
DFe	Dissolved Iron	TP	Total Phosphorus
TFe	Total Iron	DPO4	Dissolved Orthophosphate
TMg	Total Magnesium	TPO4	Total Orthophosphate
DMn	Dissolved Manganese	DS	Dissolved Solids
TMn	Total Manganese	TS	Total Solids
DNH3	Dissolved Ammonia	TSO4	Total Sulfate
TNH3	Total Ammonia	TOC	Total Organic Carbon
DNO2	Dissolved Nitrite	TURB	Turbidity
TNO2	Total Nitrite	WQI	Water Quality Index
TCIn	Total Chlorine	RBP	Rapid Bioassessment Protocol
SS	Suspended Sediment		

Table 20. Water Quality Summary Apalachin Creek at Little Meadows, Pa.

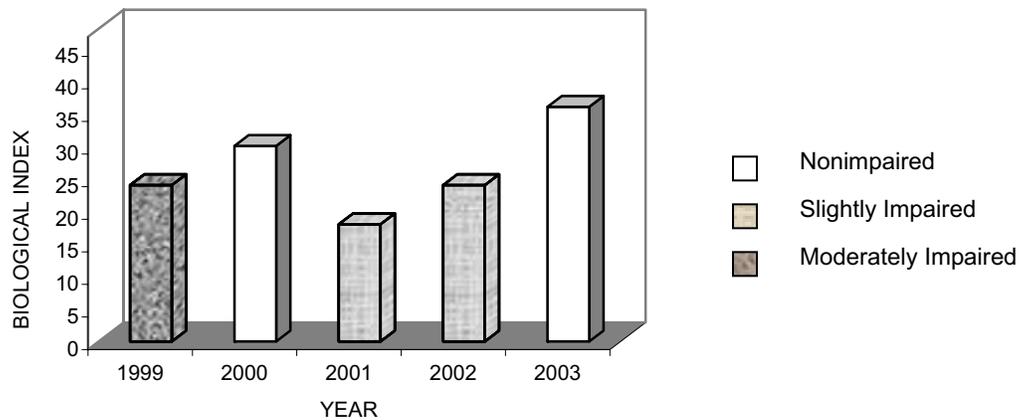
Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
TFe	08/13/03	350 µg/l	300 µg/l	N.Y. aquatic (chronic)

Date	WQI	Parameters Exceeding 90 th Percentile						
08/13/03	23.9	TEMP	DO					

Biological and Habitat Summary	
Number of Taxa	21
Diversity Index	2.46
RBP Score	36
RBP Condition	Nonimpaired
Total Habitat Score	135
Habitat Condition Category	Supporting



Water Quality Index



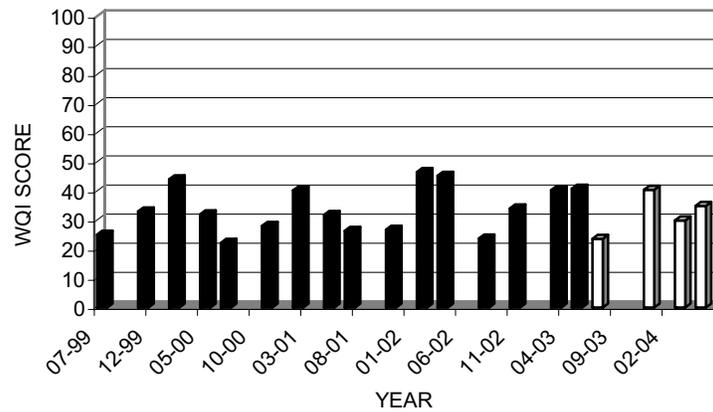
Biological Index

Table 21. Water Quality Summary Bentley Creek at Wellsburg, N.Y.

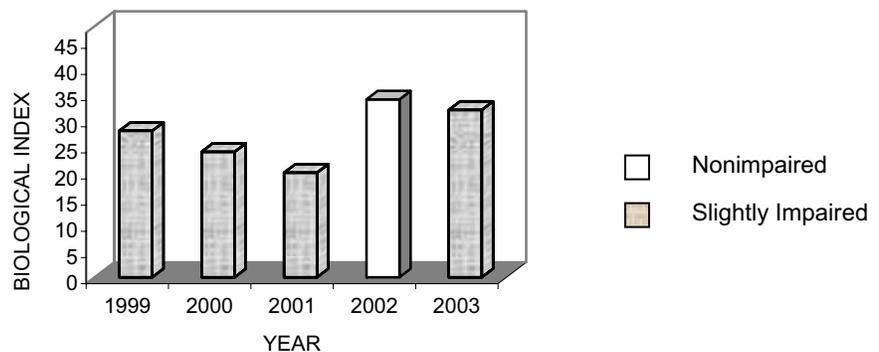
Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
TFe	12/18/03	398 µg/l	300 ug/l	N.Y. aquatic (chronic)
TAI	12/18/03	309 µg/l	100 ug/l	N.Y. aquatic (chronic)

Date	WQI	Parameters Exceeding 90 th Percentile						
07/31/03	23.6	None						
12/18/03	40.4	TEMP	DO					
03/18/04	29.9	None						
05/04/04	34.9	None						

Biological and Habitat Summary	
Number of Taxa	26
Diversity Index	2.66
RBP III Score	32
RBP III Condition	Slightly Impaired
Total Habitat Score	141
Habitat Condition Category	Supporting



Water Quality Index



Biological Index

Cascade Creek (CASC 1.6)

Cascade Creek at Lanesboro, Pa., (CASC 1.6) was rated as nonimpaired in fiscal year 2004. CASC 1.6 was not sampled for macroinvertebrates and water quality in August 2002, due to drought conditions. Habitat conditions were rated as excellent, though low scores were given for sediment deposition and channel flow status.

Cascade Creek was added to the Group 1 streams during the 2000 sampling season to monitor conditions in the stream during the winter months. Results at this site indicated continuing water quality concerns, as state standards for pH, total iron, dissolved iron, alkalinity, and total aluminum were exceeded during the 2003-2004 sampling period (Table 22). Total iron and alkalinity standards have been exceeded in previous years. Along with Troups Creek (see Table 31), Cascade Creek had the most water quality exceedances of all the New York-Pennsylvania streams.

Cayuta Creek (CAYT 1.7)

Biological conditions of Cayuta Creek at Waverly, N.Y., (CAYT 1.7) were rated nonimpaired, as they were during fiscal year 2003. This site had the greatest taxa richness and EPT Index of all streams along the Pennsylvania-New York border. Habitat conditions were rated as supporting, although very low scores were given for riparian vegetative zone width, as Cayuta Creek is located in an urbanized area of Waverly, N.Y. Abundant algal growth noted on the stream substrate.

CAYT 1.7 exceeded the New York aquatic (chronic) standard for total aluminum in May 2004; however, all other Cayuta Creek total aluminum samples for 2003-2004 remained below the detection limit of 200 micrograms per liter ($\mu\text{g/l}$). Both the New York and Pennsylvania state standards for total iron were exceeded at CAYT 1.7 in May 2004, with a concentration of 3,720 $\mu\text{g/l}$. Several parameters exceeded the 90th percentile including conductivity, total chloride, total residue, total phosphorus, total orthophosphate, total iron, and total organic

carbon (Table 23). The total chlorine values were 0.07 milligrams per liter (mg/l) in December and 0.06 mg/l in February. These values exceed the New York aquatic life standard for total residual chlorine. This site is downstream of wastewater discharges from the Waverly sewage treatment facility. Additional concerns in the watershed include runoff from the city of Waverly, malfunctioning septic systems, and agriculture.

Choconut Creek (CHOC 9.1)

The biological index score for Choconut Creek at Vestal Center, N.Y., (CHOC 9.1) remained nonimpaired for the second consecutive year, although the EPT Index was low compared to the reference site. The habitat was rated excellent, although a low rating was given for riparian vegetative zone width. Scour marks from a previous storm were noted at the time of sampling.

No parameters exceeded standards during July 2003, and the WQI was slightly lower than the past several years. Temperature was the only parameter to exceed the 90th percentile (Table 24).

Holden Creek (HLDN 3.5)

The biological community at Holden Creek at Woodhull, N.Y., (HLDN 3.5) was designated nonimpaired for the second consecutive year. In the past, flow conditions have been very low, which precluded macroinvertebrate sampling. The biological condition also was nonimpaired in 1998 (Table 25). During the July 2003 sampling event, taxonomic richness was high, with eight mayfly taxa.

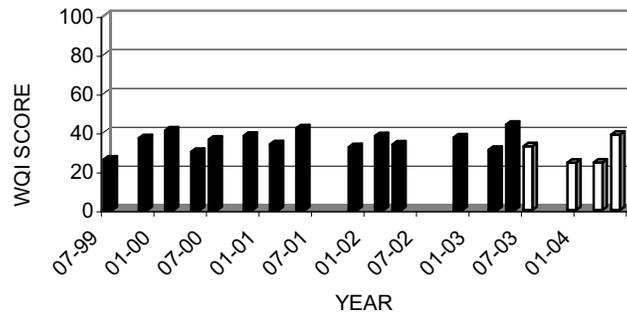
Although no parameters exceeded water quality standards, temperature, dissolved oxygen, and total organic carbon exceeded the 90th percentile at HLDN 3.5 during July 2003. The WQI score was consistent with the WQI score that was calculated in the 1998 and 2002 sample. The habitat was rated excellent, with high scores for epifaunal substrate and frequency of riffles. A salvage yard was located upstream of the sampling site, and scour marks and downed trees were noted due to the previous high flow event.

Table 22. Water Quality Summary Cascade Creek at Lanesboro, Pa.

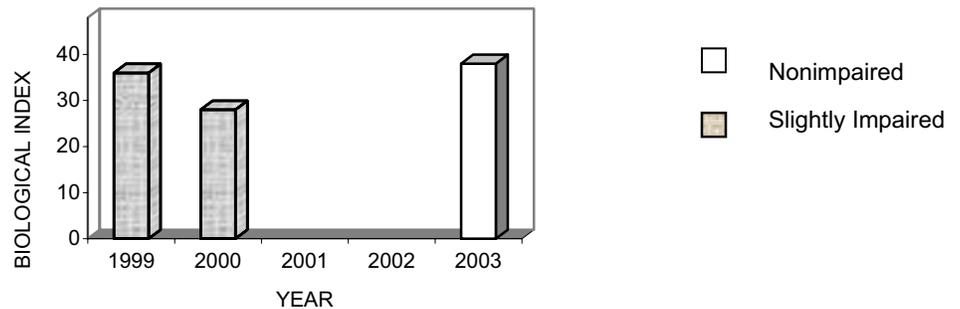
Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
pH	12/17/03	6.4	6.5	N.Y. general
ALK	12/17/03	14 mg/l	20 mg/l	Pa. aquatic life
TFe	07/21/03	1496 ug/l	300 ug/l	N.Y. aquatic (chronic)
DFe	07/21/03	1020 ug/l	300 ug/l	Pa. public water supply
ALK	03/18/04	8 mg/l	20 mg/l	Pa. aquatic life
pH	05/03/04	6.4	6.5	N.Y. general
ALK	05/03/04	18 mg/l	20 mg/l	Pa. aquatic life
TFe	03/18/04	313 ug/l	300 ug/l	N.Y. aquatic (chronic)
TFe	05/03/04	497 ug/l	300 ug/l	N.Y. aquatic (chronic)
TAI	05/03/04	262 ug/l	100 ug/l	N.Y. aquatic (chronic)

Date	WQI	Parameters Exceeding 90 th Percentile							
07/21/03	32.9	DFe	TMn	DMn					
12/17/03	24.4	None							
03/18/04	24.5	None							
05/03/04	38.3	TP	TPO4						

Biological and Habitat Summary	
Number of Taxa	24
Diversity Index	2.63
RBP III Score	38
RBP III Condition	Nonimpaired
Total Habitat Score	149
Habitat Condition Category	Excellent



Water Quality Index



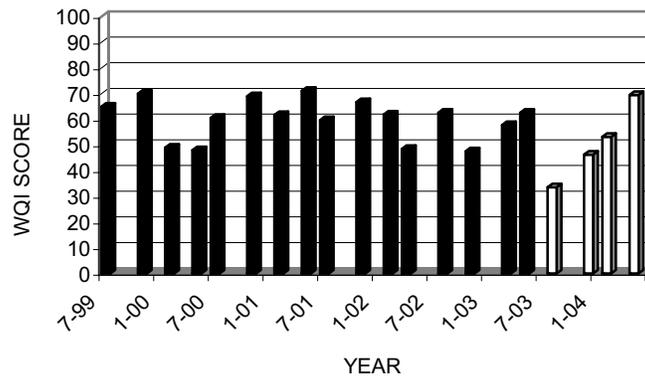
Biological Index

Table 23. Water Quality Summary Cayuta Creek at Waverly, N.Y.

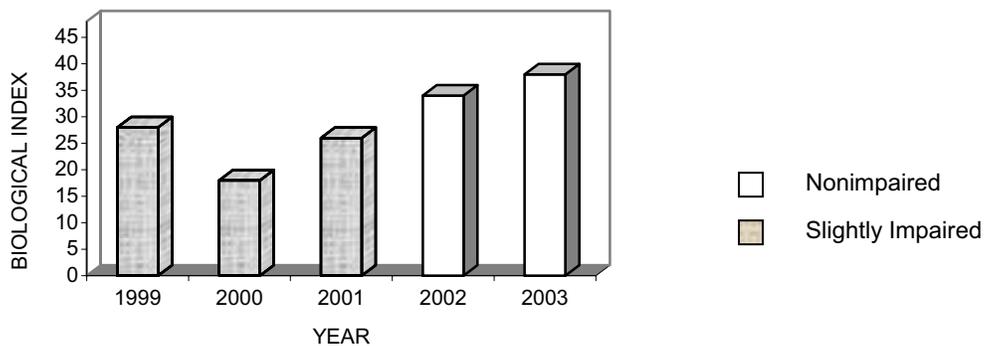
Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
TCl _n	12/17/03	0.07 mg/l	0.019 mg/l	N.Y. aquatic (acute)
TCl _n	02/17/04	0.06 mg/l	0.019 mg/l	N.Y. aquatic (acute)
TFe	05/03/04	3720 ug/l	300 ug/l	N.Y. aquatic (chronic)
TFe	05/03/04	3720 ug/l	1500 ug/l	Pa. aquatic life
TAI	05/03/04	3150 ug/l	100 ug/l	N.Y. aquatic (chronic)

Date	WQI	Parameters Exceeding 90 th Percentile							
08/14/03	33.6	None							
12/17/03	46.3	COND	TCl						
02/17/04	53.2	COND	TRES	TP	TCl	TPO4			
05/03/04	69.5	SS	TP	TOC	TFe	TAI	TURB		

Biological and Habitat Summary	
Number of Taxa	30
Diversity Index	2.52
RBP Score	38
RBP Condition	Nonimpaired
Total Habitat Score	142
Habitat Condition Category	Supporting



Water Quality Index



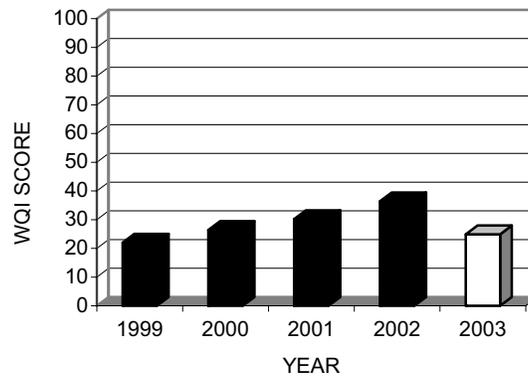
Biological Index

Table 24. Water Quality Summary Choconut Creek at Vestal Center, N.Y.

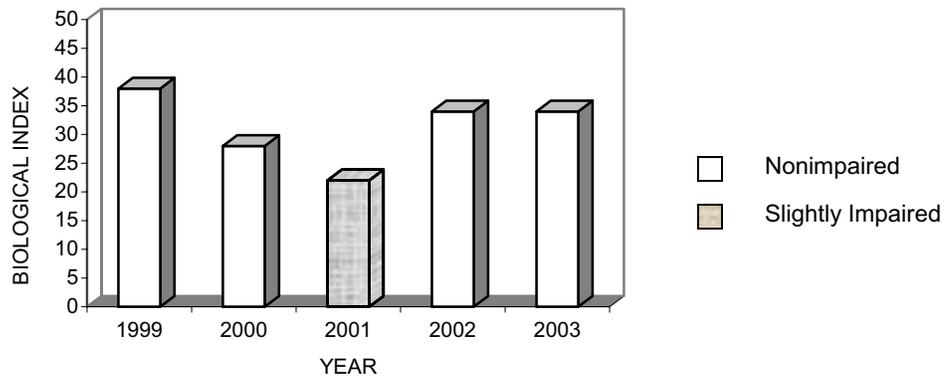
Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
None				

Date	WQI	Parameters Exceeding 90 th Percentile						
08/13/03	24.9	TEMP						

Biological and Habitat Summary	
Number of Taxa	21
Diversity Index	2.39
RBP Score	34
RBP Condition	Nonimpaired
Total Habitat Score	154
Habitat Condition Category	Excellent



Water Quality Index



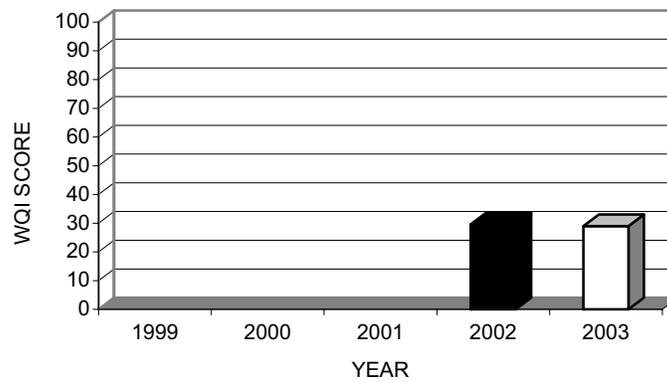
Biological Index

Table 25. Water Quality Summary Holden Creek at Woodhull, N.Y.

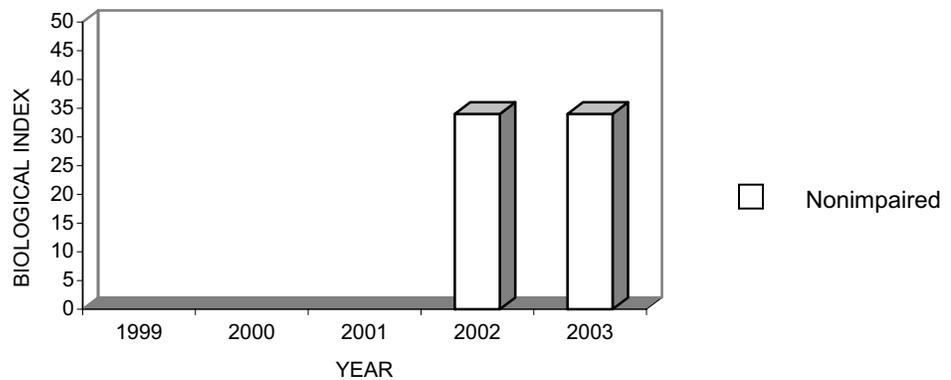
Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
None				

Date	WQI	Parameters Exceeding 90 th Percentile						
07/30/03	29.0	TEMP	DO	TOC				

Biological and Habitat Summary	
Number of Taxa	28
Diversity Index	2.49
RBP III Score	34
RBP III Condition	Nonimpaired
Total Habitat Score	157
Habitat Condition Category	Excellent



Water Quality Index



Biological Index

Little Snake Creek (LSNK 7.6)

Little Snake Creek at Brackney, Pa., (LSNK 7.6) was designated slightly impaired in August 2003 after being nonimpaired for the previous two sampling events. The slightly impaired rating was due largely to a low EPT Index and a high percentage of midges (Chironomidae). The stream was not sampled during 2001 due to low flow conditions.

Water quality values exceeded Pennsylvania and New York standards for total and dissolved iron, total aluminum, and alkalinity (Table 26). Habitat was mostly forested with logging activities occurring upstream of the site. Scour marks from a previous storm event were noted at the time of sampling. The habitat at LSNK 7.6 was rated excellent during 2003 with high scores for frequency of riffles and condition of banks.

North Fork Cowanesque River (NFCR 7.6)

North Fork Cowanesque River at North Fork, Pa., (NFCR 7.6) had a slightly impaired biological community, after being nonimpaired the previous year. This rating was due mainly to a very low EPT Index. The Hilsenhoff Index was low, probably due to the large number of organic-pollution intolerant stonefly, *Leuctra* (Plecoptera: Leuctridae), as was the percentage of Chironomidae in the sample.

Total iron exceeded the New York water quality standard, and several nutrient parameters exceeded the 90th percentile (Table 27). Habitat was rated excellent, with high scores for riparian vegetative zone width, channel alteration, and frequency of riffles. Land use at NFCR 7.6 was predominantly forest. This sampling site is often dry during July and August when Group 1 and 2 sampling is performed; therefore, macro-invertebrate samples have not been collected every year.

Seeley Creek (SEEL 10.3)

During the 1999-2000 sampling season, Seeley Creek was added to the Group 1 streams in the Interstate Streams Water Quality Network (ISWQN). Seeley Creek at Seeley Creek, N.Y.,

(SEEL 10.3) contained a slightly impaired biological community for the second consecutive year, after being moderately impaired for the previous five years. However, this site had the lowest score of all New York-Pennsylvania streams for EPT Index and a large number of midges. Total iron and total aluminum exceeded New York water quality standards, while no parameters exceeded the 90th percentile (Table 28).

Habitat conditions appear to be a possible cause for the impaired macroinvertebrate community. New York State Department of Conservation listed Seeley Creek as “threatened” in its publication, The 1998 Chemung River Basin Waterbody Inventory and Priority Waterbodies List (New York State Department of Conservation, 1998). According to this publication, the stream is threatened by habitat alteration, streambank erosion, and instability of the stream channel. At the time of sampling, SRBC staff noted that the previous storm appeared to have moved much of the substrate at SEEL 10.3.

Snake Creek (SNAK 2.3)

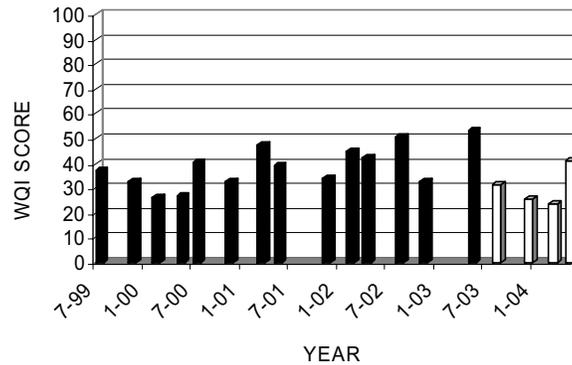
Snake Creek at Brookdale, Pa., (SNAK 2.3) served as the reference site for the New York-Pennsylvania border streams. It had a nonimpaired biological community and excellent physical habitat. SNAK 2.3 had a higher than normal WQI during July 2003, with several parameters exceeding the 90th percentile, although no parameters exceeded state standards (Table 29). The biological community has remained nonimpaired for the past seven years. Snake Creek supported many pollution intolerant taxa, including *Atherix* (Diptera: Athericidae), *Hexatoma* (Diptera: Tipulidae), *Epeorus* (Ephemeroptera: Heptageniidae), *Leucrocuta* (Ephemeroptera: Heptageniidae), *Stenonema* (Ephemeroptera: Heptageniidae), *Isonychia* (Ephemeroptera: Isonychiidae), *Paraleptophlebia* (Ephemeroptera: Leptophlebiidae), *Nigronia* (Megaloptera: Corydalidae), *Acroneuria* (Plecoptera: Perlidae), *Paragnetina* (Plecoptera: Perlidae), *Dolophilodes* (Trichoptera: Philopotamidae) and *Rhyacophila* (Trichoptera: Rhyacophilidae).

Table 26. Water Quality Summary Little Snake Creek at Brackney, Pa.

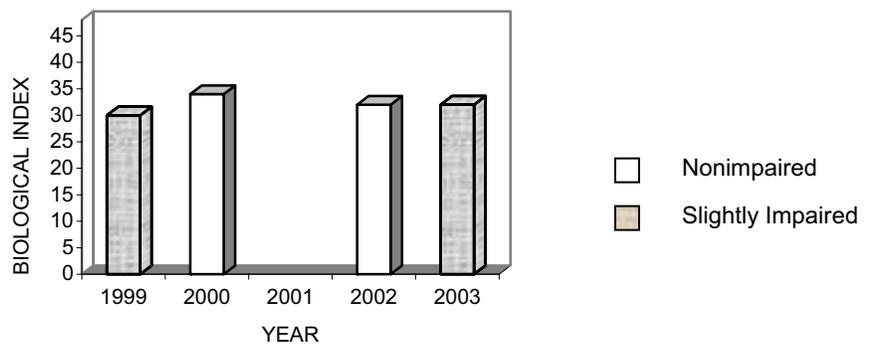
Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
TFe	08/13/03	1067 ug/l	300 ug/l	N.Y. aquatic (chronic)
DFe	08/13/03	722 ug/l	300 ug/l	Pa. public water supply
ALK	12/17/03	14 mg/l	20 mg/l	Pa. aquatic life
ALK	03/18/04	16 mg/l	20 mg/l	Pa. aquatic life
ALK	05/03/04	12 mg/l	20 mg/l	Pa. aquatic life
TFe	05/03/04	846 ug/l	300 ug/l	N.Y. aquatic (chronic)
TAI	05/03/04	512 ug/l	100 ug/l	N.Y. aquatic (chronic)

Date	WQI	Parameters Exceeding 90 th Percentile						
08/13/03	31.3	TEMP	DO					
12/17/03	25.9	None						
03/18/04	23.8	None						
05/03/04	40.9	None						

Biological and Habitat Summary	
Number of Taxa	20
Diversity Index	2.40
RBP III Score	32
RBP III Condition	Slightly Impaired
Total Habitat Score	161
Habitat Condition Category	Excellent



Water Quality Index



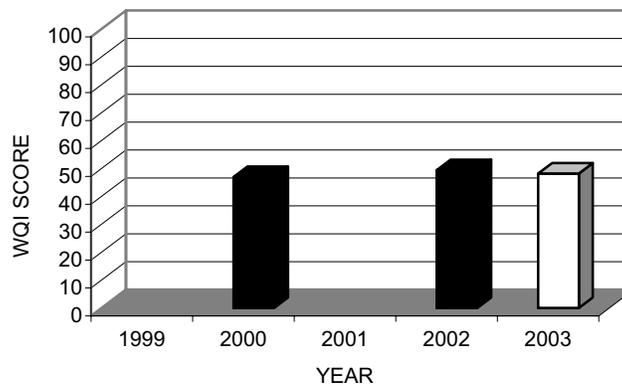
Biological Index

Table 27. Water Quality Summary North Fork Cowanesque River at North Fork, Pa.

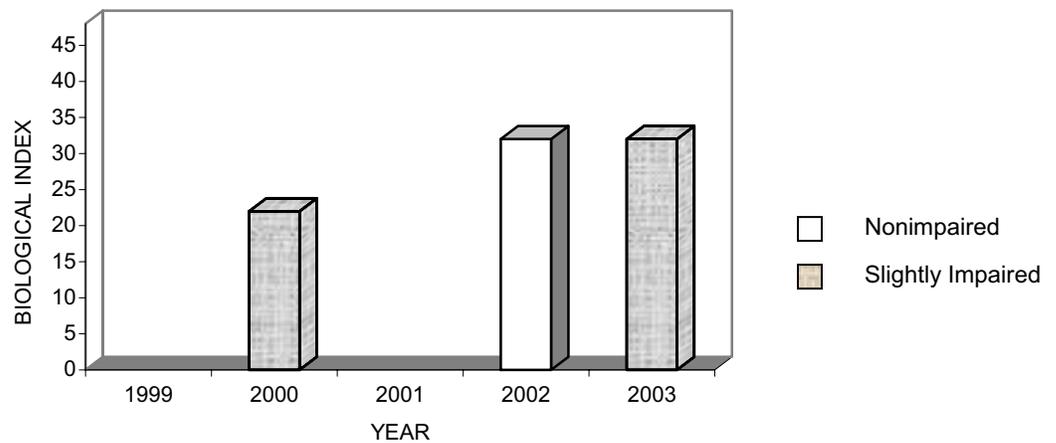
Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
TFe	07/30/03	430 ug/l	300 ug/l	N.Y. aquatic (chronic)

Date	WQI	Parameters Exceeding 90 th Percentile						
07/30/03	48.2	TN	DN	TNO3	DNO3			

Biological and Habitat Summary	
Number of Taxa	20
Diversity Index	2.30
RBP III Score	32
RBP III Condition	Slightly Impaired
Total Habitat Score	160
Habitat Condition Category	Excellent



Water Quality Index



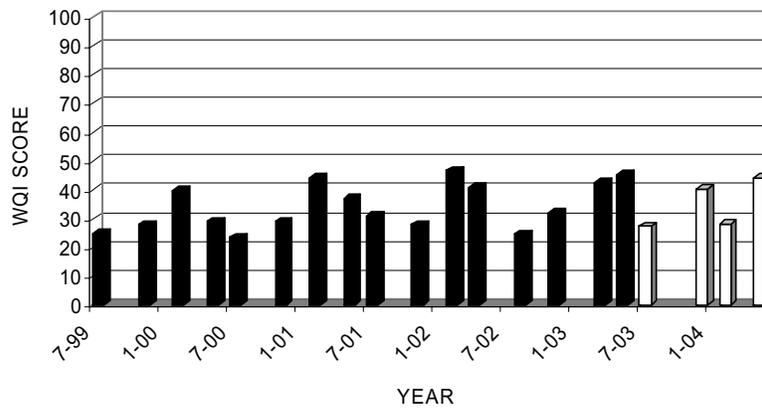
Biological Index

Table 28. Water Quality Summary Seeley Creek at Seeley Creek, N.Y.

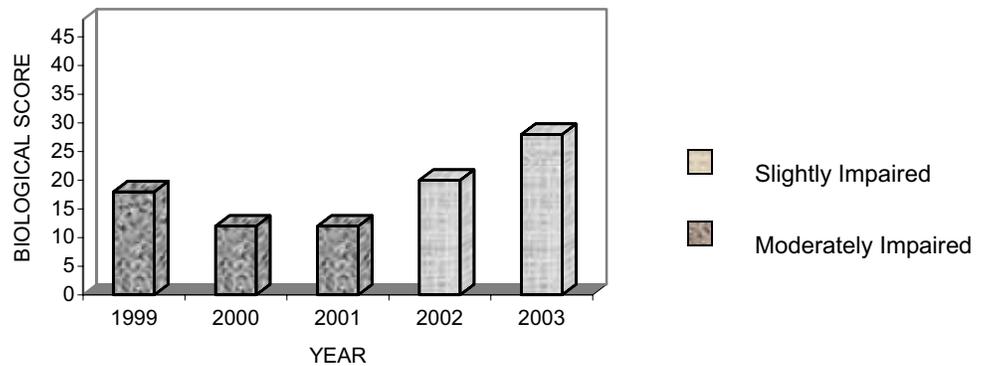
Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
TFe	12/18/03	305 ug/l	300 ug/l	N.Y. aquatic (chronic)
TAI	12/18/03	229 ug/l	100 ug/l	N.Y. aquatic (chronic)

Date	WQI	Parameters Exceeding 90 th Percentile							
07/31/03	27.4	None							
12/18/03	40.5	None							
02/18/04	28.2	None							
05/04/04	44.1	None							

Biological and Habitat Summary	
Number of Taxa	24
Diversity Index	2.38
RBP III Score	28
RBP III Condition	Slightly Impaired
Total Habitat Score	150
Habitat Condition Category	Excellent



Water Quality Index



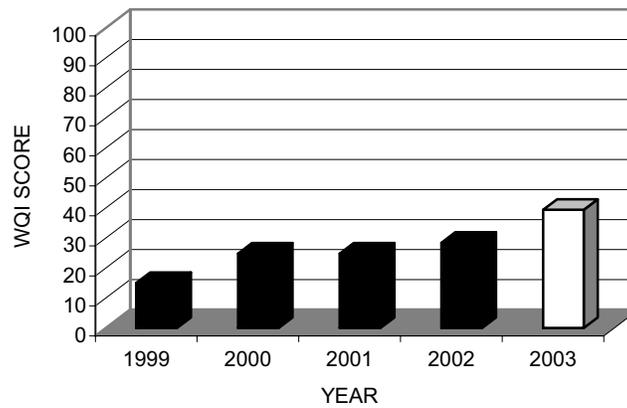
Biological Index

Table 29. Water Quality Summary Snake Creek at Brookdale, Pa.

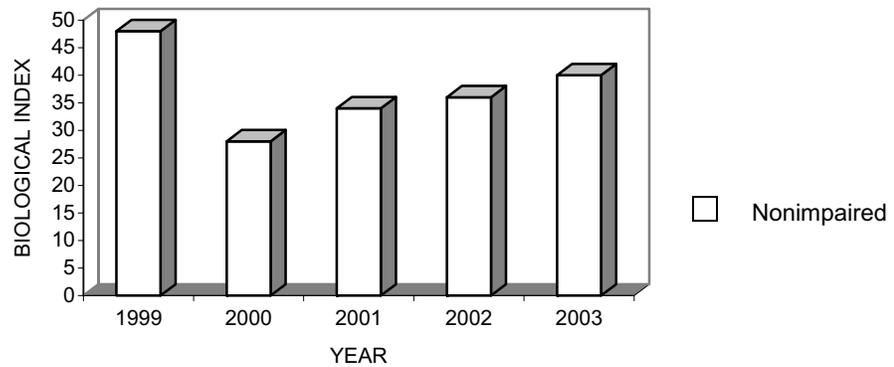
Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
None				

Date	WQI	Parameters Exceeding 90 th Percentile						
08/13/03	39.4	TEMP	TP	DP	DPO4	TSO4		

Biological and Habitat Summary	
Number of Taxa	23
Diversity Index	2.63
RBP III Score	40
RBP III Condition	Reference
Total Habitat Score	166
Habitat Condition Category	Reference



Water Quality Index



Biological Index

SRBC staff conducted a small watershed study on the Snake Creek Watershed during the second year of the Upper Susquehanna Subbasin Survey (Diehl and Sitlinger, 2001). Ten sites in the Snake Creek Watershed and three sites on the Little Snake Creek Watershed were monitored during low and high flow for water quality, macroinvertebrates, and physical habitat. The study concluded that the Snake Creek Watershed was healthy and recommended that this watershed be protected. The Little Snake Creek Watershed showed signs of heavy dredging, and the study recommended that the riparian vegetation along areas of the stream be reestablished.

South Creek (SOUT 7.8)

During fiscal year 2004, South Creek at Fassett, Pa., (SOUT 7.8) had a slightly impaired biological community, with poor scores for EPT Index, percentage of Chironomidae, and percentage of the dominant taxa. The macroinvertebrate community at this site has fluctuated in its degree of impairment throughout the past five years between moderately impaired, slightly impaired, and nonimpaired.

Total and dissolved iron exceeded New York and Pennsylvania standards, respectively, although no parameters exceeded the 90th percentile (Table 30). The habitat was rated excellent, with high scores for epifaunal substrate and velocity/depth regimes. In past sampling seasons, staff has noted extremes in flow regimes; therefore, biological impairment at this site may be due to large fluctuations in flow and periodic drying of the streambed.

Troups Creek (TRUP 4.5)

Troups Creek at Austinburg, Pa., (TRUP 4.5) had a slightly impaired biological community, after being designated nonimpaired the previous year. Over the past five years, this site has fluctuated through moderately, slightly, and nonimpaired biological conditions. During the July 2003 sampling event, taxonomic richness was the lowest of the New York-Pennsylvania border streams and EPT Index also was depressed. A large storm event occurred in the watershed in

mid-July, which appears to have scoured the streambed and may be affecting the macroinvertebrate community in this sample. There were water marks at approximately 14 feet higher than normal flows and major damage to streamside trees and shrubs from the storm. The habitat was rated supporting, with low scores for epifaunal substrate and riparian vegetative zone width.

Total iron and total aluminum concentrations exceeded New York water quality standards during all sampling periods, while pH exceeded New York water quality standards and total iron exceeded Pennsylvania standards in December 2003. Furthermore, a variety of parameters exceeded the 90th percentile in July 2003, March 2004, and May 2004 (Table 31).

Trowbridge Creek (TROW 1.8)

Trowbridge Creek at Great Bend, Pa., (TROW 1.8) showed slightly impaired biological conditions, after being nonimpaired the previous year. During July 2003, percentage of Chironomidae and percentage of dominant taxa were elevated, contributing to the slightly impaired designation. The biological conditions at this site have fluctuated between moderately, slightly, and nonimpaired over the past five years. Alkalinity exceeded Pennsylvania water quality standards in July 2003, although no parameters exceeded the 90th percentile (Table 32). Habitat was rated supporting; however, low ratings were given for velocity/depth regime and riparian vegetative zone width.

Wappasening Creek (WAPP 2.6)

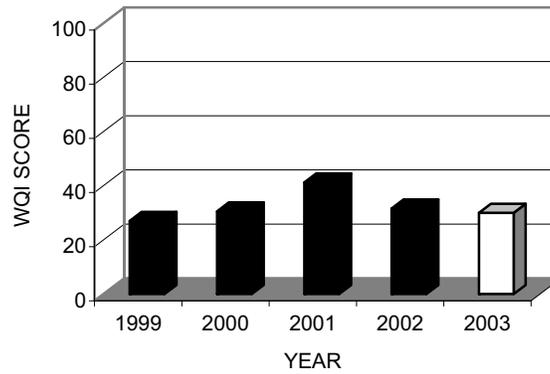
The biological index rating for Wappasening Creek at Nichols, N.Y., (WAPP 2.6) has fluctuated between moderately impaired and slightly impaired ratings over the past five years (Table 33). In July 2003, it scored a slightly impaired rating. The habitat was rated excellent, although SRBC staff noted scour marks from a previous storm, as well as changes to the gravel bars and the existence of numerous dry overflow channels. No parameters exceeded water quality standards; however, temperature exceeded the 90th percentile.

Table 30. Water Quality Summary South Creek at Fassett, Pa.

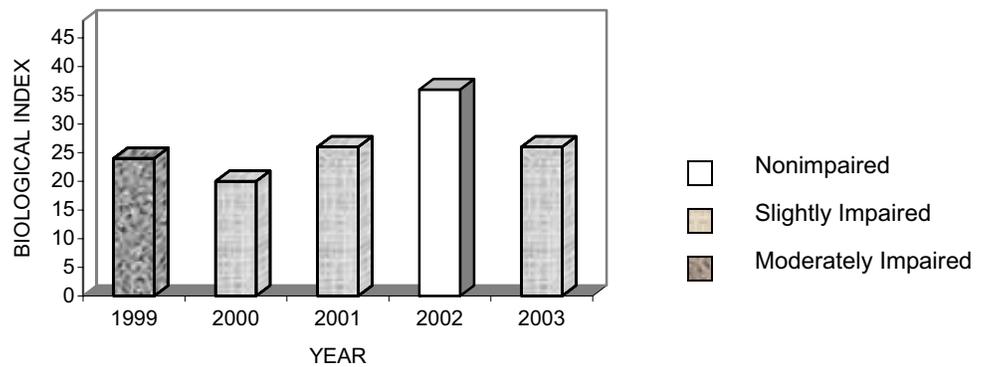
Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
TFe	07/31/03	720 ug/l	300 ug/l	N.Y. aquatic (chronic)
DFe	07/31/03	335 ug/l	300 ug/l	Pa. public water supply

Date	WQI	Parameters Exceeding 90 th Percentile						
07/31/03	30.0	None						

Biological and Habitat Summary	
Number of Taxa	19
Diversity Index	2.02
RBP III Score	26
RBP III Condition	Slightly Impaired
Total Habitat Score	153
Habitat Condition Category	Excellent



Water Quality Index



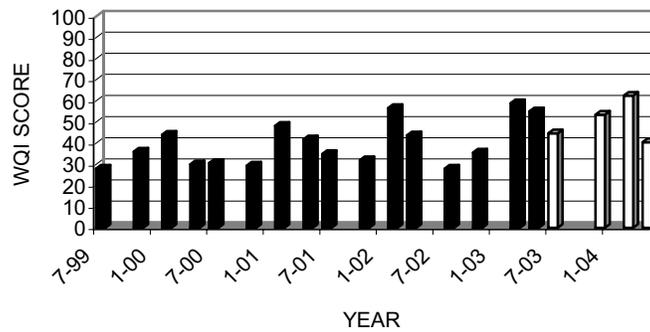
Biological Index

Table 31. Water Quality Summary Troups Creek at Austinburg, Pa.

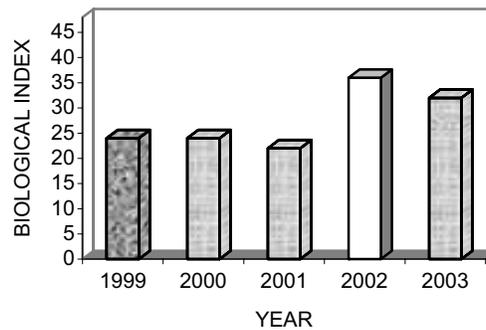
Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
TFe	07/30/03	1320 ug/l	300 ug/l	N.Y. aquatic (chronic)
TAI	07/30/03	1350 ug/l	100 ug/l	N.Y. aquatic (chronic)
pH	12/18/03	6.4	6.5	N.Y. general
TFe	12/18/03	2690 ug/l	300 ug/l	N.Y. aquatic (chronic)
TFe	12/18/03	2690 ug/l	1500 ug/l	Pa. aquatic life
TFe	03/18/04	1380 ug/l	300 ug/l	N.Y. aquatic (chronic)
TAI	12/18/03	1490 ug/l	100 ug/l	N.Y. aquatic (chronic)
TAI	03/18/04	1210 ug/l	100 ug/l	N.Y. aquatic (chronic)
TFe	05/05/04	335 ug/l	300 ug/l	N.Y. aquatic (chronic)
TAI	05/05/04	201 ug/l	100 ug/l	N.Y. aquatic (chronic)

Date	WQI	Parameters Exceeding 90 th Percentile						
07/30/03	44.7	TPO4	TURB					
12/18/03	53.5	None						
03/18/04	62.5	TEMP	DO	TN	TFe	TAI	TURB	
05/05/04	40.5	COND	TS					

Biological and Habitat Summary	
Number of Taxa	17
Diversity Index	2.41
RBP Score	32
RBP Condition	Slightly Impaired
Total Habitat Score	130
Habitat Condition Category	Supporting



Water Quality Index



- Nonimpaired
- Slightly Impaired
- Moderately Impaired

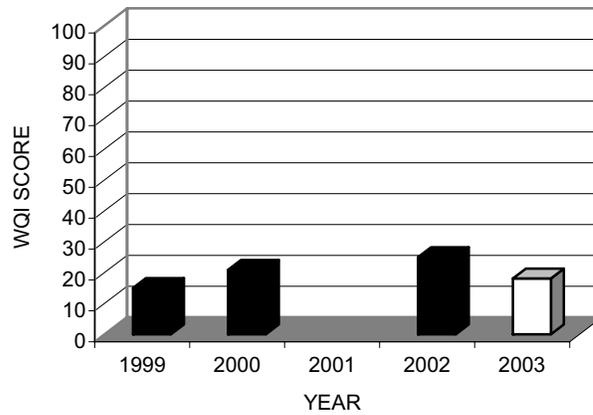
Biological Index

Table 32. Water Quality Summary Trowbridge Creek at Great Bend, Pa.

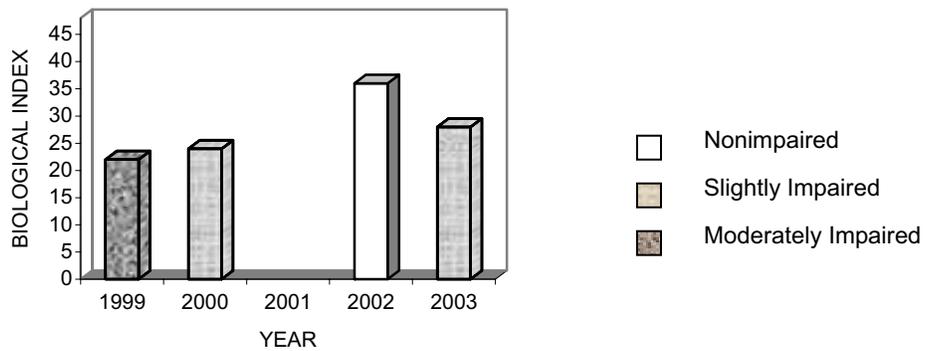
Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
ALK	07/21/03	16 mg/l	20 mg/l	Pa. aquatic life

Date	WQI	Parameters Exceeding 90 th Percentile						
07/21/03	18.1	None						

Biological and Habitat Summary	
Number of Taxa	25
Diversity Index	2.18
RBP III Score	28
RBP III Condition	Slightly Impaired
Total Habitat Score	145
Habitat Condition Category	Supporting



Water Quality Index



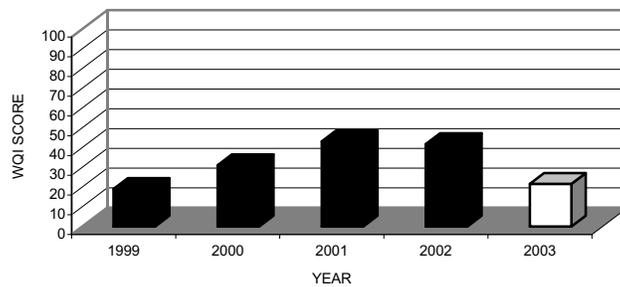
Biological Index

Table 33. Water Quality Summary Wappasening Creek at Nichols, N.Y.

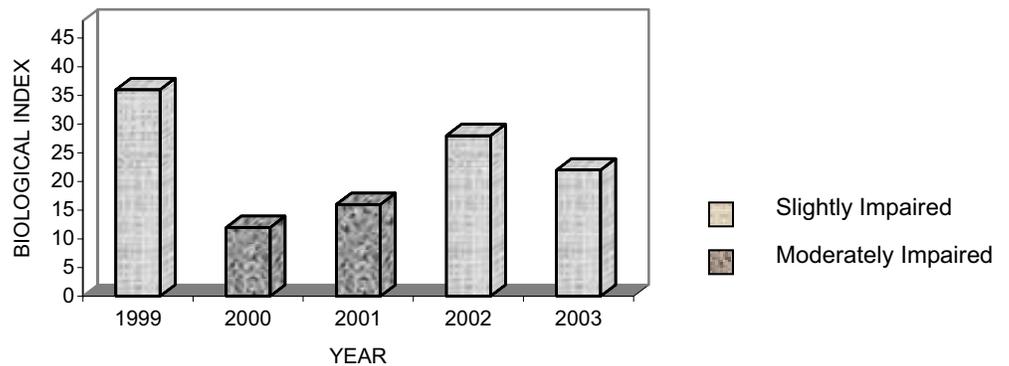
Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
None				

Date	WQI	Parameters Exceeding 90 th Percentile						
07/31/03	21.6	TEMP						

Biological and Habitat Summary	
Number of Taxa	19
Diversity Index	1.88
RBP Score	22
RBP Condition	Slightly Impaired
Total Habitat Score	165
Habitat Condition Category	Excellent



Water Quality Index



Biological Index

Pennsylvania-Maryland Streams

Big Branch Deer Creek (BBDC 4.1)

Big Branch Deer Creek at Fawn Grove, Pa., (BBDC 4.1) had a nonimpaired biological community during fiscal year 2004, as it has for at least the past six years. It had the highest EPT Index of all Pennsylvania-Maryland sites and good scores for Hilsenhoff Biotic Index, Shannon Diversity Index, and taxonomic richness; however, the community scored poorly for percentage of Chironomidae and percentage of dominant taxa. Water quality was fairly good in Big Branch Deer Creek in August 2003, with only alkalinity exceeding Pennsylvania standards and no parameters exceeding the 90th percentile (Table 34). BBDC 4.1 had the best habitat conditions of all the Pennsylvania-Maryland border sites, with high scores for a number of parameters, including epifaunal substrate, instream cover, and channel flow status.

Conowingo Creek (CNWG 4.4)

Conowingo Creek at Pleasant Grove, Pa., (CNWG 4.4) had a slightly impaired community for the fourth year in a row, with a very low taxonomic richness and EPT Index. This stream was impacted by agricultural activities, as evidenced by high sediment deposition and elevated nutrients. Parameters that exceeded the 90th percentile were predominantly nutrients (Table 35). Nitrate plus nitrite exceeded the Pennsylvania standards for public water supply during July 2003 and May 2004 and remained elevated during the other sampling seasons. Pennsylvania water quality standards for total iron also were exceeded during November 2003 and February 2004. These high metal values may be due to problems with sediment erosion in the watershed.

Deer Creek (DEER 44.2)

Deer Creek at Gorsuch Mills, Md., (DEER 44.2) served as the reference site for fiscal year 2004. DEER 44.2 had the highest taxonomic richness and diversity index and the lowest percent dominant taxa of the Pennsylvania-Maryland streams, as well as a high EPT Index and low percent Chironomidae. Organic-pollution intolerant organisms included: *Atherix*, *Antocha* (Diptera: Tipulidae), *Dicranota* (Diptera: Tipulidae), *Serratella* (Ephemeroptera: Ephemerellidae), *Isonychia*, *Nigronia*, *Ophiogomphus* (Odonata: Gomphidae), *Leuctra* (Plecoptera: Leuctridae), *Tallaperla* (Plecoptera: Peltoperlidae), *Acroneuria*, *Agnatina* (Plecoptera: Perlidae), *Paragnetina*, and *Dolophilodes*. This site had fairly good water quality, with no parameters exceeding standards, and only temperature and dissolved oxygen exceeding the 90th percentile during the November 2003 sampling period (Table 36). This sampling site was located adjacent to agricultural activities.

Ebaughs Creek (EBAU 1.5)

Ebaughs Creek at Stewartstown, Pa., (EBAU 1.5) had a moderately impaired community in July 2003 and scored poorly in a number of metrics, including taxonomic richness, EPT Index, percentage of Chironomidae, and percentage of dominant taxa. This site usually has slightly or moderately impaired biological conditions, with the July 2001 rating of nonimpaired being an anomaly. Habitat was rated as excellent, with high scores for bank vegetative protection and channel flow status.

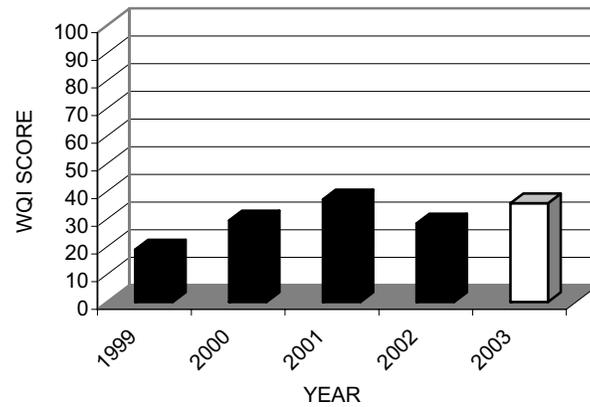
Total chlorine values exceeded state standards during every sampling period with ranges of 0.1 mg/l to 0.07 mg/l (Table 37). A variety of other parameters exceeded the 90th percentile. EBAU 1.5 is located downstream of the Stewartstown Treatment Plant.

Table 34. Water Quality Summary Big Branch Deer Creek at Fawn Grove, Pa.

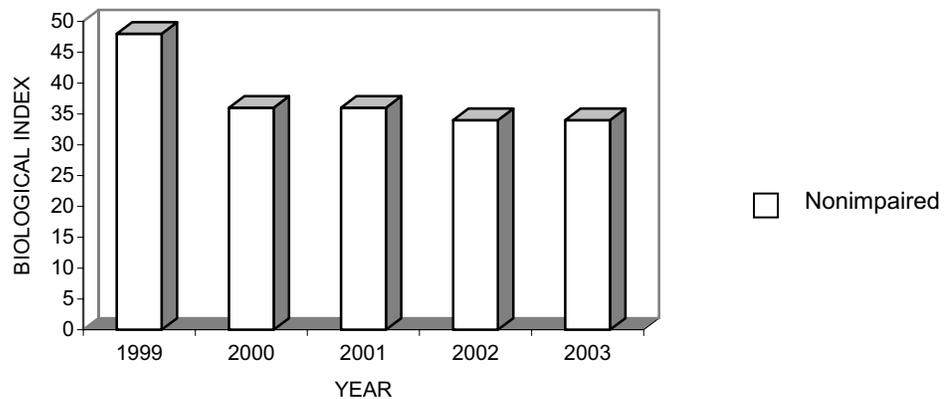
Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
ALK	07/28/03	16 mg/l	20 mg/l	Pa. aquatic life

Date	WQI	Parameters Exceeding 90 th Percentile						
07/28/03	35.7	None						

Biological and Habitat Summary	
Number of Taxa	22
Diversity Index	2.24
RBP Score	34
RBP Condition	Nonimpaired
Total Habitat Score	171
Habitat Condition Category	Excellent



Water Quality Index



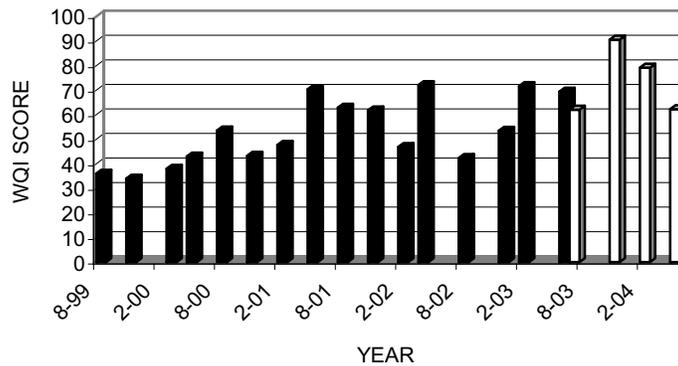
Biological Index

Table 35. Water Quality Summary Conowingo Creek at Pleasant Grove, Pa.

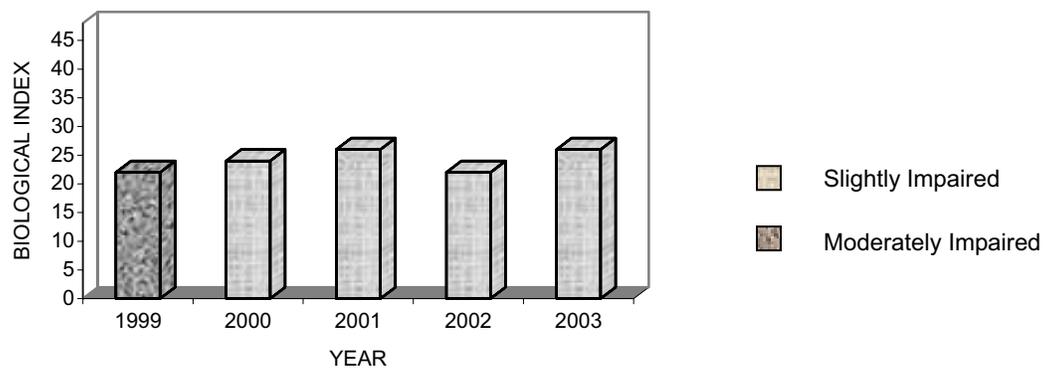
Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
Nitrate + Nitrite	07/29/03	10.63 mg/l	10 mg/l	Pa. public water supply
TFe	11/07/03	6530 ug/l	1500 ug/l	Pa. aquatic life
Nitrate + Nitrite	05/06/04	10.82 mg/l	10 mg/l	Pa. public water supply
TFe	02/11/04	2950 ug/l	1500 ug/l	Pa. aquatic life
TURB	11/07/03	204.3 NTU	150 NTU	Md. aquatic life

Date	WQI	Parameters Exceeding 90 th Percentile							
07/29/03	62.1	TS	DS	TN	DN	TNO3	DNO3	TPO4	
11/07/03	90.6	SS	TEMP	DO	TS	TN	TNH3	TNO2	TNO3
		TP	TOC	TFe	TMn	TAI	TPO4	TURB	
02/11/04	79.2	SS	TN	TNH3	TP	TOC	TFe	TAI	TPO4
		TURB							
05/06/04	62.3	COND	TS	TN	TNO3	TP	TPO4		

Biological and Habitat Summary	
Number of Taxa	12
Diversity Index	2.03
RBP III Score	26
RBP III Condition	Slightly Impaired
Total Habitat Score	161
Habitat Condition Category	Excellent



Water Quality Index



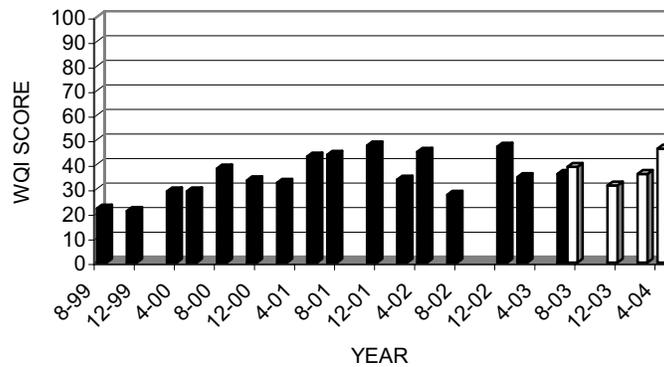
Biological Index

Table 36. Water Quality Summary Deer Creek at Gorsuch Mills, Md.

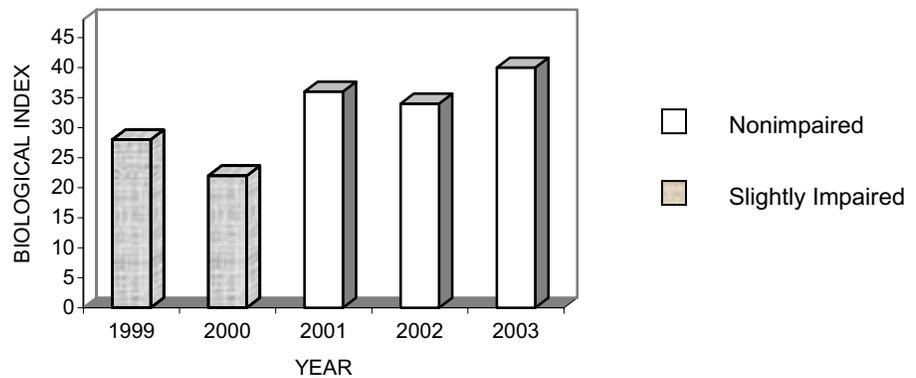
Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
None				

Date	WQI	Parameters Exceeding 90 th Percentile						
0728/03	39.0							
11/06/03	31.4	TEMP	DO					
02/10/04	36.1							
04/27/04	46.4							

Biological and Habitat Summary	
Number of Taxa	24
Diversity Index	2.46
RBP Score	40
RBP Condition	Reference
Total Habitat Score	147
Habitat Condition Category	Reference



Water Quality Index



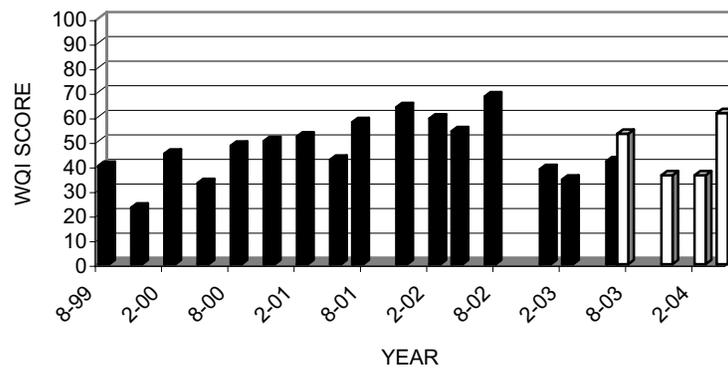
Biological Index

Table 37. Water Quality Summary Ebaughs Creek at Stewartstown, Pa.

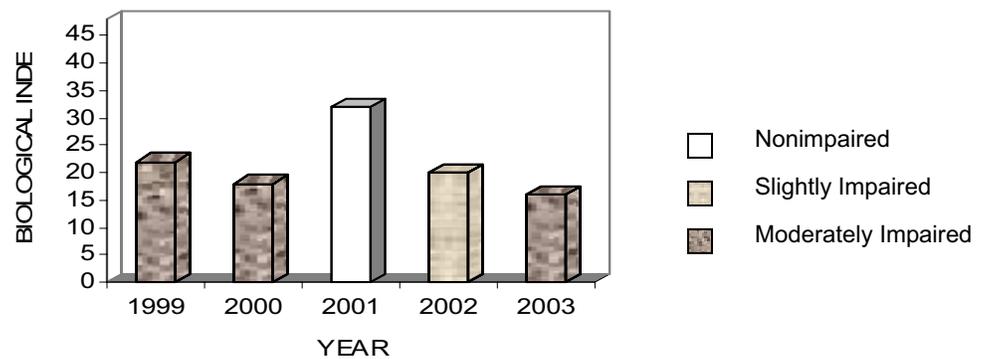
Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
TCIn	07/28/03	0.1 mg/l	0.019 mg/l	Md. aquatic life
TCIn	11/06/03	0.09 mg/l	0.019 mg/l	Md. aquatic life
TCIn	02/10/04	0.07 mg/l	0.019 mg/l	Md. aquatic life
TCIn	04/27/04	0.09 mg/l	0.019 mg/l	Md. aquatic life

Date	WQI	Parameters Exceeding 90 th Percentile						
07/28/03	53.1	DFe	DMn					
11/06/03	36.2	TEMP	DO	TNO2				
02/10/04	36.2	TEMP	TNO3					
04/27/04	61.5	TNH3	TNO2	TP	TPO4			

Biological and Habitat Summary	
Number of Taxa	13
Diversity Index	1.66
RBP Score	16
RBP Condition	Moderately Impaired
Total Habitat Score	156
Habitat Condition Category	Excellent



Water Quality Index



Biological Index

Falling Branch Deer Creek (FBDC 4.1)

The biological community of Falling Branch Deer Creek at Fawn Grove, Pa., (FBDC 4.1) was designated nonimpaired. This site had the lowest Hilsenhoff Biotic Index and the highest percentage of Ephemeroptera of all the Pennsylvania-Maryland stations. The habitat was rated excellent with a dense vegetative cover; however staff noted that the riparian vegetative zone width was much better upstream of the station than downstream. Water quality was fairly good with only alkalinity exceeding Pennsylvania aquatic life standards and no parameters exceeding the 90th percentile (Table 38).

Long Arm Creek (LNGA 2.5)

Long Arm Creek at Bandanna, Pa., (LNGA 2.5) had a moderately impaired biological community for the second consecutive year, with low metric scores for taxonomic richness, EPT Index, and percentage of Chironomidae. LNGA 2.5 was located in a cow pasture. The site was expected to improve as an organic farm with fewer livestock and reduced access to the stream replaced the previous operation; however, significant improvements have not been noted yet. SRBC staff noted that several steers were using the pasture and entering Long Arm Creek upstream of the sampling site. Habitat conditions were rated as supporting; however the site received low scores for embeddedness, sediment deposition, and riparian vegetative zone width.

During the 2000 sampling season, Long Arm Creek was elevated to a Group 1 stream. Although no water quality standards were exceeded in fiscal year 2004, both metals and nutrients such as total iron, total aluminum, total nitrate, and total organic carbon exceeded the 90th percentile at this site. Dissolved oxygen and turbidity also exceeded the 90th percentile (Table 39).

Octoraro Creek (OCTO 6.6)

Octoraro Creek at Rising Sun, Md., (OCTO 6.6) had a slightly impaired biological community, with a low score for Hilsenhoff Index, indicating a large number of organic-pollution tolerant organisms. Total iron exceeded Pennsylvania standards during February 2004

(Table 40). Solids, phosphorus, temperature, dissolved oxygen, and conductivity exceeded the 90th percentile, and total nitrogen and total nitrate were elevated, although they did not exceed the 90th percentile.

Scott Creek (SCTT 3.0)

Scott Creek at Delta, Pa., (SCTT 3.0) was rated moderately impaired in July 2003, after being designated severely impaired for numerous years. This site consistently had the worst macroinvertebrate metric scores of all the Pennsylvania-Maryland sites and was heavily dominated by Chironomidae. However, during fiscal year 2004, several pollution sensitive organisms appeared in the sample for the first time, including *Nigronia*, *Diplectrona* (Trichoptera: Hydropsychidae), and *Dolophilodes*. No parameters exceeded state standards in fiscal year 2004; however, a variety of parameters, including dissolved oxygen, conductivity, solids, total chloride, total sulfate, and total organic carbon exceeded the 90th percentile. WQI scores appear to be decreasing, indicating potential for improvement (Table 41). The habitat was rated supporting, with poor scores for riparian vegetative zone width and velocity/depth regimes. A slight fuel oil smell was noted when the substrate was disturbed.

South Branch Conewago Creek (SBCC 20.4)

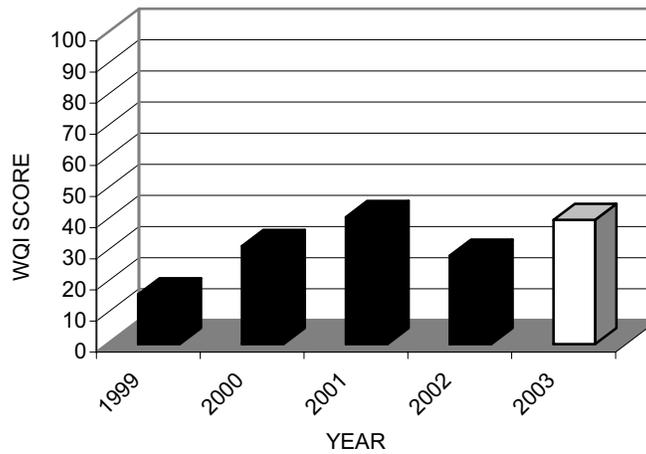
South Branch Conewago Creek near Bandanna, Pa., (SBCC 20.4) contained a nonimpaired biological community after being rated as slightly impaired for the previous six years. No water quality standards were exceeded, and no parameters exceeded the 90th percentile (Table 42). The habitat was rated excellent, with high scores for epifaunal substrate, channel alteration, frequency of riffles, and vegetative protective cover. Before this stream was slightly impaired, it had served as the Pennsylvania-Maryland reference site for several years. Logging activities occur upstream in the watershed; however, it has not been determined whether this is the source of impairment. All-terrain vehicle tracks were noted on the streambank and in South Branch Conewago Creek at the time of sampling.

Table 38 Water Quality Summary Falling Branch Deer Creek at Fawn Grove, Pa.

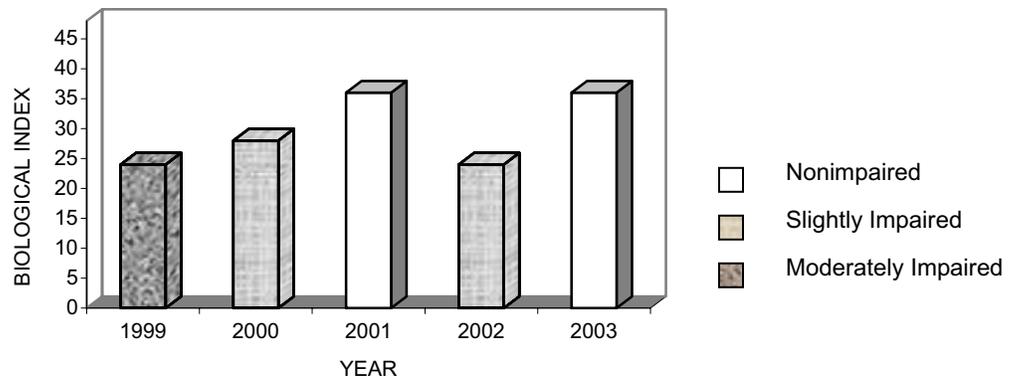
Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
ALK	07/29/03	16 mg/l	20 mg/l	Pa. aquatic life

Date	WQI	Parameters Exceeding 90 th Percentile						
07/29/03	39.9	None						

Biological and Habitat Summary	
Number of Taxa	18
Diversity Index	2.20
RBP Score	36
RBP Condition	Nonimpaired
Total Habitat Score	154
Habitat Condition Category	Excellent



Water Quality Index



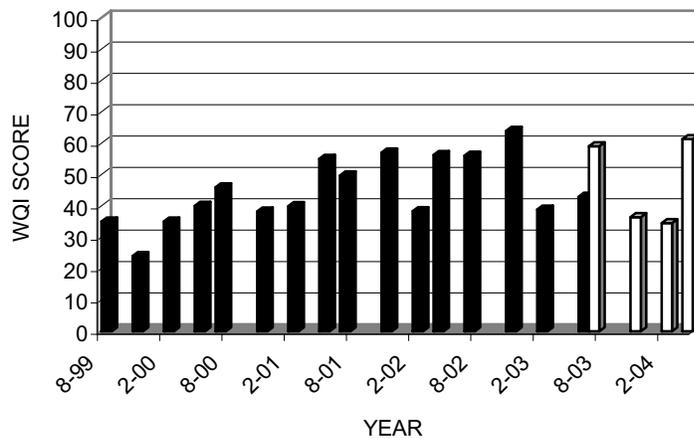
Biological Index

Table 39. Water Quality Summary Long Arm Creek at Bandanna, Pa.

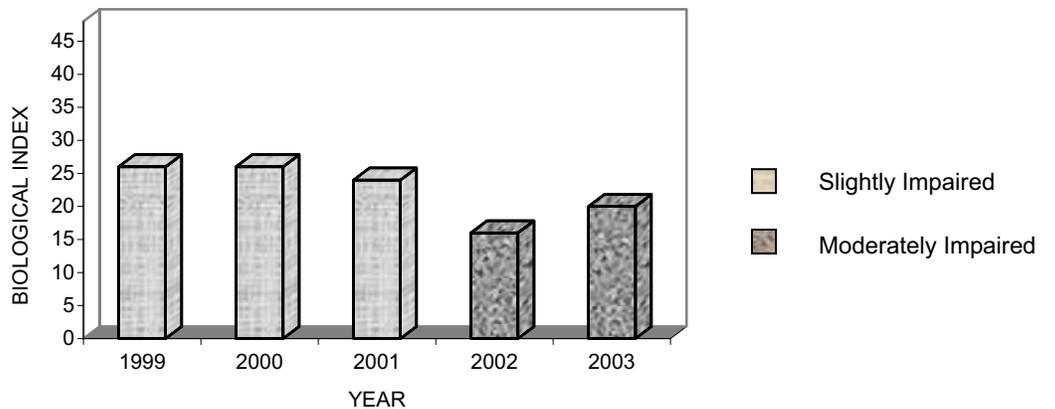
Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
None				

Date	WQI	Parameters Exceeding 90 th Percentile						
07/28/03	59.0	TAI	TPO4	TURB				
11/06/03	36.4	TEMP	DO					
02/10/04	34.5	TNO3						
04/27/04	61.3	TP	TOC	TFe	TPO4			

Biological and Habitat Summary	
Number of Taxa	13
Diversity Index	2.02
RBP III Score	20
RBP III Condition	Moderately Impaired
Total Habitat Score	125
Habitat Condition Category	Supporting



Water Quality Index



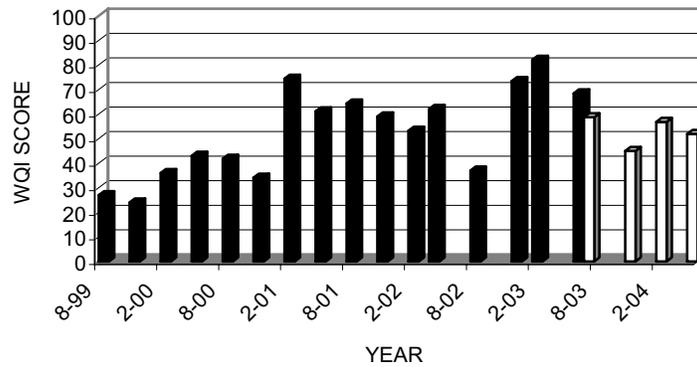
Biological Index

Table 40. Water Quality Summary Octoraro Creek at Rising Sun, Md.

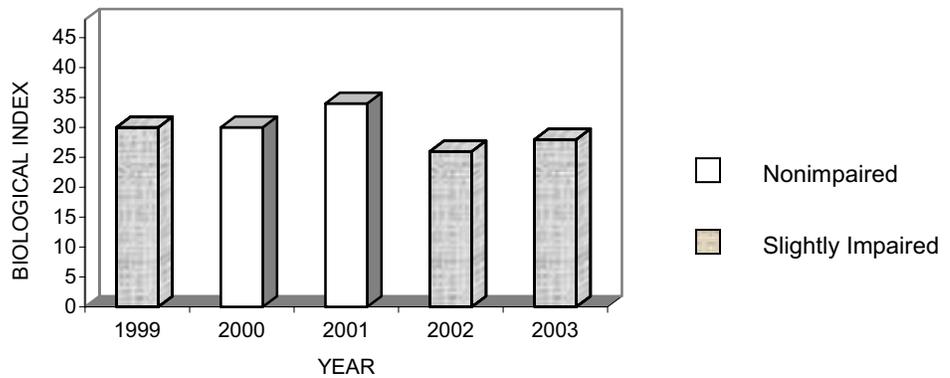
Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
TFe	02/11/04	1880 ug/l	1500 ug/l	Pa. aquatic life

Date	WQI	Parameters Exceeding 90 th Percentile							
07/29/03	58.7	TEMP	TS	DS	TP	DP			
11/07/03	45.0	TEMP	DO						
02/11/04	56.8	None							
05/06/04	51.9	COND	TS						

Biological and Habitat Summary	
Number of Taxa	16
Diversity Index	2.12
RBP III Score	28
RBP III Condition	Slightly Impaired
Total Habitat Score	161
Habitat Condition Category	Excellent



Water Quality Index



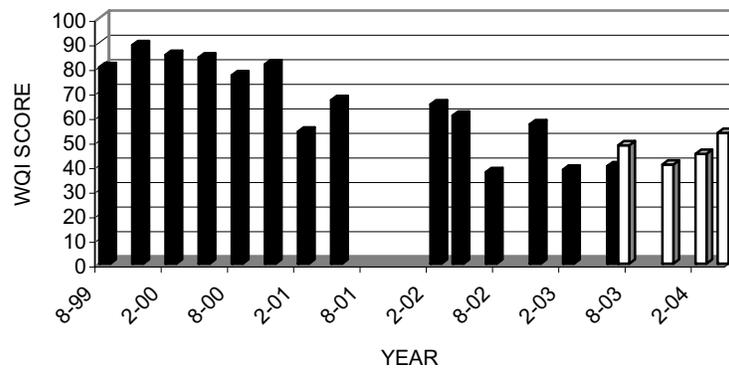
Biological Index

Table 41. Water Quality Summary Scott Creek at Delta, Pa.

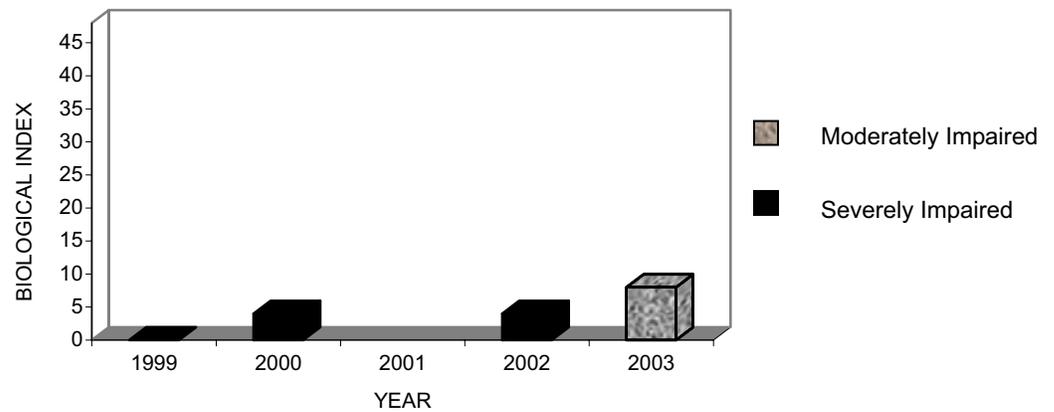
Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
None				

Date	WQI	Parameters Exceeding 90 th Percentile							
07/29/03	48.2	COND	TS	DS	DP	DPO4	TCI	TPO4	
11/06/03	40.4	TEMP	DO	COND	TCI	TSO4			
02/10/04	44.7	TEMP	COND	TS	TCI				
04/27/04	53.3	COND	TOC	TCI					

Biological and Habitat Summary	
Number of Taxa	10
Diversity Index	0.55
RBP III Score	8
RBP III Condition	Moderately Impaired
Total Habitat Score	128
Habitat Condition Category	Supporting



Water Quality Index



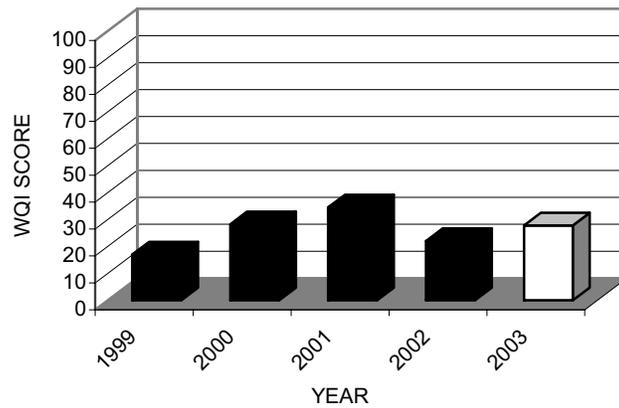
Biological Index

Table 42. Water Quality Summary South Branch Conewago Creek at Bandanna, Pa.

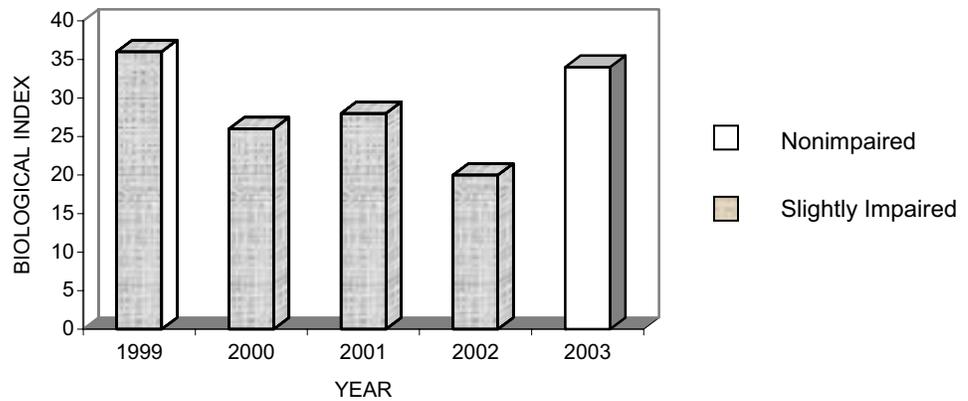
Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
None				

Date	WQI	Parameters Exceeding 90 th Percentile						
07/28/03	27.8	None						

Biological and Habitat Summary	
Number of Taxa	19
Diversity Index	2.19
RBP III Score	34
RBP III Condition	Nonimpaired
Total Habitat Score	165
Habitat Condition Category	Excellent



Water Quality Index



Biological Index

River Sites

Chemung River (CHEM 12.0)

Due to high flows throughout the sampling season, no macroinvertebrate sample was collected at the Chemung River at Chemung, N.Y., (CHEM 12.0). Total iron and total aluminum exceeded the New York water quality standards during September and December 2003 and May 2004; also exceeded was the Pennsylvania total iron standard during September 2003 and May 2004. Numerous parameters exceeded the 90th percentile including conductivity, solids, and dissolved oxygen, among others (Table 43).

Cowanesque River (COWN 2.2)

Due to high flows throughout the sampling season, no macroinvertebrate sample or habitat data was collected on the Cowanesque River downstream of the Cowanesque Reservoir at Lawrenceville, Pa., (COWN 2.2).

Water quality data was not collected at COWN 2.2 during the first sampling quarter due to very high flows downstream of the Cowanesque Reservoir. Total iron exceeded New York and Pennsylvania standards in December 2003 and the New York standard during February and May 2004, while the New York total aluminum standard also was exceeded during all sampling periods (Table 44). A variety of parameters exceeded the 90th percentile at COWN 2.2 including dissolved oxygen and total organic carbon.

Cowanesque River (COWN 1.0)

A site was added on the Cowanesque River near the mouth of the stream (COWN 1.0) during the 1999-2000 sampling season to determine the extent of impairment in the river. However, due to high flows during summer 2003, no macroinvertebrate sample or habitat information was collected at COWN 1.0.

Total iron and total aluminum exceeded the New York water quality standards during every sampling period, while total iron also exceeded

Pennsylvania standards during December 2003. Parameters that exceeded the 90th percentile included dissolved oxygen, total iron, total aluminum, and various nutrients (Table 45). The water quality was very similar between COWN 2.2 and COWN 1.0. The Cowanesque Reservoir and a wastewater treatment plant discharge are located upstream of COWN 1.0.

Susquehanna River at Windsor, N.Y. (SUSQ 365.0)

Since very few macroinvertebrate samples were collected on the larger rivers due to high flow conditions, the biological community at Susquehanna River at Windsor, N.Y., (SUSQ 365.0) was compared to SNAK 2.3, the reference station for the New York-Pennsylvania border streams. SUSQ 365.0 was designated nonimpaired during fiscal year 2004 and had an excellent habitat score, with high ratings for epifaunal substrate, velocity/depth regimes, and vegetative protective cover. Logs and woody debris were noted in the stream, along with some algae covering the rocks.

Total iron and total aluminum slightly exceeded New York aquatic standards. Temperature, total solids, and total chloride were elevated (Table 46) at this site.

Susquehanna River at Kirkwood, N.Y. (SUSQ 340.0)

Susquehanna River at Kirkwood, N.Y., (SUSQ 340.0) also was compared to SNAK 2.3, due to the lack of macroinvertebrate samples collected at most of the river sites. During July 2003, SUSQ 340.0 was designated as nonimpaired and received an excellent score for habitat conditions.

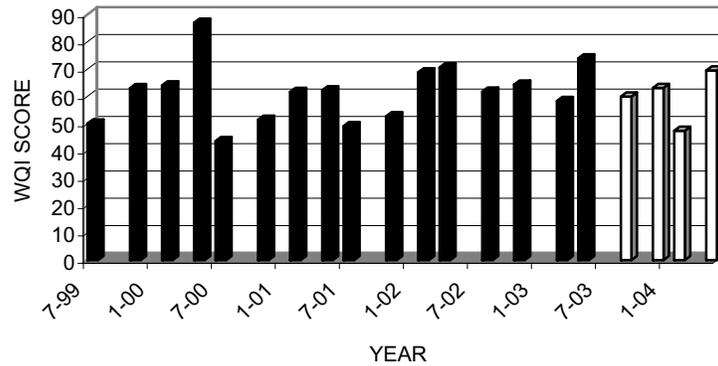
Total iron exceeded New York water quality standards on three occasions, while total aluminum exceeded standards twice. Additional water quality analysis indicated that temperature, dissolved oxygen, and total chloride exceeded the 90th percentile (Table 47).

Table 43. Water Quality Summary Chemung River at Chemung, N.Y.

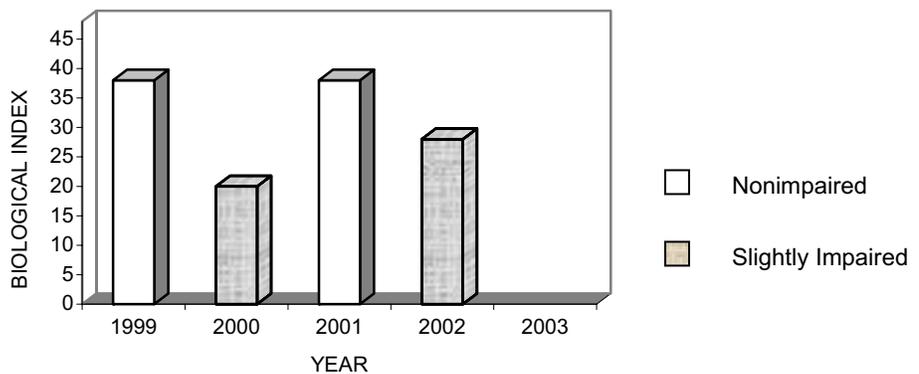
Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
TFe	09/23/03	2510 ug/l	300 ug/l	N.Y. aquatic (chronic)
TFe	09/23/03	2510 ug/l	1500 ug/l	Pa. aquatic life
TAI	09/23/03	2140 ug/l	100 ug/l	N.Y. aquatic (chronic)
TFe	12/17/03	1450 ug/l	300 ug/l	N.Y. aquatic (chronic)
TAI	12/17/03	795 ug/l	100 ug/l	N.Y. aquatic (chronic)
TFe	05/04/04	1650 ug/l	300 ug/l	N.Y. aquatic (chronic)
TFe	05/04/04	1650 ug/l	1500 ug/l	Pa. aquatic life
TAI	05/04/04	1190 ug/l	100 ug/l	N.Y. aquatic (chronic)

Date	WQI	Parameters Exceeding 90 th Percentile							
09/23/03	59.9	COND	TS	DS	TNO2	TCI	TFe	TAI	
12/17/03	63.1	DO	COND	TS	TN	TNO3	TSO4		
02/18/04	47.4	DO	TN	TNO3					
05/04/04	69.5	COND	TS	TN	TP	TCI	TPO4		

Biological and Habitat Summary	
Number of Taxa	NA
Diversity Index	NA
RBP Score	NA
RBP Condition	NA
Total Habitat Score	NA
Habitat Condition Category	NA



Water Quality Index



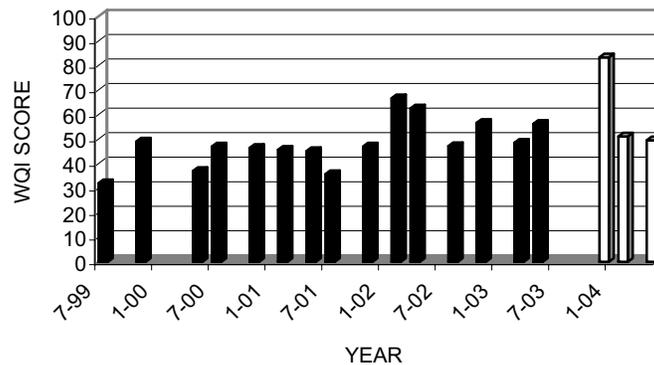
Biological Index

Table 44. Water Quality Summary Cowanesque River (COWN 2.2) at Lawrenceville, Pa.

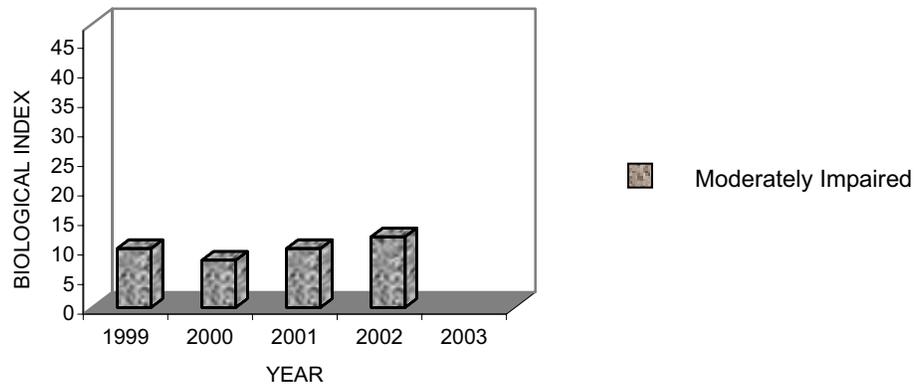
Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
TFe	12/18/03	5340 ug/l	300 ug/l	N.Y. aquatic (chronic)
TFe	12/18/03	5340 ug/l	1500 ug/l	Pa. aquatic life
TFe	02/18/04	611 ug/l	300 ug/l	N.Y. aquatic (chronic)
TAI	12/18/03	6760 ug/l	100 ug/l	N.Y. aquatic (chronic)
TAI	02/18/04	578 ug/l	100 ug/l	N.Y. aquatic (chronic)
TFe	05/05/04	353 ug/l	300 ug/l	N.Y. aquatic (chronic)
TAI	05/05/04	290 ug/l	100 ug/l	N.Y. aquatic (chronic)

Date	WQI	Parameters Exceeding 90 th Percentile							
12/18/03	83.3	SS	DO	TS	TNH3	TP	TOC	TFe	TAI
		TPO4	TURB						
02/18/04	51.1	DO	TOC						
05/05/04	49.5	DO	TNO3						

Biological and Habitat Summary	
Number of Taxa	NA
Diversity Index	NA
RBP Score	NA
RBP Condition	NA
Total Habitat Score	NA
Habitat Condition Category	NA



Water Quality Index



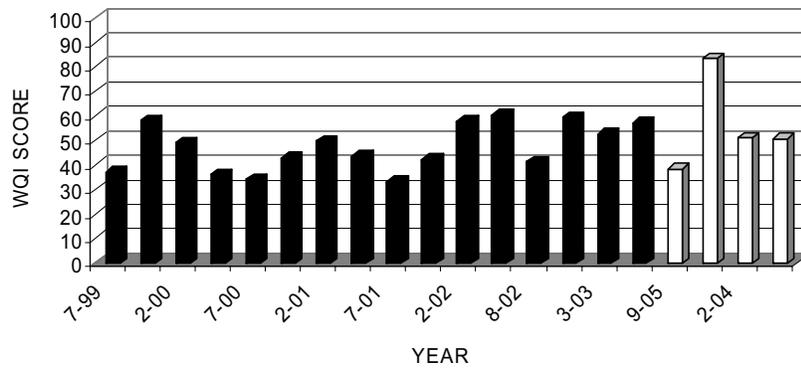
Biological Index

Table 45. Water Quality Summary Cowanesque River (COWN 1.0) at Lawrenceville, Pa.

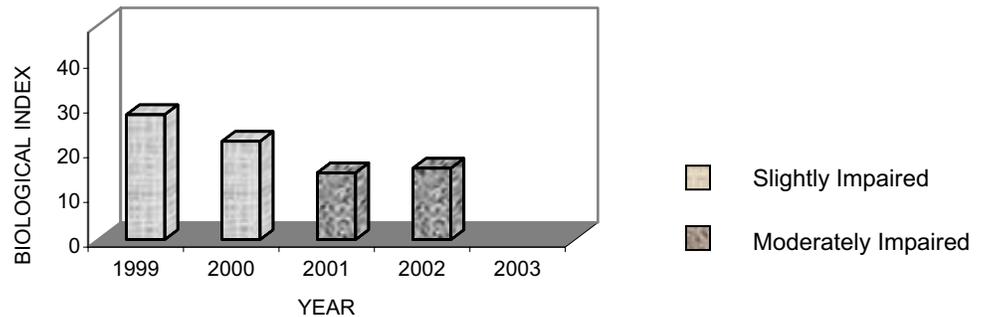
Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
TFe	09/23/03	427 ug/l	300 ug/l	N.Y. aquatic (chronic)
TAI	09/23/03	328 ug/l	100 ug/l	N.Y. aquatic (chronic)
TFe	12/18/03	5340 ug/l	300 ug/l	N.Y. aquatic (chronic)
TFe	12/18/03	5340 ug/l	1500 ug/l	Pa. aquatic life
TFe	02/18/04	655 ug/l	300 ug/l	N.Y. aquatic (chronic)
TAI	12/18/03	6700 ug/l	100 ug/l	N.Y. aquatic (chronic)
TAI	02/18/04	606 ug/l	100 ug/l	N.Y. aquatic (chronic)
TFe	05/04/04	429 ug/l	300 ug/l	N.Y. aquatic (chronic)
TAI	05/04/04	392 ug/l	100 ug/l	N.Y. aquatic (chronic)

Date	WQI	Parameters Exceeding 90 th Percentile							
09/23/03	38.3	DNH3	TNH3	TOC					
12/18/03	83.4	SS	DO	TS	TNH3	TP	TOC	TFe	TAI
		TPO4	TURB						
02/18/04	50.8	DO	TOC						
05/04/04	50.6	DO	TNO3						

Biological and Habitat Summary	
Number of Taxa	NA
Diversity Index	NA
RBP Score	NA
RBP Condition	NA
Total Habitat Score	NA
Habitat Condition Category	NA



Water Quality Index



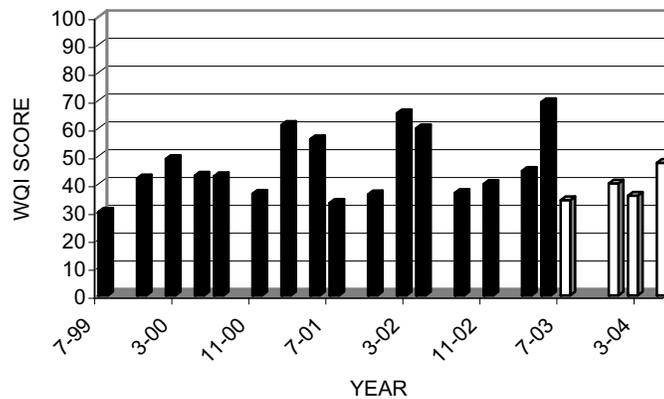
Biological Index

Table 46. Water Quality Summary Susquehanna River (SUSQ 365.0) at Windsor, N.Y.

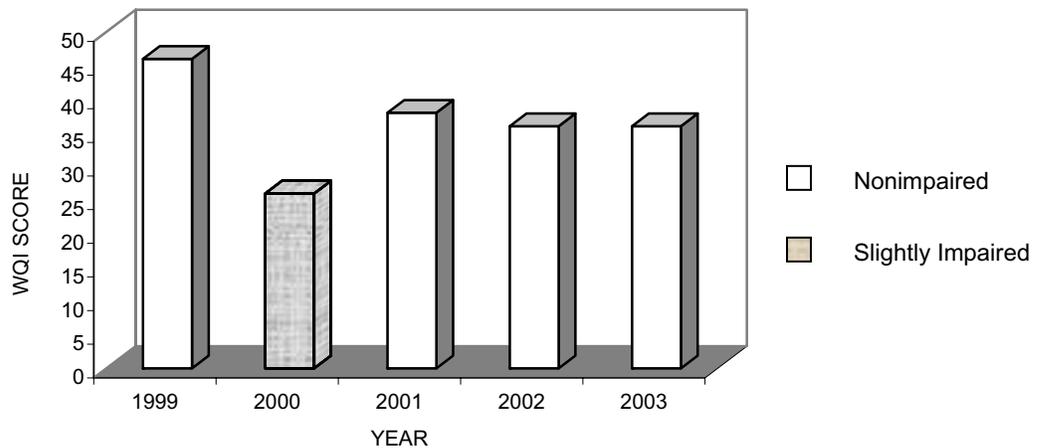
Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
TFe	12/17/03	307 ug/l	300 ug/l	N.Y. aquatic (chronic)
TFe	05/03/04	647 ug/l	300 ug/l	N.Y. aquatic (chronic)
TAI	05/03/04	375 ug/l	100 ug/l	N.Y. aquatic (chronic)

Date	WQI	Parameters Exceeding 90 th Percentile							
07/21/03	34.2	TEMP							
12/17/03	40.2	None							
02/17/04	35.8	None							
05/03/04	47.6	TS	TCl						

Biological and Habitat Summary	
Number of Taxa	27
Diversity Index	2.42
RBP Score	36
RBP Condition	Nonimpaired
Total Habitat Score	165
Habitat Condition Category	Excellent



Water Quality Index



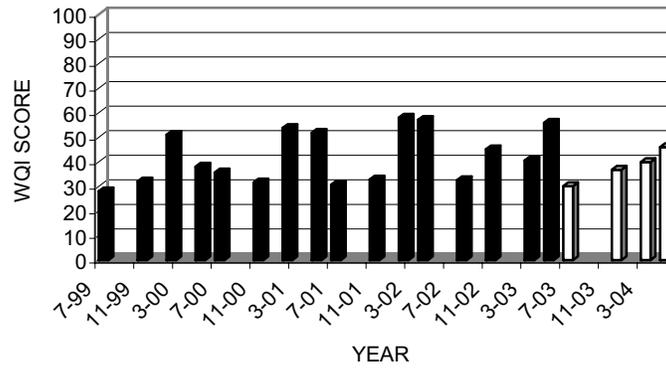
Biological Index

Table 47. Water Quality Summary Susquehanna River (SUSQ 340.0) at Kirkwood, N.Y.

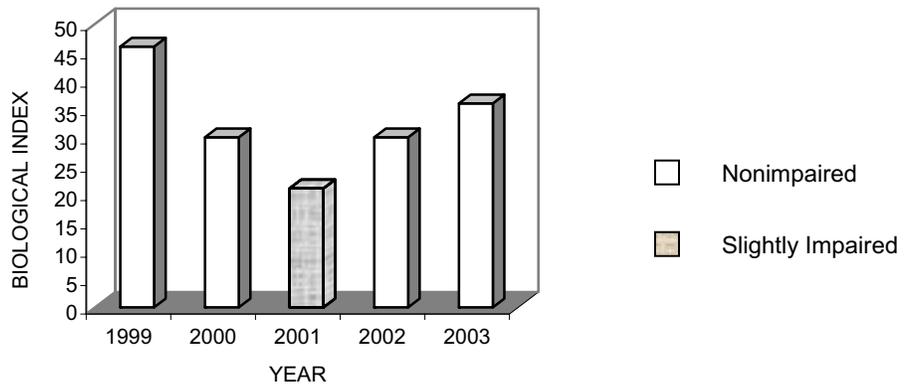
Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
TFe	12/17/03	356 ug/l	300 ug/l	N.Y. aquatic (chronic)
TFe	03/18/04	477 ug/l	300 ug/l	N.Y. aquatic (chronic)
TFe	05/03/04	624 ug/l	300 ug/l	N.Y. aquatic (chronic)
TAI	03/18/04	263 ug/l	100 ug/l	N.Y. aquatic (chronic)
TAI	05/03/04	373 ug/l	100 ug/l	N.Y. aquatic (chronic)

Date	WQI	Parameters Exceeding 90 th Percentile						
07/21/03	30.1	TEMP						
12/17/03	36.8	None						
03/18/04	39.9	None						
05/03/04	46.0	TEMP	DO	TCI				

Biological and Habitat Summary	
Number of Taxa	22
Diversity Index	2.18
RBP Score	36
RBP Condition	Nonimpaired
Total Habitat Score	162
Habitat Condition Category	Excellent



Water Quality Index



Biological Index

Susquehanna River at Sayre, Pa.
(SUSQ 289.1)

Due to high river flows throughout the 2003 sampling season, no macroinvertebrate sample was collected at the Susquehanna River at Sayre, Pa., (SUSQ 289.1). Total aluminum and total iron exceeded New York water quality standards during September, December, and May. Other parameters that were elevated compared to other Group 1 and 2 New York-Pennsylvania streams were temperature, several nutrient parameters, and total chloride (Table 48).

Susquehanna River at Marietta, Pa.
(SUSQ 44.5)

As river flows were very high throughout summer 2003, no macroinvertebrate sample or habitat information was collected on the Susquehanna River at Marietta, Pa., (SUSQ 44.5). No parameters exceeded Pennsylvania or Maryland water quality standards; however, several parameters, including dissolved oxygen, conductivity, temperature, and total organic carbon exceeded the 90th percentile (Table 49).

Susquehanna River at Conowingo, Md.
(SUSQ 10.0)

No macroinvertebrate sampling was performed in the Susquehanna River at Conowingo, Md., (SUSQ 10.0) due to deep waters and a lack of riffle habitat. During this sampling season, no parameters exceeded Pennsylvania or Maryland state standards. Parameters that exceeded the 90th percentile included temperature, dissolved oxygen, total sulfate, total manganese, and various other constituents (Table 50).

Tioga River (TIOG 10.8)

No macroinvertebrate sampling or habitat assessments occurred during 2003 on the Tioga River at Lindley, N.Y., (TIOG 10.8) due to high flows throughout the sampling season. Total iron exceeded New York water quality standards on three occasions, while total aluminum exceeded

New York standards every quarter during FY-2004. The Pennsylvania water quality standard for total iron also was exceeded in December 2003 (Table 51). Additional water quality analysis indicated that total manganese and total sulfate were consistently high through the sampling period.

Acid mine drainage problems exist in the headwaters of the Tioga River. The Tioga-Hammond Reservoir, located upstream of TIOG 10.8, alleviates some of the effects of acid mine drainage by buffering the outflow of Tioga Lake with alkaline waters stored in Hammond Lake. However, the effects of the acid mine drainage may still be observed downstream. Poor quality water from the Cowanesque River also may affect the Tioga River downstream of their confluence.

In 2001 and 2002, SRBC and Gannett Fleming, Inc. assessed the Pennsylvania portion of the Tioga River Watershed and developed a remediation strategy through the aid of a Pennsylvania Growing Greener Grant. SRBC created a report identifying acid mine drainage problem areas and prioritizing sites for treatment (Orr, 2003). This report also discusses treatment alternatives and makes predictions as to the possible treatment results.

Group 3 Sites

Babcock Run (BABC)

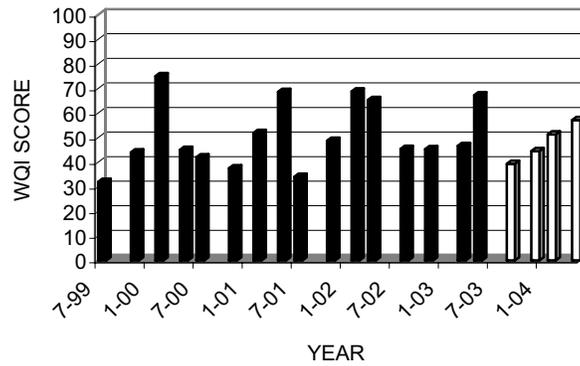
During May 2004, the macroinvertebrate community of Babcock Run near Cadis, Pa., was designated slightly impaired, with a low metric score for percentage of Chironomidae. Physical habitat conditions were designated excellent, and all field chemistry parameters were within acceptable limits. BABC is located in a mostly forested watershed.

Table 48. Water Quality Summary Susquehanna River (SUSQ 289.1) at Sayre, Pa.

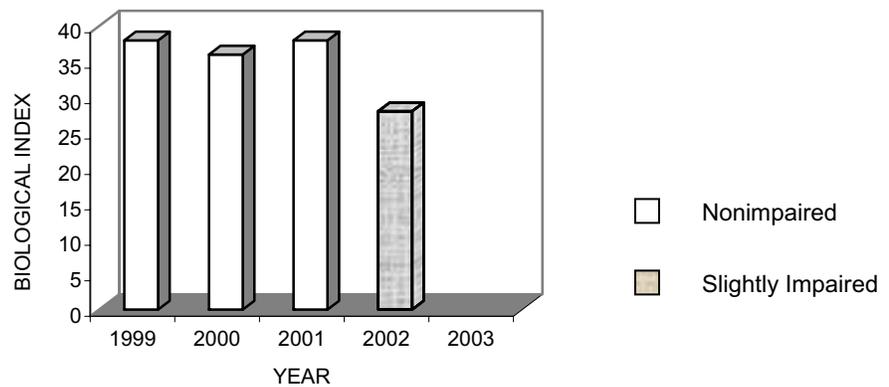
Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
TFe	09/23/03	583 ug/l	300 ug/l	N.Y. aquatic (chronic)
TAI	09/23/03	367 ug/l	100 ug/l	N.Y. aquatic (chronic)
TFe	12/17/03	517 ug/l	300 ug/l	N.Y. aquatic (chronic)
TFe	05/03/04	1420 ug/l	300 ug/l	N.Y. aquatic (chronic)
TAI	12/17/03	257 ug/l	100 ug/l	N.Y. aquatic (chronic)
TAI	05/03/04	1020 ug/l	100 ug/l	N.Y. aquatic (chronic)

Date	WQI	Parameters Exceeding 90 th Percentile					
09/23/03	39.3	None					
12/17/03	44.5	None					
02/17/04	51.3	SS	TN	TNH3	TNO3		
05/03/04	57.1	TEMP	TS	TN	TCI		

Biological and Habitat Summary	
Number of Taxa	NA
Diversity Index	NA
RBP Score	NA
RBP Condition	NA
Total Habitat Score	NA
Habitat Condition Category	NA



Water Quality Index



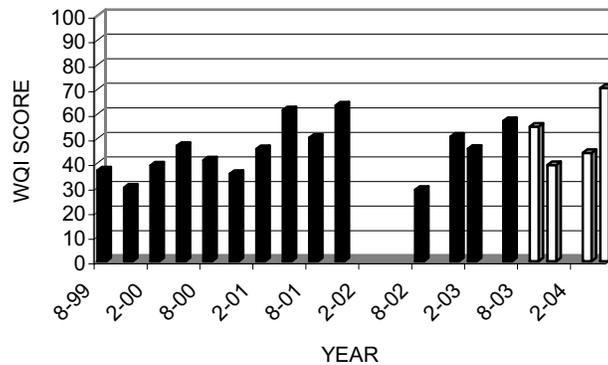
Biological Index

Table 49. Water Quality Summary Susquehanna River (SUSQ 44.5) at Marietta, Pa.

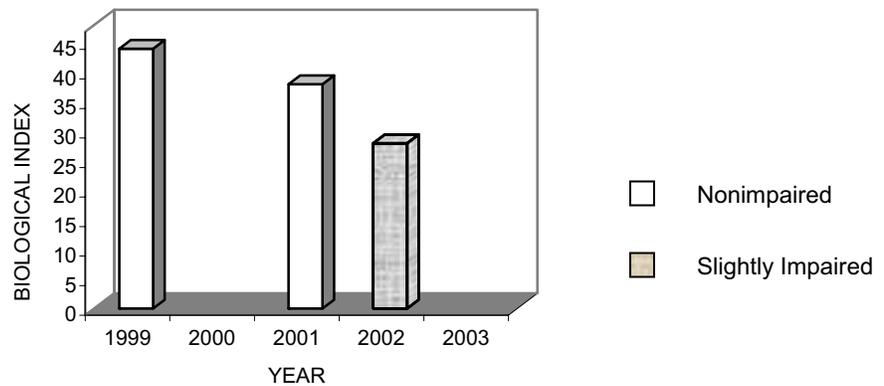
Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
None				

Date	WQI	Parameters Exceeding 90 th Percentile							
09/29/03	54.8	TP	TOC	TFe					
11/07/03	39.2	DO							
03/03/04	44.1	DO	TSO4	TMn					
05/06/04	70.5	SS	TEMP	COND	TS	TP	TOC	TAI	TURB

Biological and Habitat Summary	
Number of Taxa	NA
Diversity Index	NA
RBP Score	NA
RBP Condition	NA
Total Habitat Score	NA
Habitat Condition Category	NA



Water Quality Index

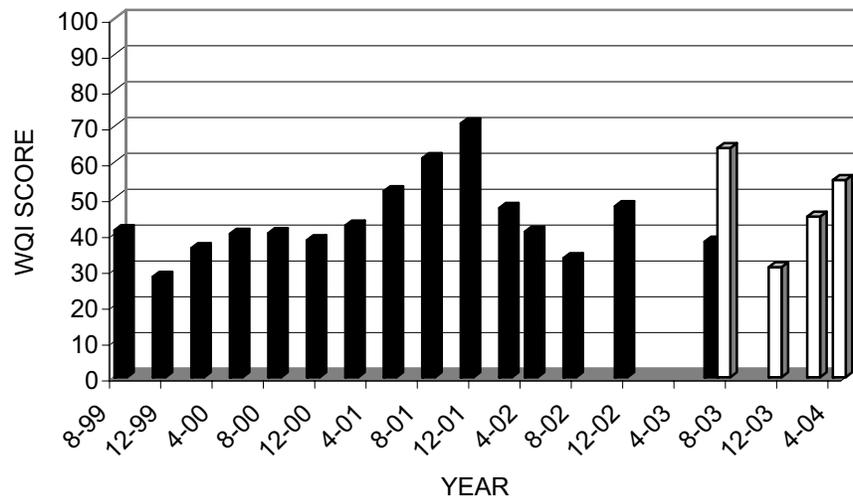


Biological Index

Table 50. Water Quality Summary Susquehanna River (SUSQ 10.0) at Conowingo, Md.

Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
None				

Date	WQI	Parameters Exceeding 90 th Percentile							
		TEMP	DO	COND	TS	DS	TNH3	TNO2	TOC
07/29/03	63.9	TSO4	TMn						
11/06/03	30.7	TEMP	DO						
02/11/04	44.8	None							
04/27/04	55.0	TEMP	DO	TSO4	TMn				



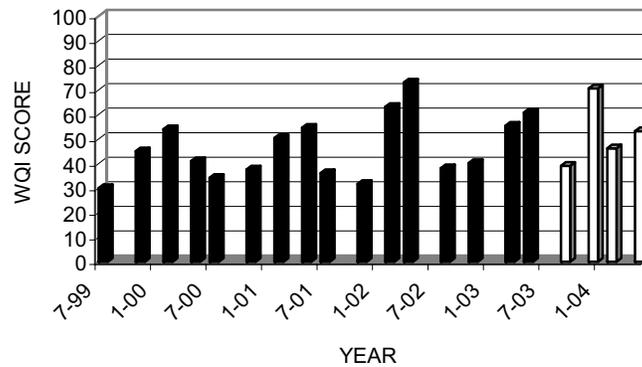
Water Quality Index

Table 51. Water Quality Summary Tioga River at Lindley, N.Y.

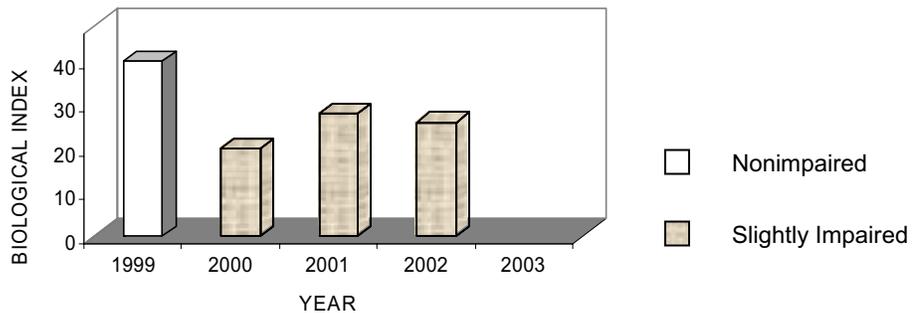
Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
TFe	09/23/03	723 ug/l	300 ug/l	N.Y. aquatic (chronic)
TAI	09/23/03	500 ug/l	100 ug/l	N.Y. aquatic (chronic)
TFe	12/18/03	3380 ug/l	300 ug/l	N.Y. aquatic (chronic)
TFe	12/18/03	3380 ug/l	1500 ug/l	Pa. aquatic life
TAI	12/18/03	3920 ug/l	100 ug/l	N.Y. aquatic (chronic)
TAI	02/18/04	223 ug/l	100 ug/l	N.Y. aquatic (chronic)
TFe	05/04/04	443 ug/l	300 ug/l	N.Y. aquatic (chronic)
TAI	05/04/04	375 ug/l	100 ug/l	N.Y. aquatic (chronic)

Date	WQI	Parameters Exceeding 90 th Percentile						
09/23/03	39.1	TOC						
12/18/03	70.6	DO	TSO4	TMn				
02/18/04	46.2	TSO4	TMn					
05/04/04	53.2	TSO4	TMn					

Biological and Habitat Summary	
Number of Taxa	NA
Diversity Index	NA
RBP III Score	NA
RBP III Condition	NA
Total Habitat Score	NA
Habitat Condition Category	NA



Water Quality Index



Biological Index

Beagle Hollow Run (BEAG)

Slightly impaired biological conditions existed at Beagle Hollow Run near Osceola, Pa., during May 2004. The sample contained a large number of organic pollution-intolerant organisms; however, the percentage of Chironomidae was rather high. Habitat conditions were considered excellent, with a large amount of woody debris located in this forested stream, and all field chemistry parameters were within natural ranges.

Bill Hess Creek (BILL)

Bill Hess Creek near Nelson, Pa., was designated nonimpaired, with a high diversity index and a high EPT Index. The habitat was rated excellent, with a low score given only for velocity/depth regimes. All field chemistry parameters were within acceptable limits.

Bird Creek (BIRD)

Bird Creek near Webb Mills, N.Y., was designated nonimpaired. This site had a high EPT Index and was dominated by an organic pollution intolerant mayfly, *Epeorus*. The habitat was designated excellent and was located in a predominantly forested area. All field chemistry parameters fell within acceptable ranges. High flows due to heavy rains the previous evening were noted at the time of sampling.

Biscuit Hollow (BISC)

Nonimpaired biological conditions existed at Biscuit Hollow near Austinburg, Pa., during this survey, with a low percentage of dominant taxa and a high EPT Index. This is a dramatic improvement from the moderately impaired conditions found the previous year. The physical habitat at this site was considered supporting, with poor scores given for instream cover, velocity/depth regimes, and riparian vegetative zone width. The site had slightly eroded banks and was located in an area dominated by abandoned fields and lightly used pasture, downstream of numerous old beaver dams. Field chemistry parameters were within acceptable ranges.

Briggs Hollow Run (BRIG)

Briggs Hollow Run near Nichols, N.Y., was designated slightly impaired during the 2004 sampling season, with poor metric scores for EPT Index and percentage of dominant taxa. The sample at BRIG was heavily dominated by the pollution-sensitive mayfly, *Epeorus*, which comprised nearly 45 percent of the organisms. The physical habitat was designated excellent, and all field chemistry parameters were within acceptable limits. Human refuse was noted in the stream at the time of sampling.

Bulkley Brook (BULK)

Bulkley Brook near Knoxville, Pa., had a slightly impaired biological community and excellent habitat conditions during the 2003-2004 sampling season. BULK is located in a forested area downstream of a beaver dam. Field chemistry indicated that all parameters were within acceptable limits.

Camp Brook (CAMP)

Camp Brook near Osceola, Pa., had a slightly impaired biological community in May 2004, with low scores for EPT Index and percentage of Chironomidae. The physical habitat of the stream was designated excellent; high scores were given for channel alteration, frequency of riffles, condition of banks, vegetative protective cover, and riparian vegetative zone width. All field chemistry parameters were normal.

Cook Hollow (COOK)

Cook Hollow near Austinburg, Pa., had a slightly impaired biological community. This site had a high diversity index and taxonomic richness, but scored poorly for percentage of Chironomidae. The habitat was rated excellent, and field chemistry parameters were all within acceptable limits.

Deep Hollow Brook (DEEP)

The biological community of Deep Hollow Brook near Danville, N.Y., was designated

nonimpaired with excellent physical habitat. This site had the highest taxonomic richness, Shannon Diversity Index value, and EPT Index of all the Group 3 stations. Alkalinity (10 mg/l) exceeded the Pennsylvania aquatic life standard, as it has in previous years. The pH value (6.25) also exceeded the New York general water quality standard. DEEP is located in a mostly forested area, interspersed with scattered cropland and old fields, downstream of a beaver dam.

Denton Creek (DENT)

Denton Creek near Hickory Grove, Pa., had a moderately impaired biological community during May 2004. DENT was dominated by pollution tolerant Chironomidae and had poor scores for several metrics, including EPT Index, percentage of Chironomidae, and percentage of dominant taxon. The habitat was rated excellent with high scores for condition of banks and vegetative protective cover; however, this sampling site was located downstream of Hawkins Lake. The lake is not heavily used since swimming, boating, and camping are not allowed, but it still impacts water quality on Denton Creek. DENT had low pH (6.35) and the lowest alkalinity (8.0 mg/l) of all the Group 3 sites (Table A3). These pH and alkalinity values exceeded the New York and Pennsylvania water quality standards, respectively.

Dry Brook (DRYB)

Dry Brook at Waverly, N.Y., was designated moderately impaired in May 2004, with the lowest metric scores for percent Ephemeroptera, percent Chironomidae, and percent dominant taxon. This stream runs directly through residential and commercial areas in the town of Waverly and has partially supporting habitat conditions due to channel alteration and lack of vegetated riparian zone. A large amount of human refuse was noted in the stream at the time of sampling. All field chemistry parameters were within acceptable limits.

Little Wappasening Creek (LWAP)

The biological community of Little Wappasening Creek near Nichols, N.Y., was

designated nonimpaired in May 2004. This site was rated slightly impaired in 2003, nonimpaired the previous year, and moderately impaired prior to that, indicating this stream quality fluctuates. The high-cut banks with areas of erosion indicate large fluctuations in flow. The land cover is mostly forested, with some agriculture in the headwaters. The habitat was rated excellent with good stream cover. In 2001, dredging equipment was found in the stream, and timber was being removed from the streambanks. In 2002 and 2003, no evidence of dredging or timber removal was noted. All field chemistry parameters were normal.

Parks Creek (PARK)

In 2003, the location of the site for Parks Creek near Litchfield, N.Y., was moved upstream slightly due to logging at the previous sampling site. PARK had a slightly impaired biological community during the 2004 sampling season. This site had highest percent Ephemeroptera and lowest percent Chironomidae of all Group 3 streams; however, the percent dominant taxon was high, due to the large number of the organic pollution intolerant mayfly, *Epeorus*. The site had excellent habitat, with high scores for a number of parameters, including instream cover, epifaunal substrate, and vegetative riparian zone width. The predominant land use is forested, with a considerable amount of woody debris and fallen trees in the stream channel. At the time of sampling, high flows were noted, due to heavy rain the previous evening. All field chemistry parameters were within acceptable ranges.

Prince Hollow Run (PRIN)

Prince Hollow Run near Cadis, Pa., was designated slightly impaired in May 2004, after being severely impaired in 2002. The habitat was rated as supporting, with low scores for vegetative protective cover and riparian vegetative zone width. Heavy algal growth was noted at the time of sampling. Alkalinity was low (18 mg/l) and exceeded the Pennsylvania aquatic life standard (Table A3).

Russell Run (RUSS)

Russell Run near Windham, Pa., was designated slightly impaired after being nonimpaired the previous year. Poor metric scores were given for taxonomic richness, EPT Index, and percent dominant taxon. However, the dominant taxon was pollution-intolerant *Epeorus*. The habitat was considered excellent, with high scores given for sediment deposition, channel alteration, and frequency of riffles. All field chemistry parameters were normal.

Sackett Creek (SACK)

The biological condition of Sackett Creek near Nichols, N.Y., was designated slightly impaired, and the physical habitat was excellent. SACK had the lowest Hilsenhoff Biotic Index of all Group 3 sites, as well as a high percent Ephemeroptera, and a low percent Chironomidae. The percent dominant taxon was high, but the taxon in question was the pollution-intolerant mayfly, *Epeorus*. All field chemistry parameters were within normal ranges. High flows due to recent rain events were noted at the time of sampling.

Smith Creek (SMIT)

Smith Creek near East Lawrence, Pa., served as the reference site for the Group 3 streams during May 2004. This site had the best combination of biological, habitat, and field chemistry conditions of the Group 3 streams. This small stream drains a wetland area and mixed coniferous forest, and the habitat was rated excellent, with high scores for a number of parameters, including channel alteration, frequency of riffles, and condition of banks. There were no extreme values in the field chemistry parameters.

Strait Creek (STRA)

A nonimpaired biological community existed at Strait Creek near Nelson, Pa., during fiscal year 2004. The site had a high EPT Index, but a large number of Chironomidae. The physical habitat was designated excellent and all field chemistry parameters were within normal limits.

White Branch Cowanesque River (WBCO)

In May 2004, White Branch Cowanesque River near North Fork, Pa., was designated moderately impaired with the worst metric scores in taxonomic richness, diversity index, Hilsenhoff Biotic Index, and EPT Index. This site had been nonimpaired in May 2000 with a number of pollution intolerant taxa, and then it degraded to moderately impaired during May 2001 and May 2002, and severely impaired in May 2003. The sample was dominated by the pollution tolerant caddisfly taxon, *Cheumatopsyche* (Trichoptera: Hydropsychidae), comprising 55.4 percent of the sample. The habitat was partially supporting due to low scores in embeddedness, vegetative protective cover, and riparian vegetative zone width. Cows had direct access to the stream in a pasture upstream of the sampling site, and sediment was deep in spots. Field chemistry measurements were within acceptable ranges.

White Hollow (WHIT)

White Hollow near Wellsburg, N.Y., was designated slightly impaired in fiscal year 2004, after serving as the reference site in May 2003. This site had a high percent Ephemeroptera, and a low Hilsenhoff Biotic Index and percent Chironomidae, but a high percent dominant taxon and a low EPT Index, when compared to other Group 3 streams. However, the dominant taxon in this sample was pollution-intolerant *Epeorus*. The physical habitat was excellent, with a large amount of woody debris, in this mostly forested stream. All water chemistry parameters were normal.

MANAGEMENT IMPLICATIONS

Long-term studies of this nature are critical to establish water quality trends and understand biological conditions. To effectively manage the resources, officials and local interest groups must have a true picture of ecological dynamics and possible problem areas, which can only be obtained through long-term studies such as this one.