BIOASSESSMENT OF INTERSTATE STREAMS

Abbreviations for water quality standards are provided in Table 22. 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 2002 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 slightly impaired biological community during fiscal year 2002, degraded from a nonimpaired designation the previous year. The number of taxa and diversity index score were much lower than the previous year. In fact, the number of taxa was half the number of the previous year (12 versus 24), and it was the lowest score of all the New York-Pennsylvania border streams (Table 23).

Total iron exceeded water quality standards during July 2001, as in July 1999 and 2000. Total and dissolved iron, total and dissolved ammonia, and total and dissolved manganese exceeded the 90th percentile. The WQI increased slightly from the previous year as it has done over the past five years (Table 23).

Bentley Creek (BNTY 0.9)

A slightly impaired biological community existed at Bentley Creek at Wellsburg, N.Y., (BNTY 0.9). Biological conditions at BNTY 0.9 have been impaired for the past 11 years. This could be due to heavy disturbances caused by dredging and the unstable nature of this glacial stream. The habitat assessment scores were lower in channel alteration, sediment deposition, instream cover, channel flow status, condition of banks, and vegetated riparian zone width. The Bradford County Conservation District in Pennsylvania and the U.S. Fish and Wildlife Service are conducting a stream stabilization project on this stream. Rock structures, such as cross vanes and single rock vanes, have been constructed into 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 concentrations exceeded New York standards during February and May 2000, but no values exceeding standards were found in fiscal year 2001 or 2002 (Table 24).

Cascade Creek (CASC 1.6)

Cascade Creek at Lanesboro, Pa., (CASC 1.6) was not sampled for macroinvertebrates and water quality in July 2001 due to drought conditions.

Cascade Creek was added to the Group 1 streams during the 2000 sampling season to monitor conditions in the stream during the winter months. Water quality standards for total iron, dissolved iron, and alkalinity were exceeded during the 2000-2001 and 2001-2002 sampling period (Table 25). Iron values fluctuated throughout the year and were highest during the November sampling, which was also the sample with the lowest corresponding flow.

Cayuta Creek (CAYT 1.7)

Biological conditions of Cayuta Creek at Waverly, N.Y., (CAYT 1.7) were designated slightly impaired, same as the two previous years. This site had the lowest percentage of Chironomidae (10 percent) compared to the other New York-Pennsylvania border streams. Even though no water quality standards were exceeded at CAYT 1.7, this site had the highest values of total chloride (104 milligrams per liter (mg/l)), conductivity (642 micromhos/centimeter (µmhos/cm)), total phosphorus (0.17 mg/l), dissolved phosphorus (0.142 mg/l), dissolved orthophosphate (0.14 mg/l), and total orthophosphate (0.148 mg/l) of all interstate streams in fiscal year 2002 (Table A1). Many parameters exceeded the 90th percentile including dissolved oxygen, conductivity, total and

dissolved nitrates, total and dissolved phosphorus, total and dissolved orthophosphate, total chloride, total and dissolved nitrogen, and total and dissolved solids (Table 26). The total chlorine values were 0.09 mg/l in July, 0.11 mg/l in November, and 0.1 mg/l in February and April.

Poor water quality conditions may be due to a variety of causes, including wastewater discharges from the Waverly sewage treatment facility, runoff from the city of Waverly, failure of upstream septic systems, or agriculture. More detailed studies would need to be performed in order to determine the cause of impairment.

Cayuta Creek showed 11 decreasing trends and only one increasing trend for total concentrations. Total nitrogen showed a significant decreasing trend ($0.05<p<0.10$), while strong, significant decreasing trends ($p<0.05$) were observed for total ammonia, total phosphorus, total sulfate, total iron, and total manganese (Table 19). A strong, increasing trend was calculated only for total chloride. When flow-adjusted concentrations were calculated, total ammonia, total nitrogen, total phosphorus, total sulfate, and total manganese showed strong, significant, decreasing trends (Table 19).

Choconut Creek (CHOC 9.1)

The biological index score for Choconut Creek at Vestal Center, N.Y., (CHOC 9.1) has been decreasing over the past five years. After four years of being designated nonimpaired, the designation changed to slightly impaired in fiscal year 2002. Some of the organic pollution intolerant taxa present in fiscal year 2001, that were not found in the fiscal year 2002 sample, included *Stenonema* (Ephemeroptera: Heptageniidae), *Nigronia* (Megaloptera: Corydalidae), *Ophiogomphus* (Odonata: Gomphidae), and *Agnetina* (Plecoptera: Perlidae). The habitat was rated supporting with low ratings for riparian vegetative zone and vegetative protective cover.

No parameters exceeded standards during July 2001, although the WQI was slightly higher than it has been in the past four years. No parameters exceeded the 90th percentile (Table 27). Large amounts of riprap were present at this site, and upstream hay fields recently had been mowed, which decreased the habitat rating.

Little Snake Creek (LSNK 7.6)

Little Snake Creek at Brackney, Pa., (LSNK 7.6) was not sampled for macroinvertebrates in July 2002 due to drought conditions. Water quality values exceeded standards for total iron and alkalinity (Table 28). Total iron values were lower than in fiscal year 2001, and total aluminum did not exceed standards as it did in fiscal year 2001.

Table 22. Abbreviations Used in Tables 23 Through 53

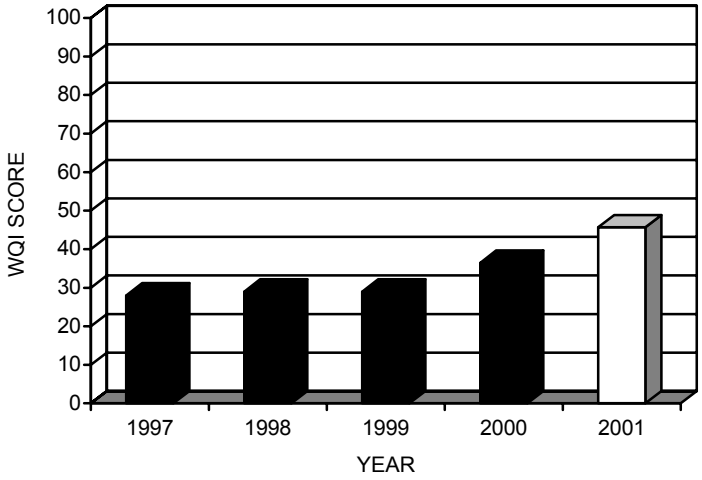
Abbreviation	Parameter	Abbreviation	Parameter
ALK	Alkalinity	DNO3	Dissolved Nitrate
COND	Conductivity	TNO3	Total Nitrate
DAl	Dissolved Aluminum	DN	Dissolved Nitrogen
TAl	Total Aluminum	TN	Total Nitrogen
TCa	Total Calcium	DO	Dissolved Oxygen
TCl	Total Chloride	DP	Dissolved Phosphorus
DFe	Dissolved Iron	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
		RBP	Rapid Bioassessment Protocol

Table 23. Water Quality Summary Apalachin Creek at Little Meadows, Pa.

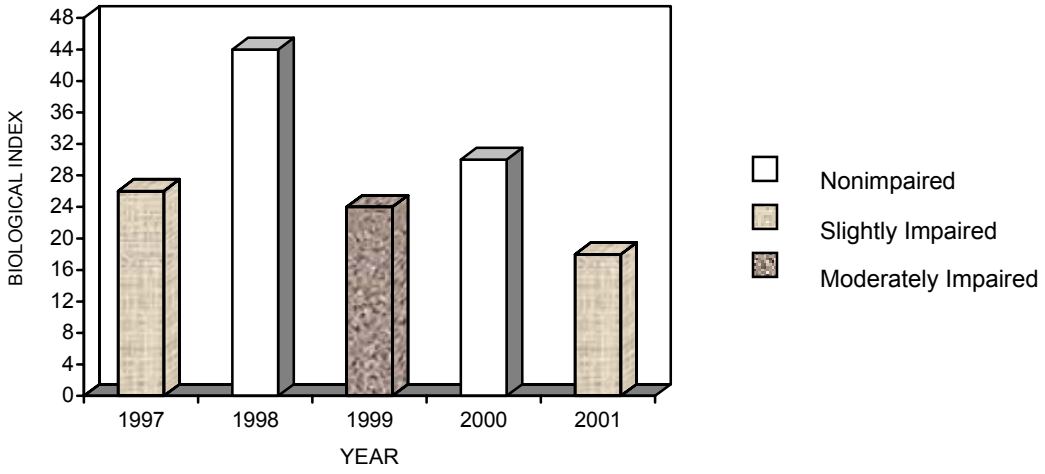
Parameters Exceeding Standards				
Parameter	**Date**	**Value**	**Standard**	**State**
TFe	07/25/01	598 µg/l	300 µg/l	N.Y. aquatic (chronic)

Date	**WQI**	**Parameters Exceeding 90th Percentile**							
07/25/01	45.7	DNH3	TNH3	TFE	DFE	TMN	DMN		

Biological and Habitat Summary	
Number of Taxa	12
Diversity Index	1.83
RBP Score	18
RBP Condition	Slightly Impaired
Total Habitat Score	130
Habitat Condition Category	Excellent



Water Quality Index



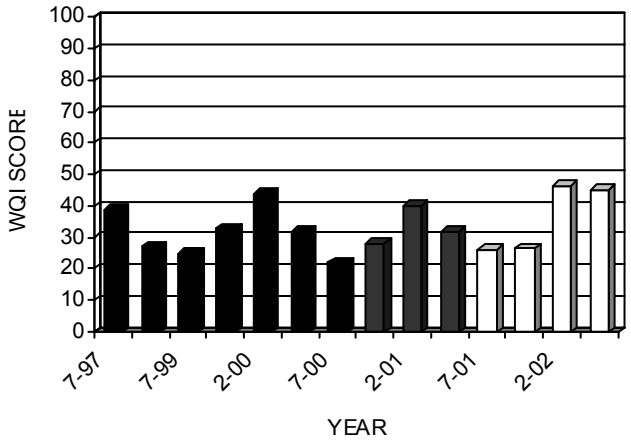
Biological Index

Table 24. Water Quality Summary Bentley Creek at Wellsburg, N.Y.

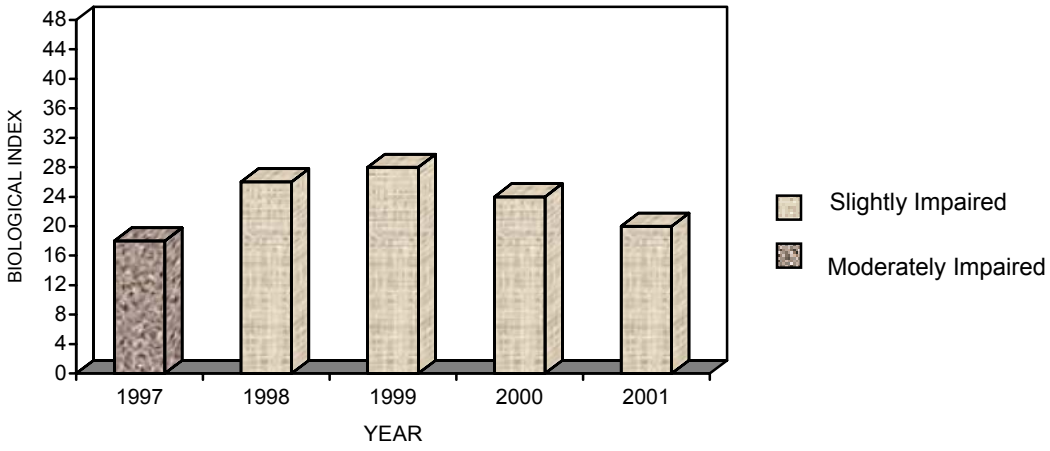
Parameters Exceeding Standards				
Parameter	**Date**	**Value**	**Standard**	**State**
None				

Date	WQI	Parameters Exceeding 90th Percentile							
07/24/01	26.3	None							
11/06/01	26.7	None							
02/26/02	46.5	DO							
04/23/02	45.2	None							

Biological and Habitat Summary	
Number of Taxa	16
Diversity Index	2.0
RBP III Score	20
RBP III Condition	Slightly Impaired
Total Habitat Score	110
Habitat Condition Category	Supporting



Water Quality Index



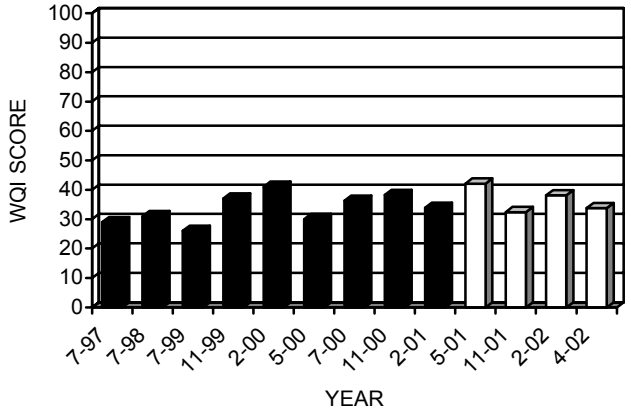
Biological Index

Table 25. Water Quality Summary Cascade Creek at Lanesboro, Pa.

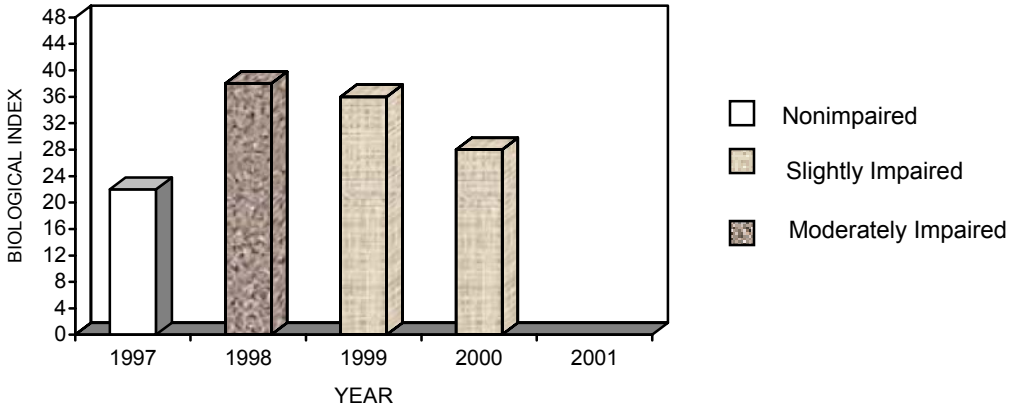
Parameters Exceeding Standards				
Parameter	**Date**	**Value**	**Standard**	**State**
DFe	11/05/01	421 µg/l	300 µg/l	Pa. aquatic life
TFe	11/05/01	750 µg/l	300 µg/l	N.Y. aquatic (chronic)
ALK	02/25/02	16 mg/l	20 mg/l	Pa. aquatic life
ALK	04/22/02	18 mg/l	20 mg/l	Pa. aquatic life

Date	**WQI**	**Parameters Exceeding 90th Percentile**							
11/05/01	32.4	TFe	DFe						
02/25/02	38.1	DO							
04/22/02	33.8								

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



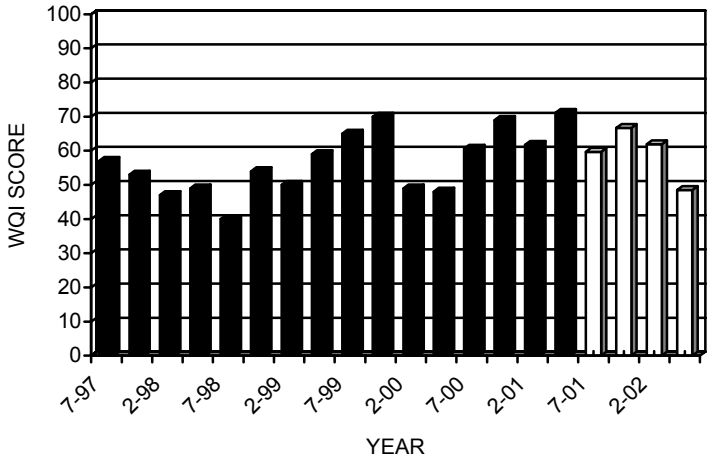
Biological Index

Table 26. Water Quality Summary Cayuta Creek at Waverly, N.Y.

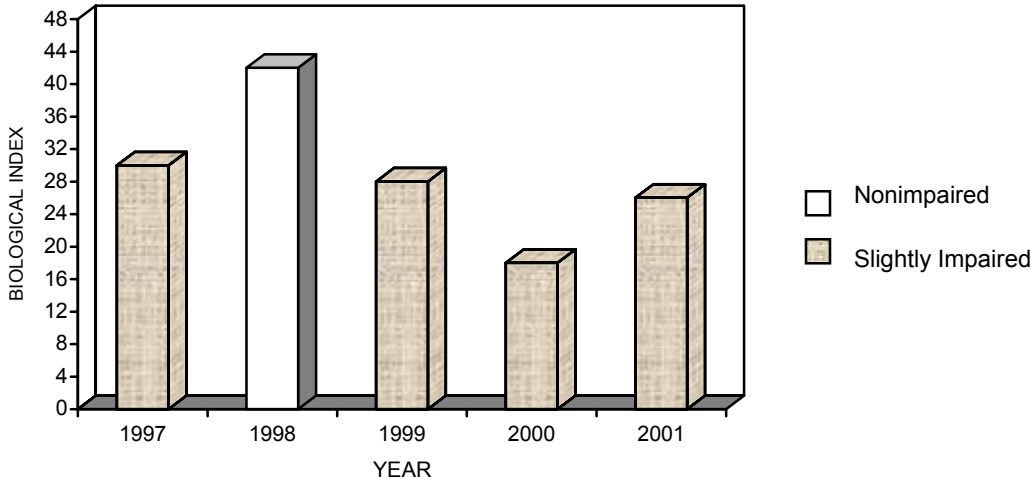
Parameters Exceeding Standards				
Parameter	**Date**	**Value**	**Standard**	**State**
None				

Date	WQI	Parameters Exceeding 90th Percentile							
07/24/01	59.7	COND	DS	TS	DP	TP	DPO4	TPO4	TCl
11/06/01	66.7	COND	DS	TS	DN	TN	DNO3	TNO3	DP
		TP	DPO4	TPO4	TCl				
02/26/02	61.9	DO	DP	TP	DPO4	TPO4			
04/23/02	48.5	None							

Biological and Habitat Summary	
Number of Taxa	16
Diversity Index	2.3
RBP Score	26
RBP Condition	Slightly Impaired
Total Habitat Score	138
Habitat Condition Category	Excellent



Water Quality Index



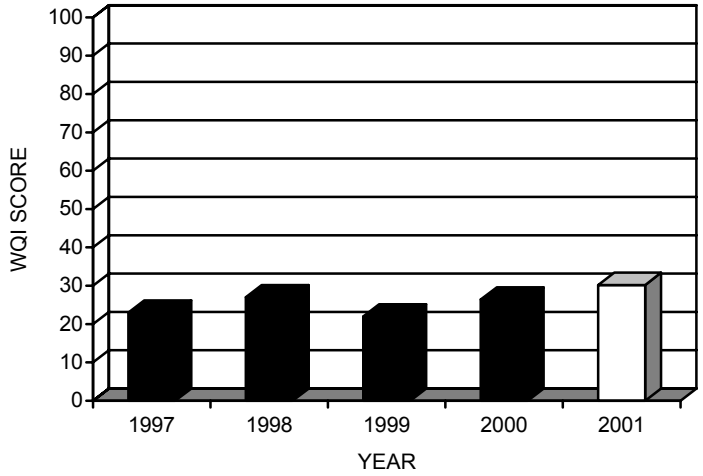
Biological Index

Table 27. Water Quality Summary Choconut Creek at Vestal Center, N.Y.

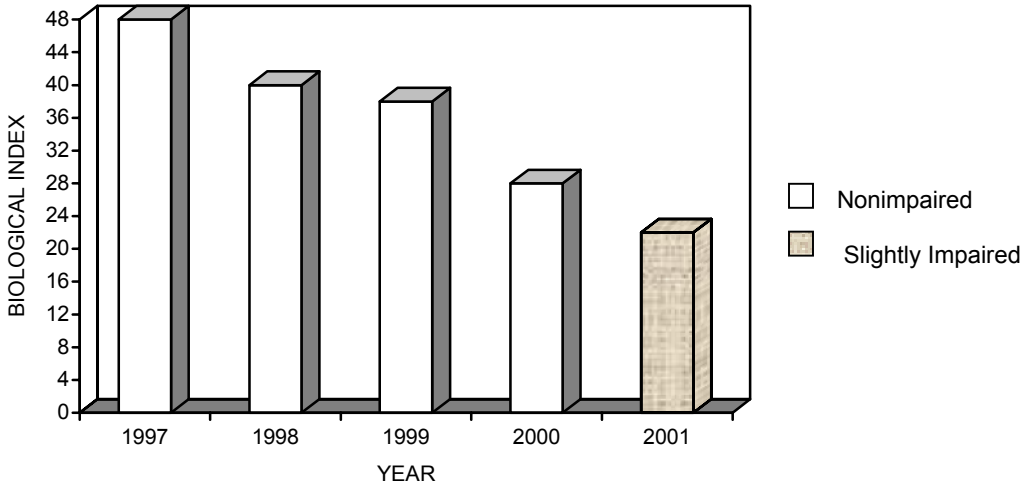
Parameters Exceeding Standards				
Parameter	**Date**	**Value**	**Standard**	**State**
None				

Date	WQI	Parameters Exceeding 90th Percentile							
07/25/01	30.2	None							

Biological and Habitat Summary	
Number of Taxa	20
Diversity Index	2.1
RBP Score	22
RBP Condition	Slightly Impaired
Total Habitat Score	121
Habitat Condition Category	Supporting



Water Quality Index



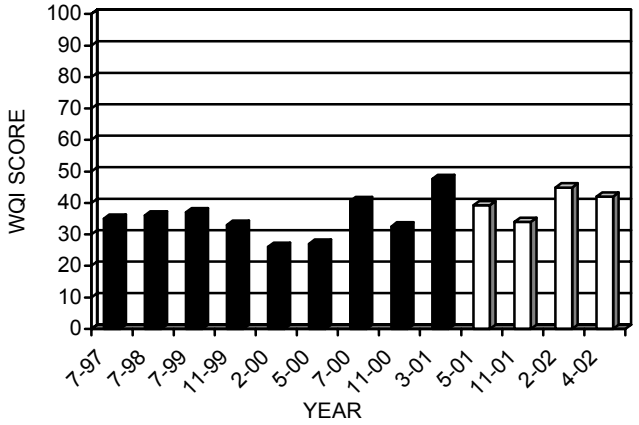
Biological Index

Table 28. Water Quality Summary Little Snake Creek at Brackney, Pa.

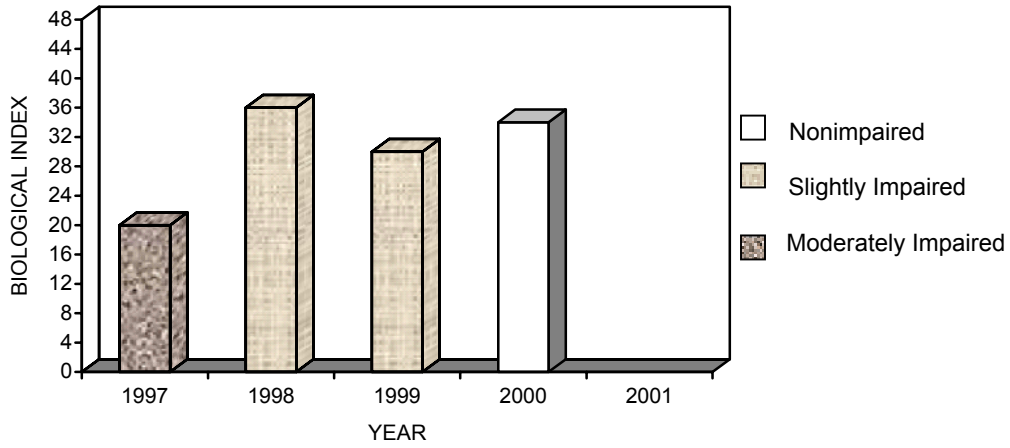
Parameters Exceeding Standards				
Parameter	**Date**	**Value**	**Standard**	**State**
TFe	11/05/01	390 µg/l	300 µg/l	N.Y. aquatic (chronic)
ALK	02/25/02	18 mg/l	20 mg/l	Pa. aquatic life
TFe	04/22/02	308 µg/l	300 µg/l	N.Y. aquatic (chronic)

Date	WQI	Parameters Exceeding 90th Percentile							
11/05/01	34.0	None							
02/25/02	44.9	DO	DFe						
04/22/02	42.0	DFe							

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

Seeley Creek (SEEL 10.3)

During the 1999-2000 sampling season, Seeley Creek was added to the Group 1 streams in the ISWQN. Seeley Creek at Seeley Creek, N.Y., (SEEL 10.3) contained a moderately impaired biological community for the past five years. In July 2001, this site scored the worst of the New York-Pennsylvania border streams in Hilsenhoff Index (5.29), percent dominant taxa (68.9 percent), percent Chironomidae (68.9 percent), and Shannon-Weaver Diversity Index (1.27) metrics. Chironomidae heavily dominated this site as in the previous year. The WQI was slightly higher than in previous years, except for the November 2001 sample. However, no parameters exceeded standards, and only dissolved oxygen and total sulfate exceeded the 90th percentile (Table 29).

Habitat conditions appear to be a possible cause for the moderately impaired macroinvertebrate community. New York State Department of Conservation (NYSDEC) listed Seeley Creek as "threatened" in its publication, The 1998 Chemung River Basin Waterbody Inventory and Priority Waterbodies List (NYSDEC, 1998). According to this publication, the stream is threatened by habitat alteration, streambank erosion, and instability of the stream channel. SRBC staff saw evidence of dredging and assigned low habitat assessment scores for channel alteration, instream cover, velocity/depth regimes, and channel flow status.

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, excellent physical habitat, and a relatively low WQI score with no parameters exceeding standards (Table 30). The biological community has remained nonimpaired for the past five years. Snake Creek supported many pollution intolerant taxa, including *Atherix* (Diptera: Athericidae), *Antocha* (Diptera: Tipulidae), *Dicranota* (Diptera: Tipulidae), *Hexatoma* (Diptera: Tipulidae), *Ephemerella* (Ephemeroptera: Ephemerellidae), *Epeorus* (Ephemeroptera: Heptageniidae), *Leucrocuta* (Ephemeroptera: Heptageniidae), *Stenonema, Isonychia* (Ephemeroptera: Isonychiidae), *Nigronia*, *Leuctra* (Plecoptera: Leuctridae), *Acroneuria* (Plecoptera: Perlidae), *Agnetina*, and *Dolophilodes* (Trichoptera: Philopotamidae).

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 2002, South Creek at Fassett, Pa., (SOUT 7.8) had a slightly impaired biological community. 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.

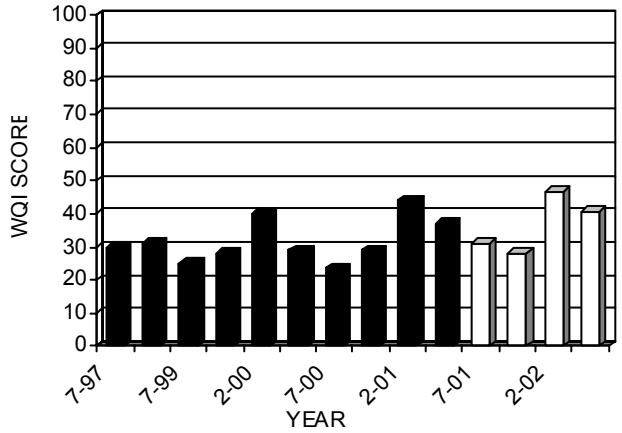
No water quality parameters exceeded standards; however, total and dissolved ammonia exceeded the 90th percentile for New York-Pennsylvania border streams (Table 31). The WQI was lowest in the same year (1998) when the macroinvertebrate population was nonimpaired. SRBC staff noted the stream had been impaired by recent flooding. Impairment of the biological community at this site may be due to periodic drying of the streambed or to poor habitat diversity.

Table 29. Water Quality Summary Seeley Creek at Seeley Creek, N.Y.

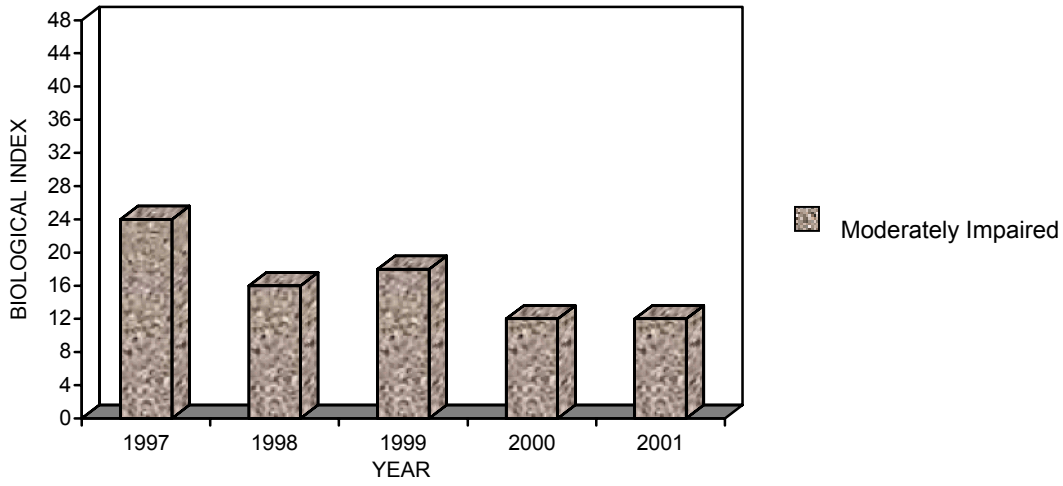
Parameters Exceeding Standards				
Parameter	**Date**	**Value**	**Standard**	**State**
None				

Date	WQI	Parameters Exceeding 90th Percentile							
07/24/01	31.1	TSO4							
11/06/01	28	None							
02/26/02	46.7	DO							
04/23/02	40.7	None							

Biological and Habitat Summary	
Number of Taxa	15
Diversity Index	1.3
RBP III Score	12
RBP III Condition	Moderately Impaired
Total Habitat Score	129
Habitat Condition Category	Excellent



Water Quality Index



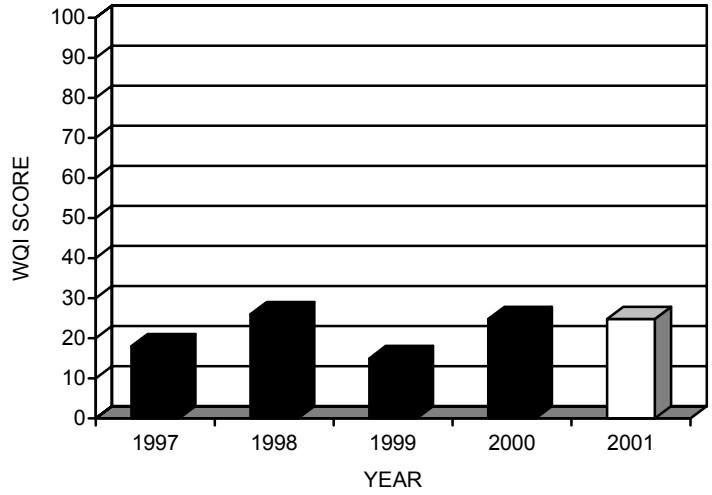
Biological Index

Table 30. Water Quality Summary Snake Creek at Brookdale, Pa.

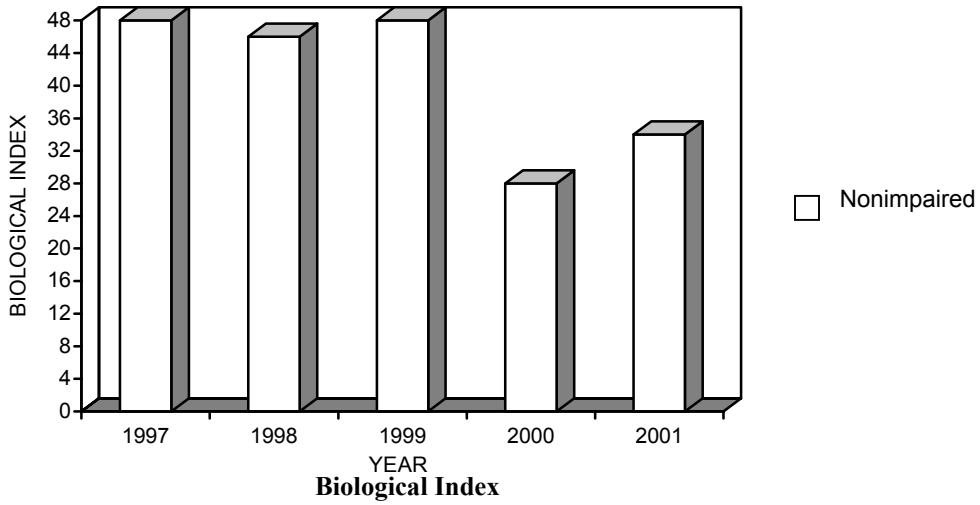
Parameters Exceeding Standards				
Parameter	**Date**	**Value**	**Standard**	**State**
None				

Date	WQI	Parameters Exceeding 90th Percentile							
07/25/01	24.8	None							

Biological and Habitat Summary	
Number of Taxa	25
Diversity Index	2.6
RBP III Score	34
RBP III Condition	Reference
Total Habitat Score	139
Habitat Condition Category	Reference



Water Quality Index



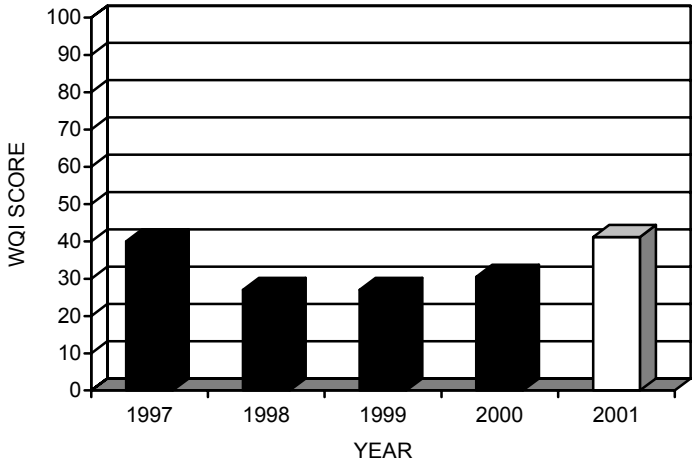
Biological Index

Table 31. Water Quality Summary South Creek at Fassett, Pa.

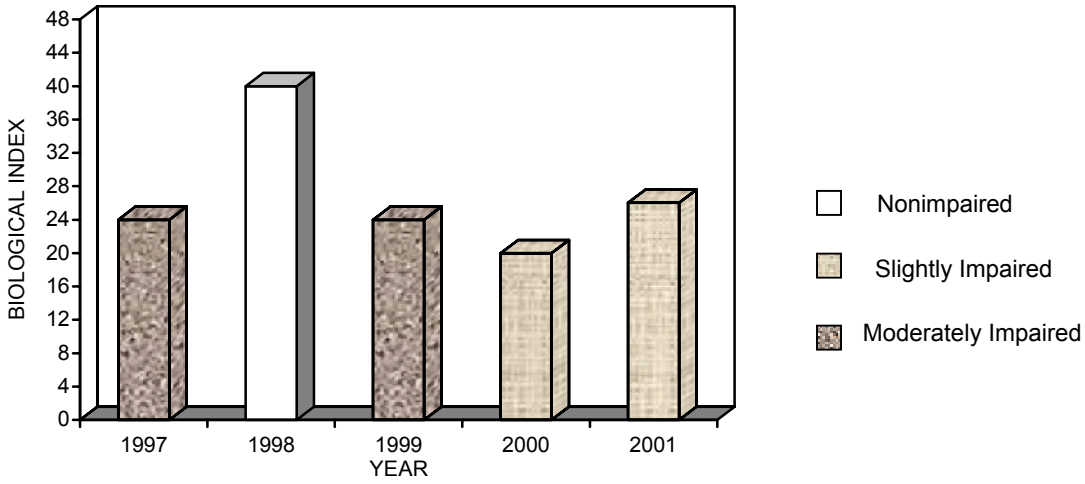
Parameters Exceeding Standards				
Parameter	**Date**	**Value**	**Standard**	**State**
None				

Date	WQI	Parameters Exceeding 90th Percentile							
07/24/01	41.2	DNH3	TNH3						

Biological and Habitat Summary	
Number of Taxa	15
Diversity Index	2.1
RBP III Score	26
RBP III Condition	Slightly Impaired
Total Habitat Score	135
Habitat Condition Category	Excellent



Water Quality Index



Biological Index

Troups Creek (TRUP 4.5)

Troups Creek at Austinburg, Pa., (TRUP 4.5) had a slightly impaired biological community. It had the worst scores in percent Ephemeroptera (0.83 percent) and number of EPT taxa (5); however, it had the best percent dominant taxa score (22.3 percent) of all the New York-Pennsylvania border streams. Dissolved oxygen and total aluminum exceeded standards, and dissolved oxygen, total aluminum, total orthophosphate, and turbidity exceeded the 90th percentile in the WQI scoring (Table 32).

Troups Creek had four increasing trends and four decreasing trends. Strong, increasing trends were shown for unadjusted concentrations of total chloride and flow-adjusted WQI scores. Increasing trends were seen in total solids concentrations and total phosphorus flow-adjusted concentrations. Strong decreasing trends were evident for unadjusted concentrations of total nitrogen and total phosphorus, and decreasing trends were seen for unadjusted and flow-adjusted concentrations of total sulfate (Table 19).

Trowbridge Creek (TROW 1.8)

Trowbridge Creek at Great Bend, Pa., (TROW 1.8) was not sampled due to drought conditions. The WQI and biological index scores from previous years are found in Table 33.

Wappasening Creek (WAPP 2.6)

The biological index rating for Wappasening Creek at Nichols, N.Y., (WAPP 2.6) had decreased in 2000 and 2001 to moderately impaired compared to slightly impaired and nonimpaired ratings in previous years (Table 34). This site scored poorly in percent dominant taxa (55.17 percent), percent Chironomidae (55.17 percent), and Shannon-Weaver Diversity Index (1.65).

No parameters exceeded water quality standards; however, WAPP 2.6 had the highest total and dissolved nitrogen, and total and dissolved nitrate values of the New York/Pennsylvania border streams. Total nitrogen, dissolved nitrogen, dissolved nitrite, dissolved nitrate, and total nitrate exceeded the 90th percentile.

North Fork Cowanesque River (NFCR 7.6)

North Fork Cowanesque River at North Fork, Pa., (NFCR 7.6) was not sampled due to drought conditions in July 2001 (Table 35).

Pennsylvania-Maryland Streams

Big Branch Deer Creek (BBDC 4.1)

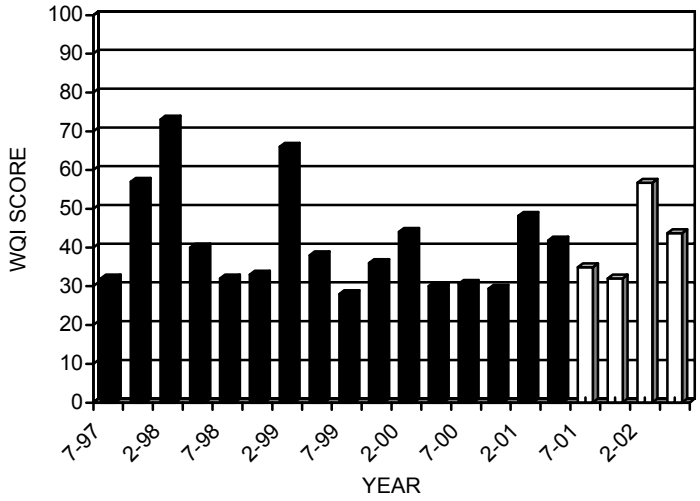
Big Branch Deer Creek at Fawn Grove, Pa., (BBDC 4.1) served as the reference site for the Pennsylvania-Maryland border streams during fiscal year 2002. This site had the best combination of biological community and physical habitat of the Pennsylvania-Maryland streams. It had the best value for the Hilsenhoff Biotic Index (3.32) metric of all the New York-Pennsylvania border streams, indicating the presence of a large number of organic pollution intolerant taxa at this site. These taxa with a Hilsenhoff Biotic Index value of three or less included *Antocha*, *Serratella* (Ephemeroptera: Ephemerellidae), *Epeorus*, *Isonychia*, *Nigronia*, *Leuctra*, *Acroneuria*, *Claassenia* (Plecoptera: Perlidae), *Hansonoperla* (Plecoptera: Perlidae), *Dolophilodes*, and *Rhyacophila* (Trichoptera: Rhyacophilidae). The biological community has been nonimpaired for the past five years. Water quality was good in Big Branch Deer Creek in July 2001, as in previous years, with no parameters exceeding standards or the 90th percentile (Table 36). The land use for this site was predominantly forest.

Table 32. Water Quality Summary Troups Creek at Austinburg, Pa.

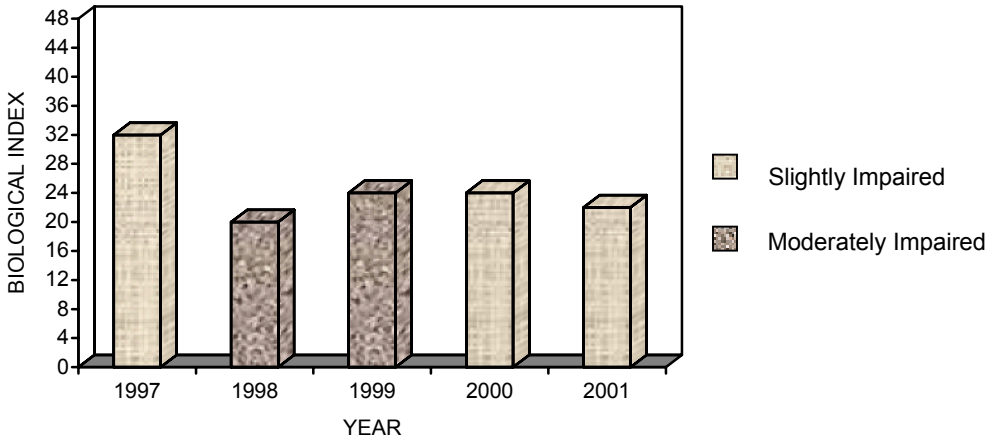
Parameters Exceeding Standards				
Parameter	**Date**	**Value**	**Standard**	**State**
DO	07/23/01	4.78 mg/l	5.0 mg/l	Pa. aquatic life
TAl	02/27/02	254 µg/l	100 µg/l	N.Y. aquatic (chronic)

Date	WQI	Parameters Exceeding 90th Percentile							
07/23/01	34.9	None							
11/07/01	32	None							
02/27/02	56.7	DO	TAl	TPO4	TURB				
04/24/02	43.7	None							

Biological and Habitat Summary	
Number of Taxa	14
Diversity Index	2.2
RBP Score	22
RBP Condition	Slightly Impaired
Total Habitat Score	128
Habitat Condition Category	Excellent



Water Quality Index



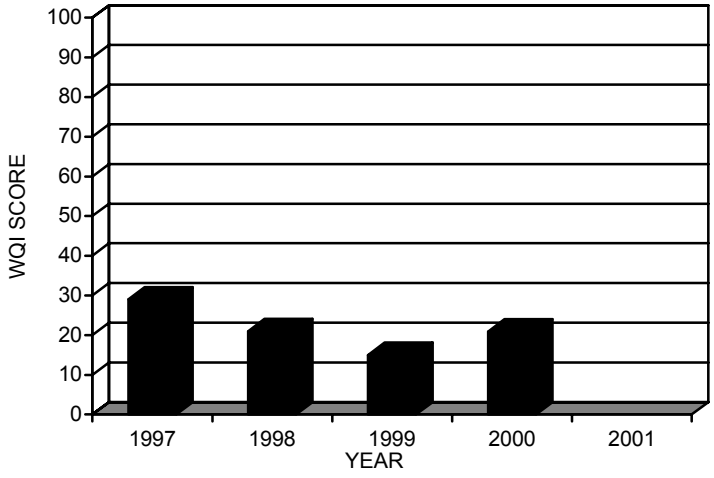
Biological Index

Table 33. Water Quality Summary Trowbridge Creek at Great Bend, Pa.

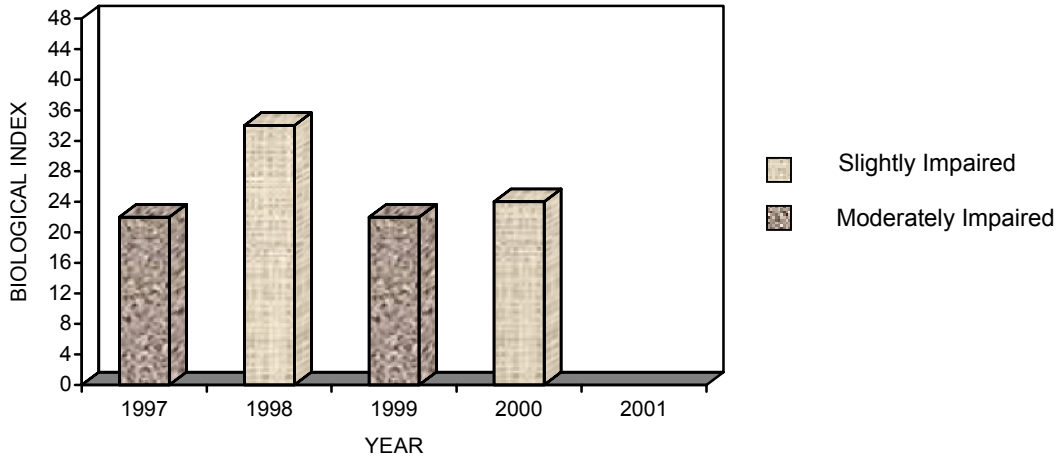
Parameters Exceeding Standards				
Parameter	**Date**	**Value**	**Standard**	**State**
NA				

Date	WQI	Parameters Exceeding 90th Percentile							
NA	NA								

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



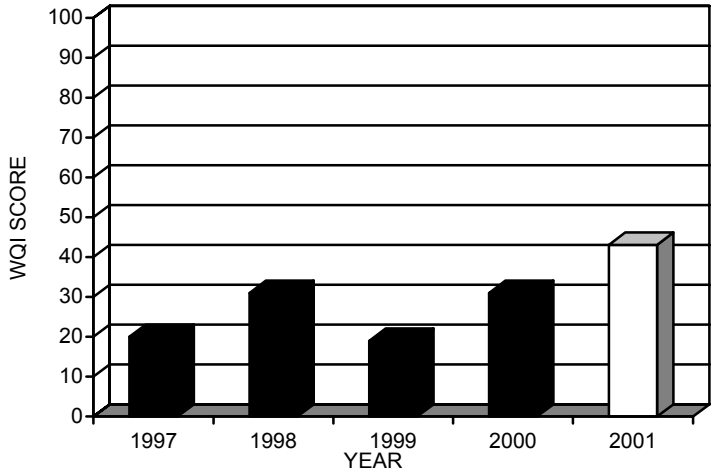
Biological Index

Table 34. Water Quality Summary Wappasening Creek at Nichols, N.Y.

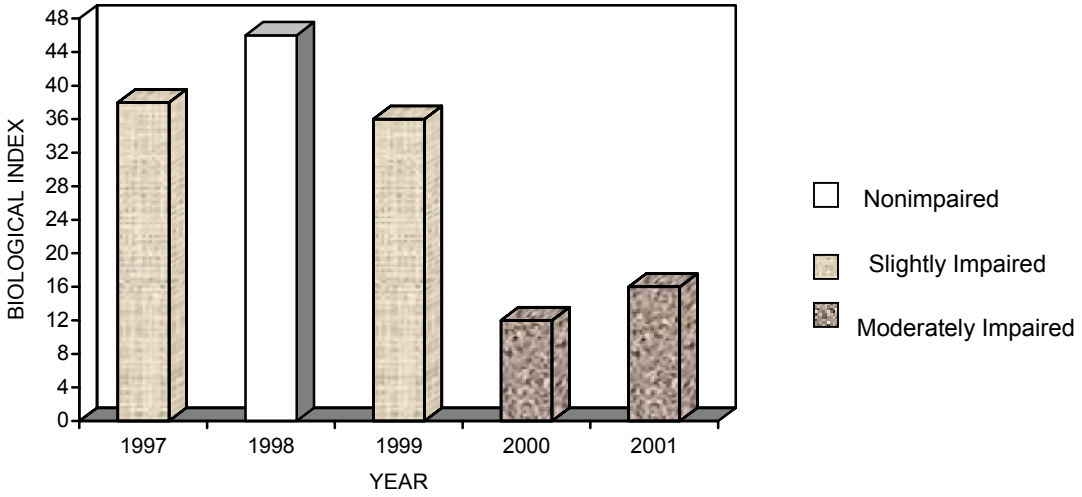
Parameters Exceeding Standards				
Parameter	**Date**	**Value**	**Standard**	**State**
None				

Date	WQI	Parameters Exceeding 90th Percentile							
07/24/01	43.1	TN	DN	DNO2	DNO3	TNO3			

Biological and Habitat Summary	
Number of Taxa	19
Diversity Index	1.7
RBP Score	16
RBP Condition	Moderately Impaired
Total Habitat Score	144
Habitat Condition Category	Excellent



Water Quality Index



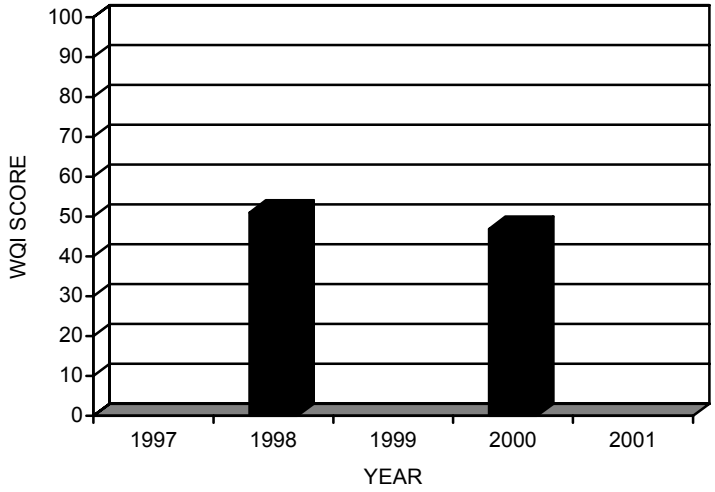
Biological Index

Table 35. Water Quality Summary North Fork Cowanesque River at North Fork, Pa.

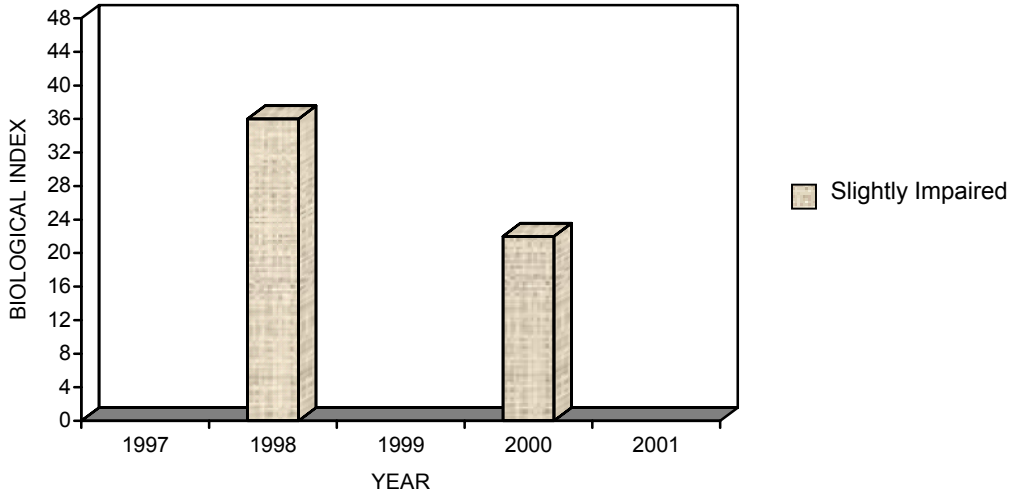
Parameters Exceeding Standards				
Parameter	**Date**	**Value**	**Standard**	**State**
NA				

Date	WQI	Parameters Exceeding 90th Percentile							
NA	NA								

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



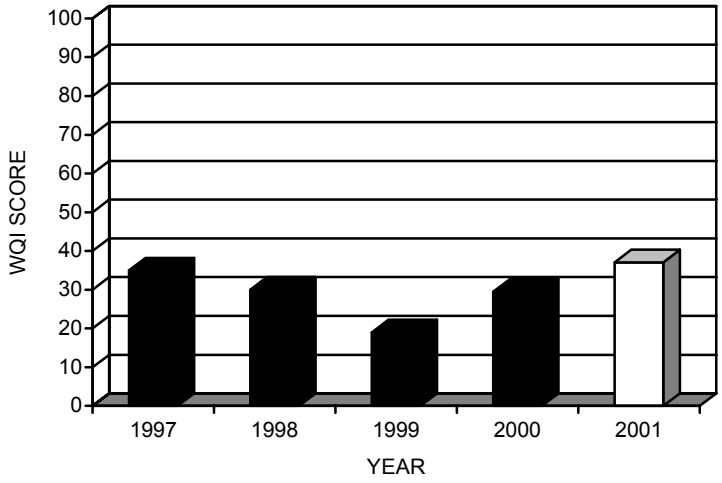
Biological Index

Table 36. Water Quality Summary Big Branch Deer Creek at Fawn Grove, Pa.

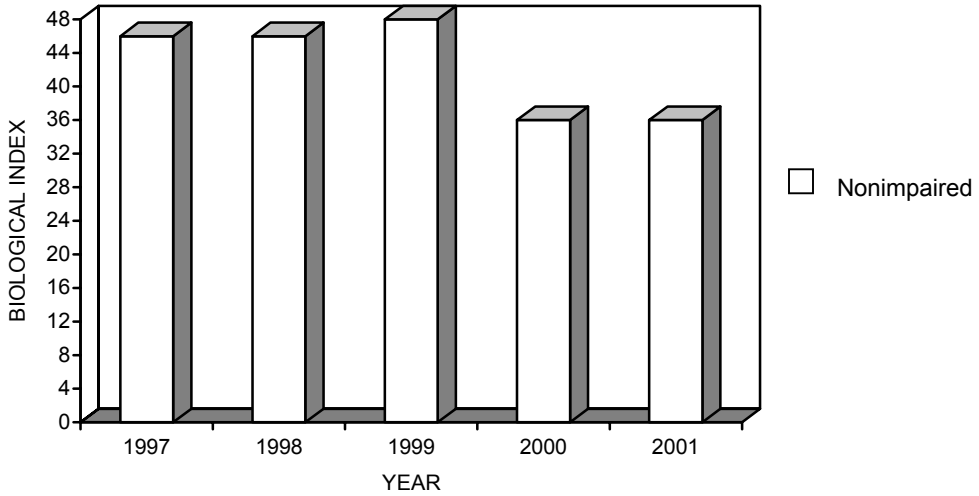
Parameters Exceeding Standards				
Parameter	**Date**	**Value**	**Standard**	**State**
None				

Date	WQI	Parameters Exceeding 90th Percentile							
07/31/01	37.1	None							

Biological and Habitat Summary	
Number of Taxa	22
Diversity Index	2.6
RBP Score	36
RBP Condition	Reference
Total Habitat Score	156
Habitat Condition Category	Reference



Water Quality Index



Biological Index

Conowingo Creek (CNWG 4.4)

Conowingo Creek at Pleasant Grove, Pa., (CNWG 4.4) had a slightly impaired community, and the worst percent dominant taxa metric score of all the Pennsylvania-Maryland border streams. This stream was impacted by agricultural activities, as evidenced by high sediment deposition and elevated nutrients. Parameters that exceeded the 90th percentile included dissolved oxygen, total and dissolved nitrogen, total and dissolved nitrate, dissolved phosphorus, dissolved orthophosphate, total and dissolved nitrite, total and dissolved solids, total organic carbon, and total iron (Table 37). CNWG 4.4 had the highest values of total and dissolved nitrogen (9.89 mg/l), total and dissolved nitrate (9.13 mg/l and 8.92 mg/l, respectively), and total and dissolved solids (718 mg/l and 706 mg/l, respectively) of all the interstate streams (Table A2). However, no parameters exceeded the current standards and an improvement was seen in the dissolved oxygen values from 4.79 mg/l in August 2000 to 7.96 mg/l in August 2001.

Conowingo Creek had nine decreasing trends and four increasing trends. Strong, significant, decreasing trends were shown for total phosphorus, total iron, and total aluminum (unadjusted and flow-adjusted concentrations), total ammonia and total manganese (unadjusted concentrations), and a significant decreasing trend for total manganese (flow-adjusted concentrations). Strong, significant, increasing trends occurred for both unadjusted and flow-adjusted concentrations for total nitrogen and total chloride (Table 19).

Deer Creek (DEER 44.2)

Deer Creek at Gorsuch Mills, Md., (DEER 44.2) returned to a nonimpaired biological community after being slightly impaired for three years. It had the best scores for EPT Index (14) and percent Chironomidae (4.05 percent) metrics of all the Pennsylvania-Maryland sites. Pollution intolerant taxa at this site included *Promoresia* (Coleoptera: Elmidae), *Atherix, Antocha, Heterocloeon* (Ephemeroptera: Baetidae), *Serratella, Stenonema, Isonychia, Nigronia, Ophiogomphus, Leuctra, Acroneuria, Agnetina, Claassenia*, and *Neoperla* (Plecoptera: Perlidae). No parameters exceeded water quality limits, and only dissolved iron exceeded the 90th percentile (Table 38). This sampling site was located adjacent to agricultural activities, and downstream of a beaver dam.

Deer Creek showed eight increasing and eight decreasing trends during the period between 1986 and 2002. Strong, significant upward trends were found for flow-adjusted and unadjusted concentrations of total solids and total chloride, and for unadjusted concentrations of total sulfate and flow-adjusted WQI values. Significant increasing trends also occurred in flow-adjusted concentrations of total sulfate and unadjusted concentrations of total nitrogen. Strong, significant, decreasing trends occurred in both unadjusted and flow-adjusted total phosphorus, total iron, and total manganese. Total ammonia had a strong, significant, decreasing trend in unadjusted concentrations and a significant, decreasing trend in flow-adjusted concentrations (Table 19).

Ebaughs Creek (EBAU 1.5)

Ebaughs Creek at Stewartstown, Pa., (EBAU 1.5) improved from a moderately impaired biological community in August 2000 to a nonimpaired community in July 2001. For 12 years prior to July 2001, this site had either a slightly or moderately impaired biological condition. EBAU 1.5 had the best percent Ephemeroptera score (20.5 percent) of all the Pennsylvania-Maryland streams, and included organic pollutant intolerant macroinvertebrates such as *Promoresia, Antocha, Stenonema, Isonychia, Leuctra, Acroneuria,* and *Dolophilodes*.

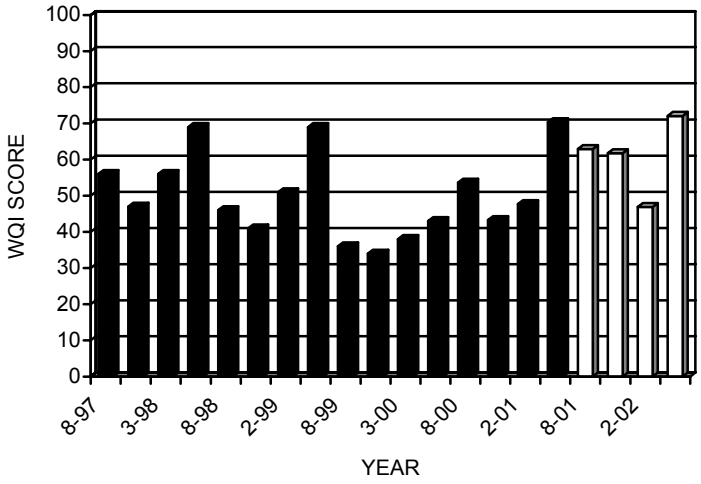
Even though the macroinvertebrate population had improved, the WQI was actually higher than in previous years. Although no parameters exceeded water quality standards, Ebaughs Creek had elevated concentrations of total and dissolved phosphorus, total chloride, dissolved iron,

Table 37. Water Quality Summary Conowingo Creek at Pleasant Grove, Pa.

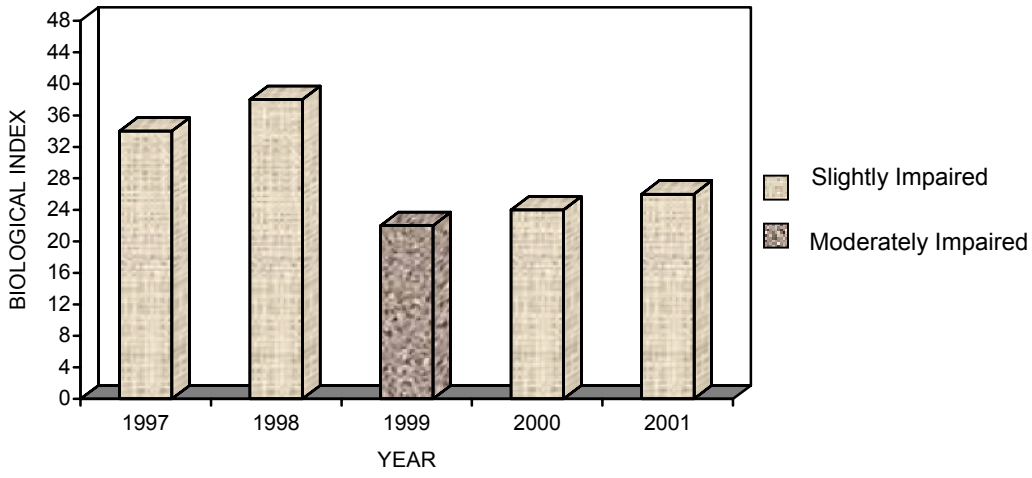
Parameters Exceeding Standards				
Parameter	**Date**	**Value**	**Standard**	**State**
None				

Date	WQI	Parameters Exceeding 90th Percentile							
08/01/01	62.9	DO	DN	TN	DNO3	TNO3	DP	DPO4	
11/13/01	61.8	DN	TN	DNO2	TNO2	DNO3	TNO3		
02/20/02	46.9	DS	TS	DN	TN	DNO3	TNO3		
04/18/02	72.1	DO	DN	TN	DNO2	TNO2	DNO3	TNO3	TOC
		TFe							

Biological and Habitat Summary	
Number of Taxa	18
Diversity Index	2.3
RBP III Score	26
RBP III Condition	Slightly Impaired
Total Habitat Score	150
Habitat Condition Category	Excellent



Water Quality Index



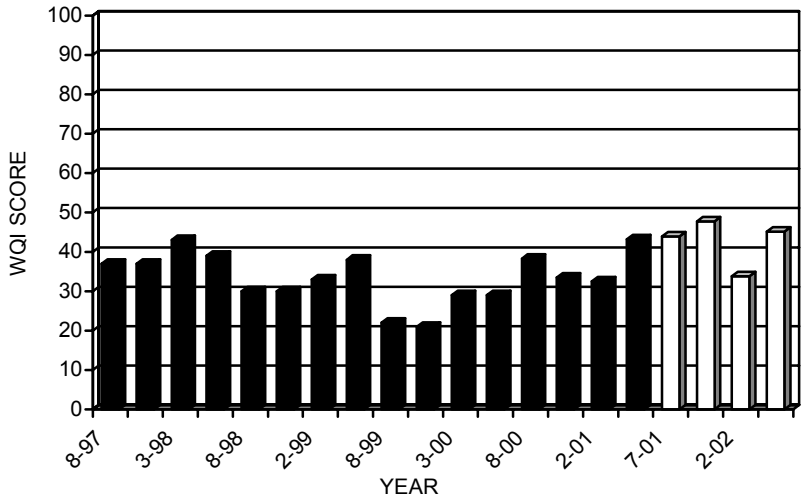
Biological Index

Table 38. Water Quality Summary Deer Creek at Gorsuch Mills, Md.

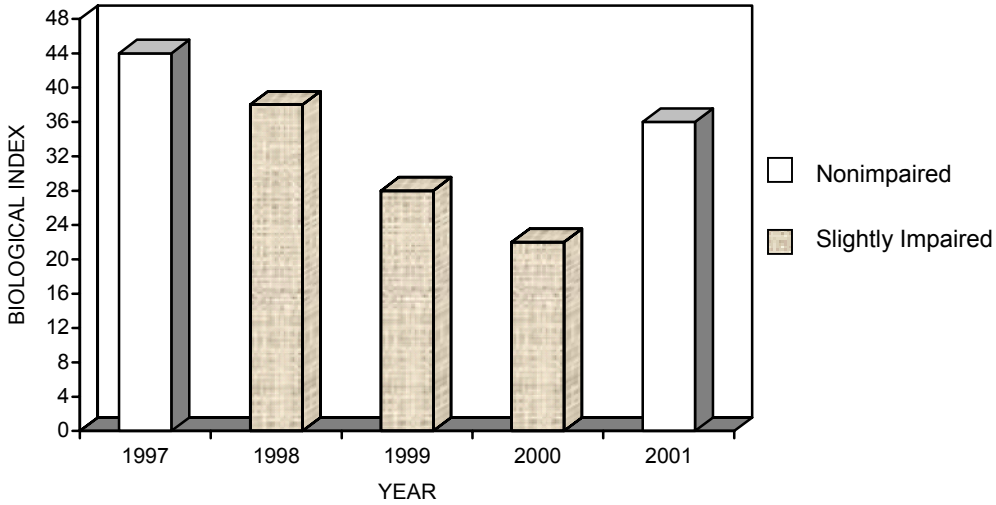
Parameters Exceeding Standards				
Parameter	**Date**	**Value**	**Standard**	**State**
None				

Date	WQI	Parameters Exceeding 90th Percentile							
07/31/01	43.9	None							
11/12/01	47.7	None							
02/19/02	33.8	None							
04/17/02	45.1	DFe							

Biological and Habitat Summary	
Number of Taxa	25
Diversity Index	2.5
RBP Score	36
RBP Condition	Nonimpaired
Total Habitat Score	135
Habitat Condition Category	Supporting



Water Quality Index



Biological Index

dissolved manganese, total and dissolved orthophosphates, total nitrogen, and total and dissolved nitrites (Table 39). The dissolved phosphorus (0.068 mg/l) and total and dissolved orthophosphate (0.074 mg/l and 0.064 mg/l, respectively) values were the highest of all the Pennsylvania-Maryland sites (Table A2). The total chlorine values were 0.21 mg/l in July, 0.09 mg/l in November, 0.11 mg/l in February, and 0.07 mg/l in April. The relatively high WQI and chemical analysis suggested that wastewater discharges upstream might have affected the water quality at the time of sampling; however, the biological condition was relatively unaffected.

Ebaughs Creek had six upward and five downward water quality trends. Strong, significant increasing trends occurred for unadjusted total chloride, unadjusted total sulfate, and unadjusted and flow-adjusted WQI values. Significant, increasing trends occurred for flow-adjusted concentrations of total chloride and total sulfate. Strong, significant, decreasing trends were found for both unadjusted and flow-adjusted total ammonia and total iron. A significant, decreasing trend also was found for flow-adjusted total manganese (Table 19).

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, an improvement from moderately and slightly impaired the two previous years. This site scored the best on taxa richness (29), percent dominant taxa (16.8 percent), and Shannon-Weaver Index (2.79) metrics; however, had the worst percentage of Ephemeroptera (3.05 percent). The organic pollution intolerant macroinvertebrates present were Promoresia, *Serratella, Epeorus, Stenonema, Nigronia, Boyeria* (Odonata: Aeshnidae), *Leuctra, Beloneuria* (Plecoptera: Perlidae), *Claassenia, Eccoptura* (Plecoptera: Perlidae), *Diplectrona* (Trichoptera: Hydropsychidae), *Dolophilodes*, and *Rhyacophila*. Alkalinity exceeded the Pennsylvania state standard, and dissolved iron exceeded the 90th percentile (Table 40).

Long Arm Creek (LNGA 2.5)

For the seventh consecutive year, Long Arm Creek at Bandanna, Pa., (LNGA 2.5) had a slightly impaired biological community. This site had the worst scores for taxa richness (17), Hilsenhoff Biotic Index (4.89), EPT Index (6), percent Chironomidae (19.75 percent), and Shannon-Weaver (2.24) metrics for the Pennsylvania-Maryland streams. LNGA 2.5 was located in a cow pasture, although it appeared not to have been in use for some time. 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. The streambanks were heavily eroded, and the embeddedness and sediment deposition scores were lower due to mud and silt in the stream during the July 2001 habitat assessment.

During the 2000 sampling season, Long Arm Creek was elevated to a Group 1 stream. Although no water quality standards were exceeded, total and dissolved iron, dissolved manganese, and dissolved oxygen exceeded the 90th percentile at this site (Table 41).

Octoraro Creek (OCTO 6.6)

Octoraro Creek at Rising Sun, Md., (OCTO 6.6) had a nonimpaired biological community for the second year in a row. Pollution intolerant taxa that were present in August 2001 were *Promoresia, Antocha, Heterocloeon, Serratella, Stenonema, Isonychia, Brachycentrus* (Trichoptera: Brachycentridae), *Macrostemum* (Trichoptera: Hydropsychidae), *Lepidostoma* (Trichoptera: Lepidostomatidae), and *Rhyacophila*. Although no parameters exceeded state standards, numerous parameters exceeded the 90th percentile including dissolved oxygen, total and dissolved ammonia, total and dissolved phosphorus, total and dissolved orthophosphate, total organic carbon, total and dissolved nitrite, total and dissolved iron, total and dissolved manganese, total aluminum, and turbidity (Table 42). These exceeding values may be due to significant agricultural activities and Octoraro Lake located upstream of this site. The WQI bar

graph indicates that the WQI was overall consistently higher throughout the seasons in fiscal year 2002 than in other years.

Three increasing and seven decreasing trends were found at OCTO 6.6. Total chloride had strong, significant increasing trends for both unadjusted and flow-adjusted concentrations, and total solids flow-adjusted concentration had a significantly increasing trend. Strong, significant decreasing trends were found in unadjusted total ammonia, total iron, total aluminum, and total manganese, and unadjusted and flow-adjusted total phosphorus. Significant decreasing trends were evident in flow-adjusted total iron (Table 19).

Scott Creek (SCTT 3.0)

Scott Creek at Delta, Pa., (SCTT 3.0) was not sampled in the summer or fall of 2001 due to drought conditions. This stream traditionally has been poor in quality and biological condition has been rated moderately to severely impaired. There were no parameters that exceeded state standards in the winter and spring of 2002; however, in fiscal year 2001 dissolved oxygen and dissolved iron exceeded Maryland and Pennsylvania state standards. The number of parameters exceeding standards was less than the previous year (fiscal year 2000), so this may indicate that water quality conditions are improving. WQI scores are lower than they were in 2000. Parameters that exceeded the 90th percentile in February and April of 2002 were conductivity, total and dissolved ammonia, total and dissolved phosphorus, total chloride, total sulfate, total and dissolved solids, total and dissolved orthophosphates, and total organic carbon (Table 43). Scott Creek had the highest conductivity (496 µmhos/cm), total chloride (74 mg/l), and total phosphorus (0.11 mg/l) compared to all the other Pennsylvania-Maryland streams, and the highest ammonia value (0.3 mg/l) of all the interstate streams (Table A2).

Scott Creek had one increasing and six decreasing trends during fiscal year 2002. The increasing trend was for unadjusted total aluminum concentrations. The decreasing trends were in flow-adjusted concentrations of total nitrogen, total phosphorus, total sulfate, total iron, and total manganese, and one strong, significant decreasing trend in unadjusted total manganese (Table 19).

South Branch Conewago Creek (SBCC 20.4)

South Branch Conewago Creek near Bandanna, Pa., (SBCC 20.4) contained a slightly impaired biological community for the fifth consecutive year. It had the worst taxa richness score (17, along with LNGA 2.5) of all the Pennsylvania-Maryland streams. Before this stream was slightly impaired, it had served as the Pennsylvania-Maryland reference site for several years. The Hilsenhoff Biotic Index was still good with many pollution intolerant taxa, including *Dicranota*, *Hexatoma*, *Limnophila* (Diptera: Tipulidae), *Stenonema*, *Nigronia*, *Leuctra*, *Tallaperla* (Plecoptera: Peltoperlidae), and *Dolophilodes*. Some the taxa not present in the July 2001 sample that were present in the July 2000 sample were *Acroneuria*, *Isoperla* (Plecoptera: Perlodidae), *Diplectrona*, and *Rhyacophila.*

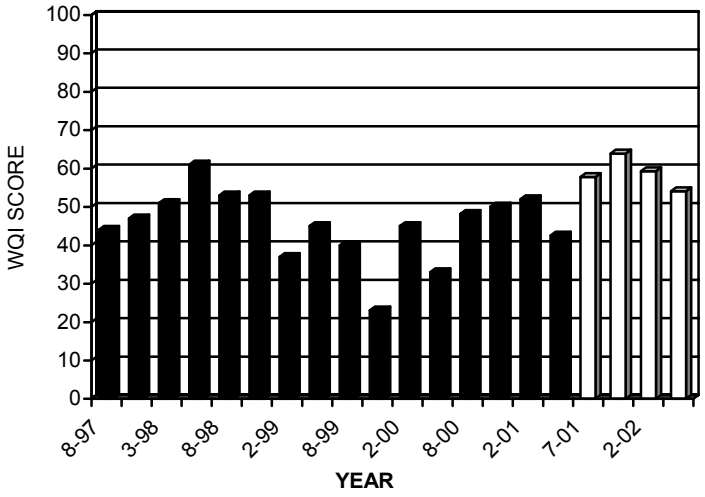
The WQI score has been increasing slightly over the past couple years, but it is still low and no parameters exceeded standards (Table 44). Total nitrite at SBCC 20.4 exceeded the 90th percentile and also was the highest value (0.1 mg/l) of all the interstate streams (Table A2). The habitat was rated excellent. The area around the stream was forested, although there was evidence of fairly recent logging.

Table 39. Water Quality Summary Ebaughs Creek at Stewartstown, Pa.

Parameters Exceeding Standards				
Parameter	**Date**	**Value**	**Standard**	**State**
None				

Date	WQI	Parameters Exceeding 90th Percentile							
07/31/01	57.8	DP	TCl						
11/12/01	63.9	DP	TP	DFe	DMn	TPO4			
02/19/02	59.3	TN	DNO2	TNO2	DP	DPO4	TPO4		
04/17/02	54.1	None							

Biological and Habitat Summary	
Number of Taxa	19
Diversity Index	2.3
RBP Score	32
RBP Condition	Nonimpaired
Total Habitat Score	153
Habitat Condition Category	Excellent



Water Quality Index

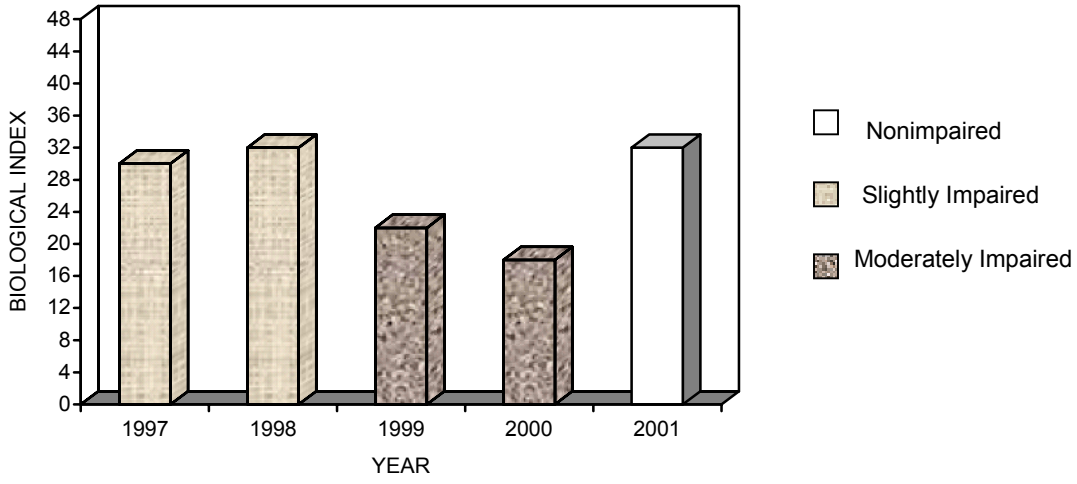


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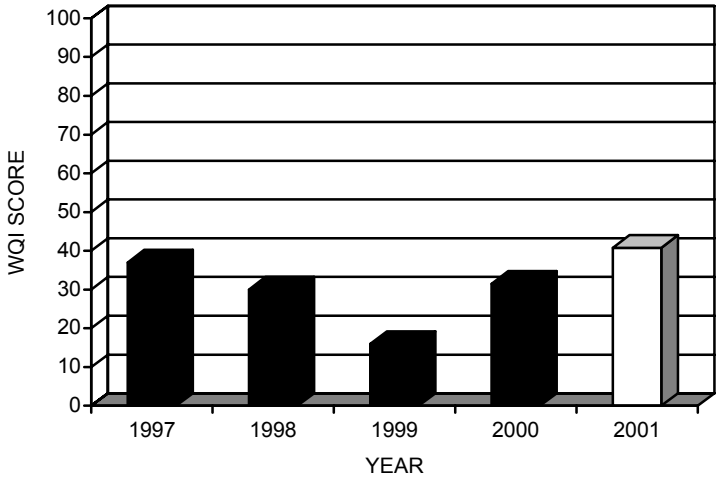
Table 40. Water Quality Summary Falling Branch Deer Creek at Fawn Grove, Pa.

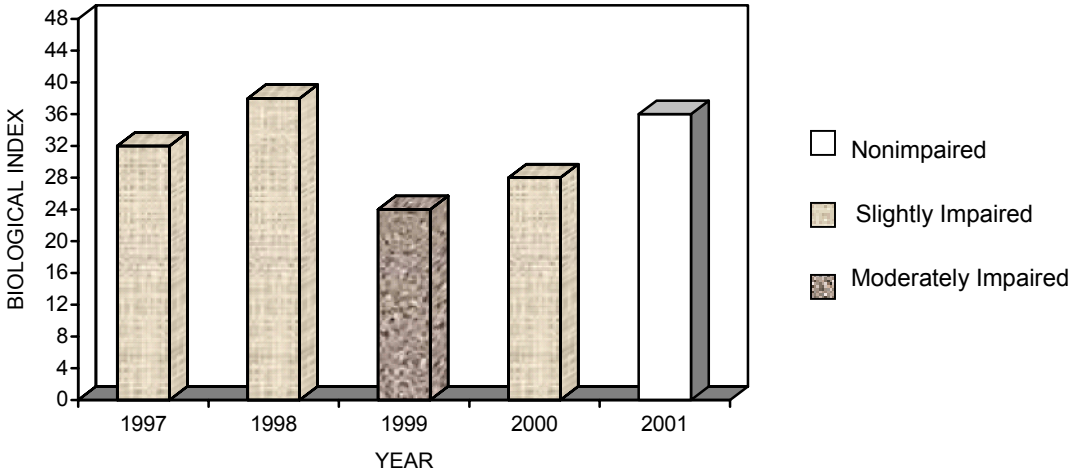
Parameters Exceeding Standards				
Parameter	**Date**	**Value**	**Standard**	**State**
ALK	07/31/01	18 mg/l	20 mg/l	Pa. aquatic life

Date	WQI	Parameters Exceeding 90th Percentile							
07/31/01	40.8	DFe							

Biological and Habitat Summary	
Number of Taxa	29
Diversity Index	2.8
RBP Score	36
RBP Condition	Nonimpaired
Total Habitat Score	138
Habitat Condition Category	Supporting



Water Quality Index



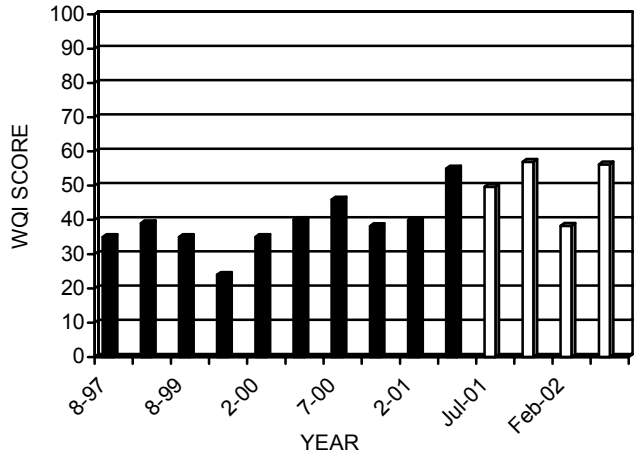
Biological Index

Table 41. Water Quality Summary Long Arm Creek at Bandanna, Pa.

Parameters Exceeding Standards				
Parameter	**Date**	**Value**	**Standard**	**State**
None				

Date	WQI	Parameters Exceeding 90th Percentile							
07/30/01	49.7	None							
11/12/01	57	DFe	DMn						
02/19/02	38.3	DO	DFe	DMn					
04/17/02	56.2	DO	TFe	DMn					

Biological and Habitat Summary	
Number of Taxa	17
Diversity Index	2.2
RBP III Score	24
RBP III Condition	Slightly Impaired
Total Habitat Score	116
Habitat Condition Category	Partially Supporting



Water Quality Index

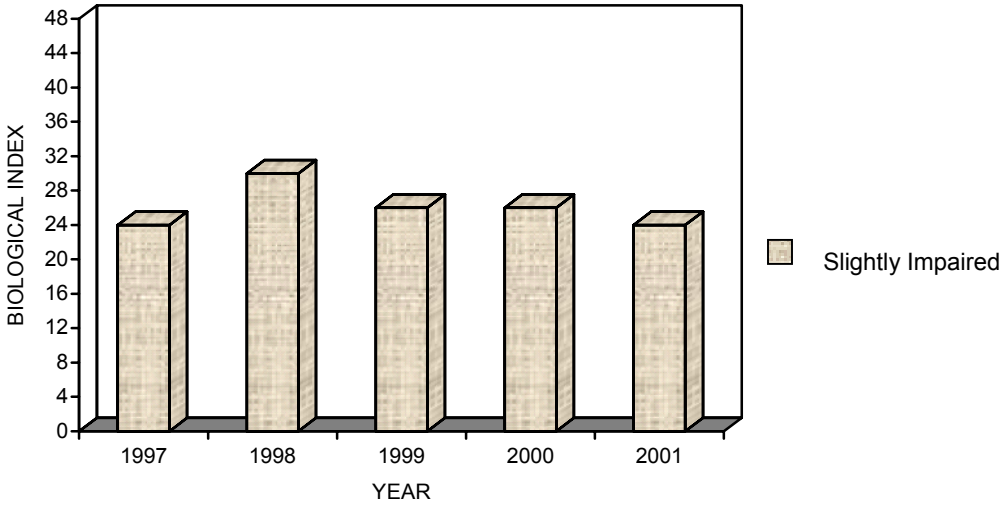


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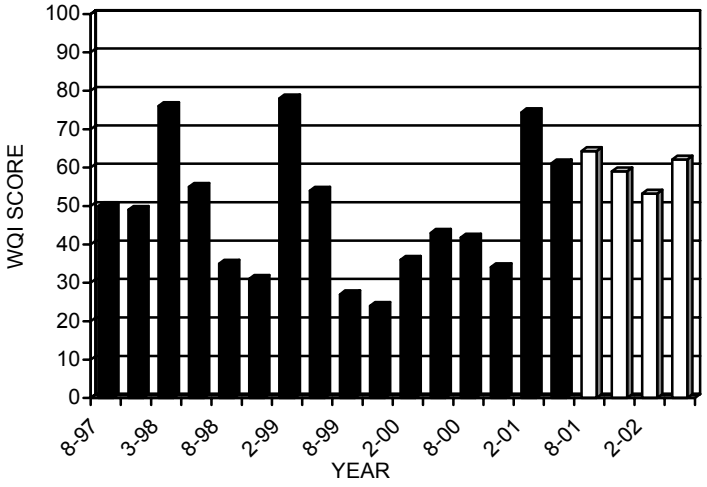
Table 42. Water Quality Summary Octoraro Creek at Rising Sun, Md.

Parameters Exceeding Standards				
Parameter	**Date**	**Value**	**Standard**	**State**
None				

Date	WQI	Parameters Exceeding 90th Percentile							
08/01/01	64.3	DO	DP	TP	DPO4	TPO4	TFe	TAl	TURB
11/13/01	59	DNO2	TNO2	TP	TOC	TPO4			
02/20/02	53.2	TOC	DFe	DMn	TMn				
04/18/02	62.1	DO	DNH3	TNH3	TOC				

Biological and Habitat Summary	
Number of Taxa	23
Diversity Index	2.4
RBP III Score	34
RBP III Condition	Nonimpaired
Total Habitat Score	163
Habitat Condition Category	Excellent



Water Quality Index

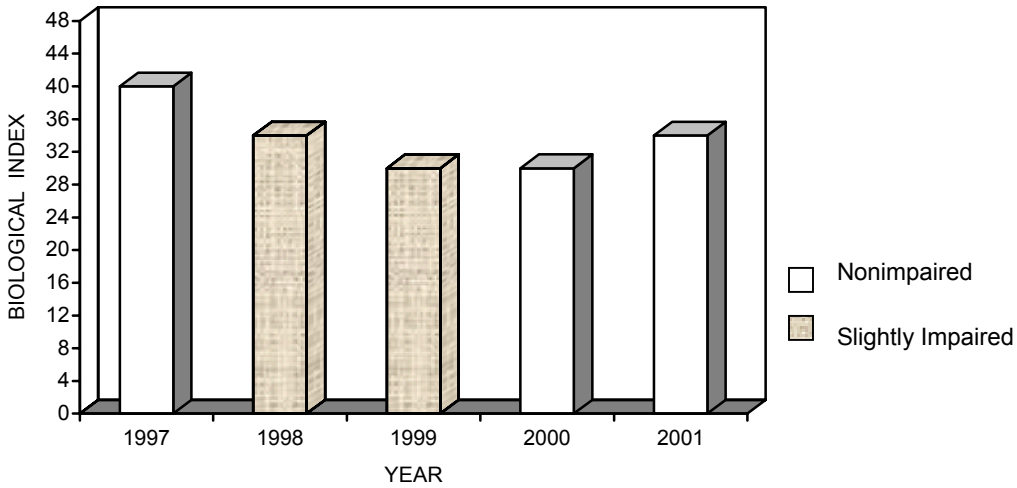


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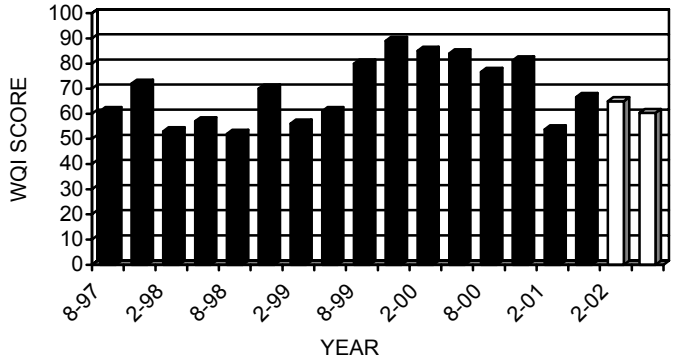
Table 43. Water Quality Summary Scott Creek at Delta, Pa.

Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
None				

Date	WQI	Parameters Exceeding 90th Percentile								
02/19/02	64.9	COND	DNH3	TNH3	DP	TP	TCl	TSO4		
04/17/02	60.3	COND	DS	TS	DP	TP	DPO4	TPO4	TOC	TCl
		TSO4								

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

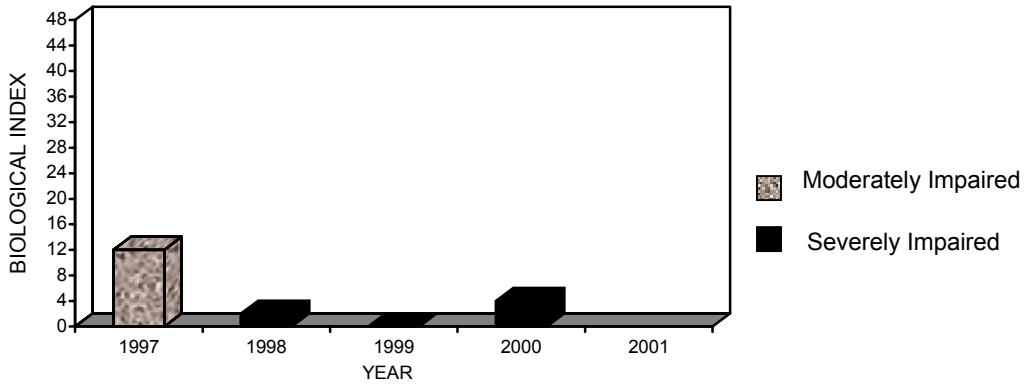


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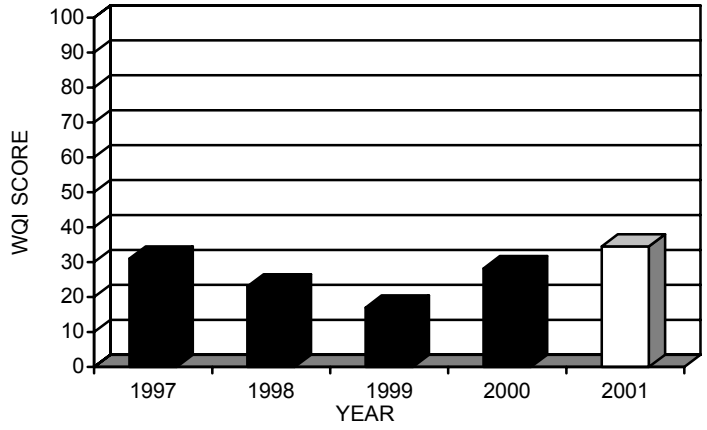
Table 44. Water Quality Summary South Branch Conewago Creek at Bandanna, Pa.

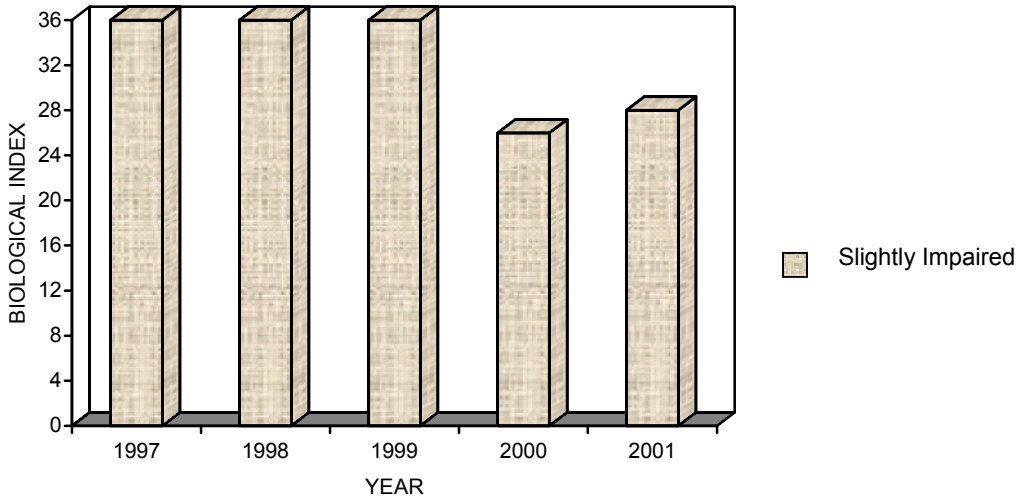
Parameters Exceeding Standards				
Parameter	**Date**	**Value**	**Standard**	**State**
None				

Date	WQI	Parameters Exceeding 90th Percentile							
07/30/01	34.5	TNO2							

Biological and Habitat Summary	
Number of Taxa	17
Diversity Index	2.5
RBP III Score	28
RBP III Condition	Slightly Impaired
Total Habitat Score	148
Habitat Condition Category	Excellent



Water Quality Index



Biological Index

River Sites

Chemung River (CHEM 12.0)

A nonimpaired biological community existed in the Chemung River at Chemung, N.Y., (CHEM 12.0). During the past five years, this site has fluctuated from moderately impaired, to slightly impaired, to nonimpaired. This site had the best taxa richness (21), percent dominant taxa (15.97 percent), and Shannon-Weaver (2.53) metric scores of all the river sites. Pollution intolerant taxa included *Heterocloeon, Serratella, Stenonema, Isonychia, Acroneuria, Agnetina, and Macrostemum*.

No parameters exceeded the standards in fiscal year 2002. Analysis indicated that dissolved oxygen was depressed while conductivity, total nitrite, total sulfate, total and dissolved solids, total chloride, turbidity, total and dissolved phosphorus, dissolved orthophosphate, total and dissolved nitrogen, and total and dissolved nitrates were elevated at CHEM 12.0 (Table 45).

There were three increasing and 12 decreasing trends at CHEM 12.0. Unadjusted and flow-adjusted total chloride showed a strong, significant increasing trend, in addition to a significantly increasing trend in unadjusted total solids concentrations. Strong, significant decreasing trends were found for unadjusted and flow-adjusted total ammonia, total nitrogen, total sulfate, total iron, total manganese, and in flow-adjusted total phosphorus. A significant decreasing trend was seen for unadjusted concentrations of total phosphorus (Table 19).

Cowanesque River (COWN 5.0)

Cowanesque River at Elkland, Pa., (COWN 5.0) was sampled only during fiscal year 2002 in order to assess the impacts of the Cowanesque Reservoir. No previous historical data exists for this site. The macroinvertebrate community was rated slightly impaired and had seven pollution intolerant taxa: *Hexatoma, Serratella, Leucrocuta, Stenonema, Isonychia, Ophiogomphus*, and *Neoperla*. The pH value slightly exceeded the New York state water quality standard of 8.5 in July 2001; however, none of the parameters exceeded the 90th percentile (Table 46). The habitat was rated supporting with low scores given to channel flow status and channel alteration.

Cowanesque River (COWN 2.2)

Moderately impaired biological conditions existed on the Cowanesque River downstream of the Cowanesque Reservoir at Lawrenceville, Pa., (COWN 2.2). Moderately to severely impaired conditions have existed at this site for the past 10 years of sampling. In the past, increased phytoplankton production in the Cowanesque Reservoir may have caused a shift in the macroinvertebrate community, resulting in a biological population dominated by filter-feeding organisms. Additionally, the bottom discharge dam depressed oxygen levels in the Cowanesque River downstream of the outflow. None of the organic-pollution intolerant taxa that were found at COWN 5.0 were found at COWN 2.2. In fact, all the taxa present had a Hilsenhoff Biotic Index tolerance value of five or higher. During July 2001, the site was dominated by *Cheumatopsyche* (Trichoptera: Hydropsychidae), and the rest of the sample consisted of other taxa tolerant of low dissolved oxygen conditions such as *Chironomidae* (Diptera), *Hemerodromia* (Diptera: Empididae), *Caecidotea* (Isopoda: Asellidae), *Gammarus* (Amphipoda: Gammaridae), *Simulium* (Diptera: Simuliidae), and *Ceratopsyche* (Trichoptera: Hydropsychidae). COWN 2.2 had the worst scores in all the metrics, except percent Chironomidae, for the river sites.

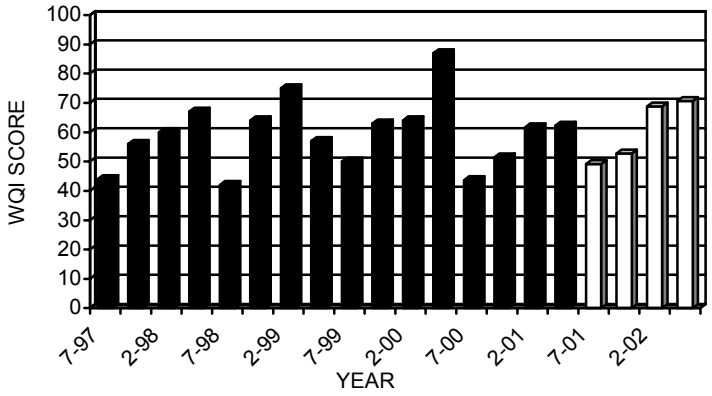
Values for dissolved oxygen, total iron, and total aluminum exceeded Pennsylvania and New York water quality standards. Also, dissolved oxygen, total and dissolved ammonia, total organic carbon, total and dissolved manganese, turbidity, total phosphorus, and total iron exceeded the 90th percentile (Table 47). COWN 2.2 had the lowest dissolved oxygen value (3.65mg/l) and highest total and dissolved manganese values (298 µg/l and 255 µg/l, respectively) for all the interstate sites (Table A1). Habitat conditions were supporting with low scores in epifaunal substrate, instream cover,

Table 45. Water Quality Summary Chemung River at Chemung, N.Y.

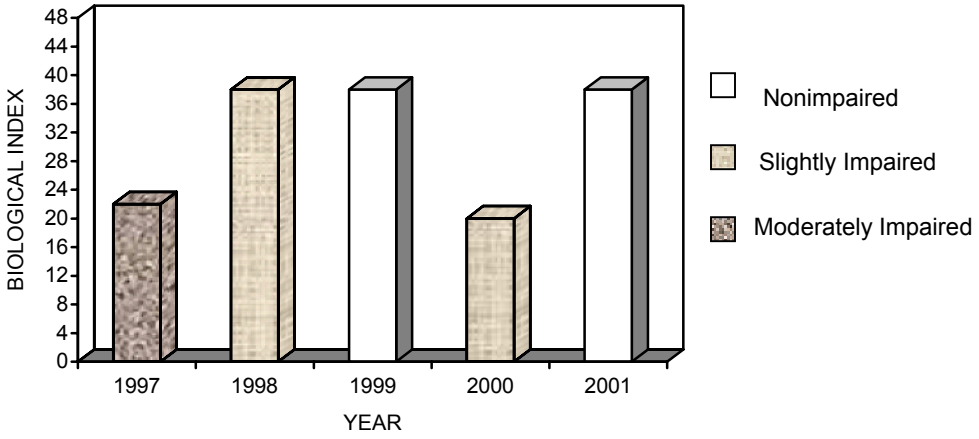
Parameters Exceeding Standards				
Parameter	**Date**	**Value**	**Standard**	**State**
None				

Date	WQI	Parameters Exceeding 90th Percentile							
07/24/01	49.1	TNO2	TURB						
11/06/01	52.7	DO	COND	DS	TS				
02/26/02	68.8	DO	COND	DS	TS	TP	TCl	TSO4	
04/23/02	70.6	DO	COND	DN	TN	DNO3	TNO3	DP	DPO4
		TCl	TSO4						

Biological and Habitat Summary	
Number of Taxa	21
Diversity Index	2.5
RBP Score	38
RBP Condition	Nonimpaired
Total Habitat Score	145
Habitat Condition Category	Excellent



Water Quality Index



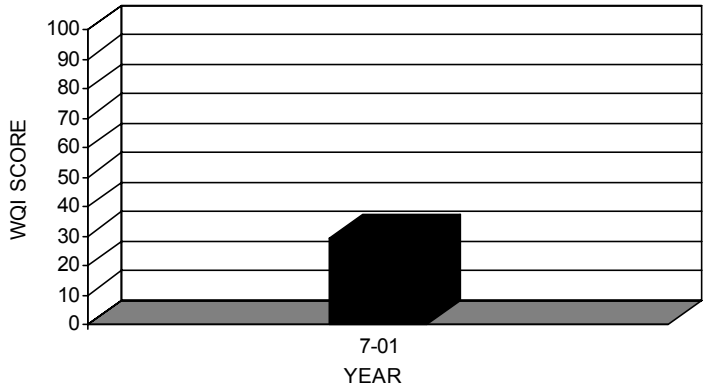
Biological Index

Table 46. Water Quality Summary Cowanesque River (COWN 5.0) at Elkland, Pa.

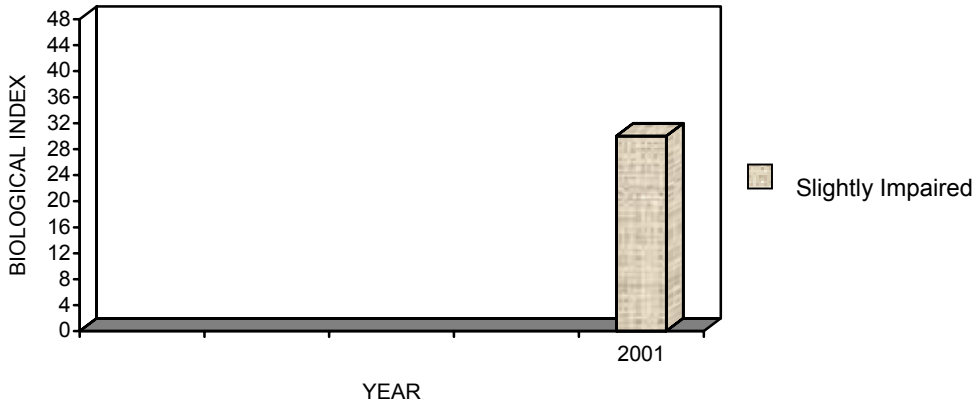
Parameters Exceeding Standards				
Parameter	**Date**	**Value**	**Standard**	**State**
pH	07/23/01	8.75	8.5	N.Y. general

Date	WQI	Parameters Exceeding 90th Percentile							
07/23/01	29.2	None							

Biological and Habitat Summary	
Number of Taxa	16
Diversity Index	2.1
RBP Score	30
RBP Condition	Slightly Impaired
Total Habitat Score	140
Habitat Condition Category	Supporting



Water Quality Index



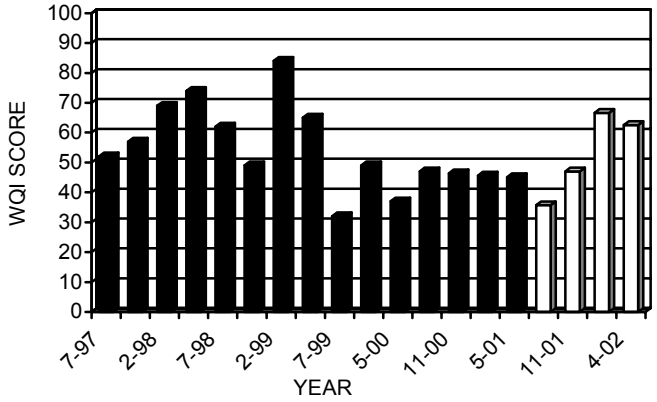
Biological Index

Table 47. Water Quality Summary Cowanesque River (COWN 2.2) at Lawrenceville, Pa.

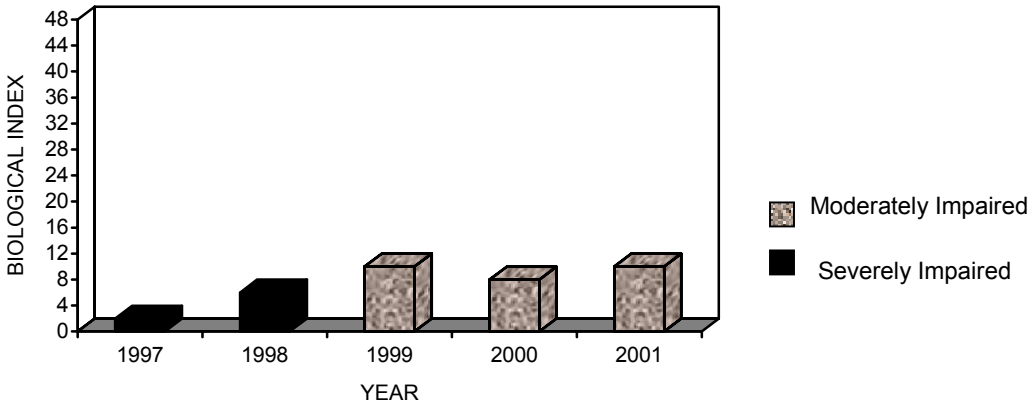
Parameters Exceeding Standards				
Parameter	**Date**	**Value**	**Standard**	**State**
DO	07/23/01	3.65 mg/l	4.0 mg/l	Pa. aquatic life
DO	07/23/01	3.65 mg/l	4.0 mg/l	N.Y. nontrout waters
TFe	02/26/02	470 µg/l	300 µg/l	N.Y. aquatic (chronic)
TAl	02/26/02	208 µg/l	100 µg/l	N.Y. aquatic (chronic)
TFe	04/23/02	431 µg/l	300 µg/l	N.Y. aquatic (chronic)
TAl	04/23/02	236 µg/l	100 µg/l	N.Y. aquatic (chronic)

Date	**WQI**	**Parameters Exceeding 90th Percentile**							
07/23/01	35.7	DO	DNH3	TNH3	TOC				
11/07/01	47	DO	DNH3	TNH3	DMn	TMn	TURB		
02/26/02	66.6	DO	TNH3	TP	TOC	TFe			
04/23/02	62.5	TOC	TFe						

Biological and Habitat Summary	
Number of Taxa	7
Diversity Index	1.3
RBP Score	10
RBP Condition	Moderately Impaired
Total Habitat Score	127
Habitat Condition Category	Supporting



Water Quality Index



Biological Index

embeddedness, velocity/depth regimes, channel alteration, and frequency of riffles. The substrate was heavily embedded, and the stream contained little riffle habitat.

Cowanesque River had three increasing and eight decreasing trends. Strong, significant increasing trends were found for unadjusted total solids, total chloride, and total manganese. Strong, significant decreasing trends occurred for unadjusted and flow-adjusted total nitrogen and total sulfate, and unadjusted total ammonia and total phosphorus. Significant downward trends were found for flow-adjusted total ammonia and total phosphorus (Table 19).

Cowanesque River (COWN 1.0)

A new 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. The biological community has shown decline at COWN 1.0 over these past three sampling seasons, and was rated moderately impaired in July 2001. The macroinvertebrate population was improved slightly at COWN 1.0 compared to COWN 2.2. Organic pollution intolerant taxa found at COWN 1.0 were *Atherix, Stenonema,* and *Nigronia*. Habitat conditions were considered excellent.

The pH was high at this site, exceeding the New York and Pennsylvania water quality standards. Parameters that exceeded the 90th percentile were total organic carbon, total and dissolved nitrite, and total and dissolved solids (Table 48). Total organic carbon exceeded the 90th percentile every season and was the highest value (4.9 mg/l) for all the interstate streams (Table A1). 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)

Susquehanna River at Windsor, N.Y., (SUSQ 365.0) was designated as the reference for all the river sites. SUSQ 365.0 was one of the river sites with the highest number of taxa (21). Pollution intolerant taxa at this site were *Heterocloeon, Leucrocuta, Rhithrogena* (Ephemeroptera: Heptageniidae), *Isonychia, Ephoron* (Ephemeroptera: Polymitarcyidae), *Ophiogomphus, Acroneuria, Agnetina*, and *Psychomyia* (Trichoptera: Psychomyiidae). In the previous year, the biological community was rated slightly impaired, possibly due to the river habitat being affected by heavy flooding. Regardless of the cause, the biological community has shown recovery.

The water quality at the time of sampling exceeded New York aquatic standards in total iron and total aluminum. Dissolved oxygen was lower, while dissolved nitrite, total sulfate, total and dissolved nitrogen, and total phosphorus were elevated (Table 49) at this site. The total sulfate value (86.2 mg/l) was the highest of all river sites (Table A1).

Four increasing and 10 decreasing trends occurred at SUSQ 365.0. Strong, significant increasing trends occurred in both unadjusted and flow-adjusted total chloride concentrations and flow-adjusted total solids. A significant increasing trend was seen in unadjusted total solids concentrations. Unadjusted and flow-adjusted total ammonia, total nitrogen, total phosphorus, and total iron and unadjusted total manganese showed strong, significant decreasing trends, and flow-adjusted total aluminum showed a significant decreasing trend (Table 19).

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

Slightly impaired conditions existed in the Susquehanna River at Kirkwood, N.Y., (SUSQ 340.0) after being nonimpaired for three years. The number of taxa and diversity index had decreased, respectively, from 22 and 2.5 in July 2000 to 12 and 1.9 in July 2001 (Table 50). The habitat assessment indicated that riffle frequency was low, and the section of river consisted mostly of run area.

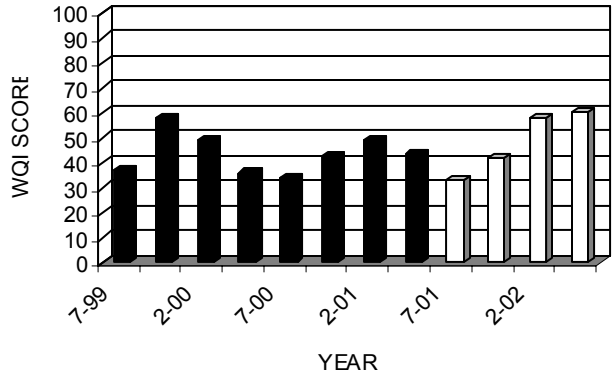
A slightly high total iron value exceeded the New York aquatic standard in February 2002.

Table 48. Water Quality Summary Cowanesque River (COWN 1.0) at Lawrenceville, Pa.

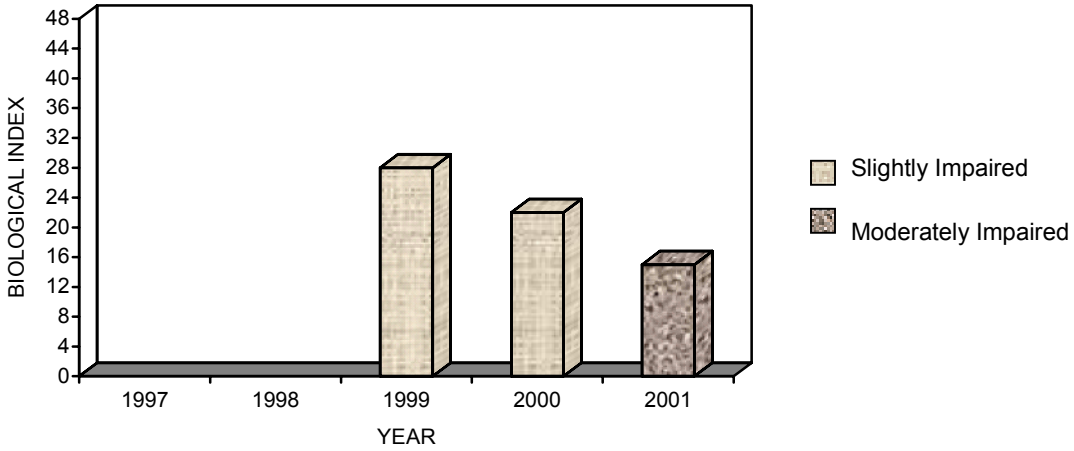
Parameters Exceeding Standards				
Parameter	**Date**	**Value**	**Standard**	**State**
pH	07/23/01	9.3	9.0	Pa. aquatic life
pH	07/23/01	9.3	8.5	N.Y. general

Date	WQI	Parameters Exceeding 90th Percentile							
07/23/01	33.3	TOC							
11/06/01	42.1	DNO2	TNO2	TOC					
02/26/02	57.9	TOC							
04/23/02	60.3	DS	TS	TOC					

Biological and Habitat Summary	
Number of Taxa	14
Diversity Index	1.7
RBP Score	15
RBP Condition	Moderately Impaired
Total Habitat Score	150
Habitat Condition Category	Excellent



Water Quality Index



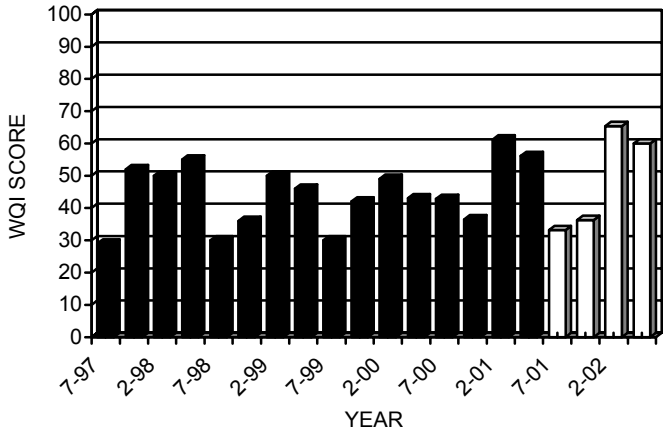
Biological Index

Table 49. Water Quality Summary Susquehanna River (SUSQ 365.0) at Windsor, N.Y.

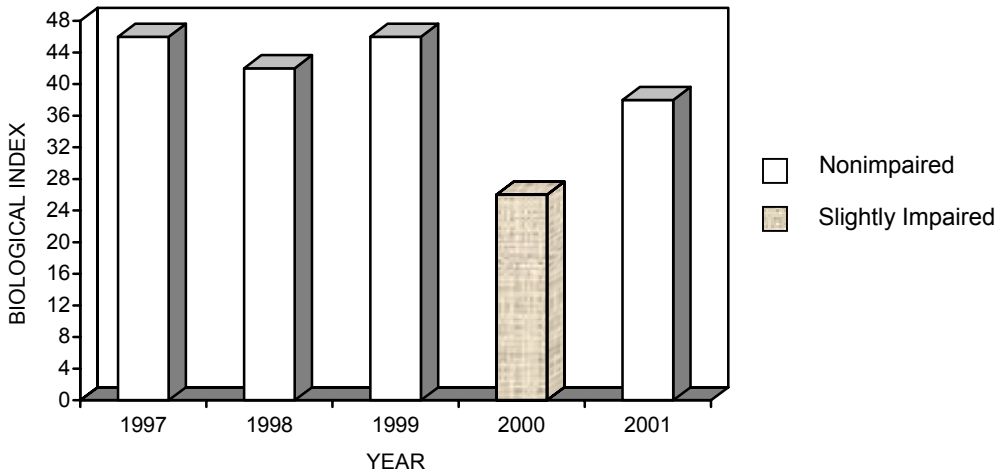
Parameters Exceeding Standards				
Parameter	**Date**	**Value**	**Standard**	**State**
TFe	02/25/02	370 µg/l	300 µg/l	N.Y. aquatic (chronic)
TAl	02/25/02	220 µg/l	100 µg/l	N.Y. aquatic (chronic)

Date	WQI	Parameters Exceeding 90th Percentile							
07/25/01	33.2	DNO2							
11/05/01	36.3	DO	TSO4						
02/25/02	65.4	DN	TN	TP					
04/22/02	60	None							

Biological and Habitat Summary	
Number of Taxa	21
Diversity Index	2.4
RBP Score	38
RBP Condition	Reference
Total Habitat Score	159
Habitat Condition Category	Reference



Water Quality Index



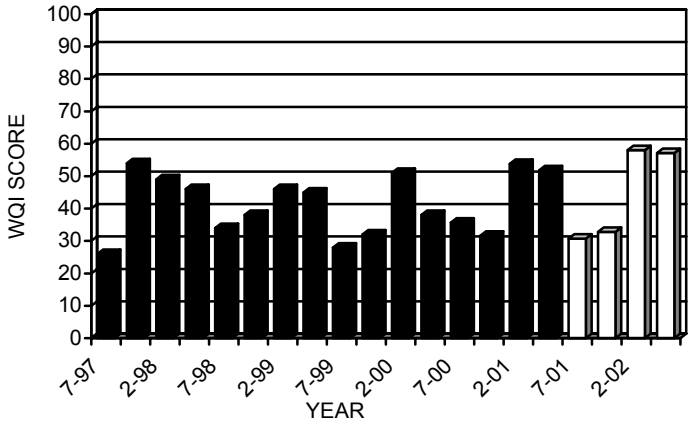
Biological Index

Table 50. Water Quality Summary Susquehanna River (SUSQ 340.0) at Kirkwood, N.Y.

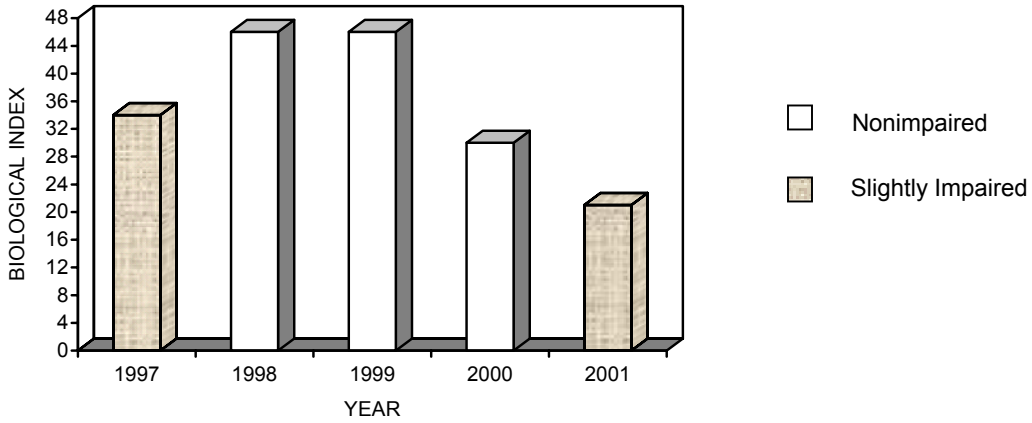
Parameters Exceeding Standards				
Parameter	**Date**	**Value**	**Standard**	**State**
TFe	02/25/02	310 µg/l	300 µg/l	N.Y. aquatic (chronic)

Date	WQI	Parameters Exceeding 90th Percentile							
07/25/01	30.7	None							
11/05/01	32.8	None							
02/25/02	58	DO							
04/22/02	57.1	None							

Biological and Habitat Summary	
Number of Taxa	12
Diversity Index	1.9
RBP Score	21
RBP Condition	Slightly Impaired
Total Habitat Score	131
Habitat Condition Category	Supporting



Water Quality Index



Biological Index

Additional water quality analysis indicated that only dissolved oxygen exceeded the 90th percentile, also in February 2002 (Table 50).

Three increasing and eight decreasing trends occurred at SUSQ 340. Strong, significant increasing trends occurred in total chloride concentrations and a significant increasing trend occurred in unadjusted total solids concentrations. Strong, significant decreasing trends were evident in unadjusted and flow-adjusted total ammonia, total nitrogen, total phosphorus, and total iron (Table 19).

Susquehanna River at Sayre, Pa. (SUSQ 289.1)

The Susquehanna River at Sayre, Pa., (SUSQ 289.1) was nonimpaired in biological community for the fourth consecutive year. This site had the best scores in the Hilsenhoff Biotic Index (4.0), EPT taxa (13), and percent Chironomidae (zero percent) metrics. Pollution intolerant taxa present at this site included *Promoresia, Heterocloeon, Serratella, Stenonema, Isonychia, Agnetina,* and *Macrostemum*.

No parameters exceeded state standards in fiscal year 2002, and no parameters exceeded the 90th percentile in July or November 2001. Parameters that exceeded the 90th percentile in February and April 2002 were dissolved oxygen, total and dissolved nitrogen, total and dissolved ammonia, total and dissolved nitrate, total phosphorus, and total and dissolved nitrite (Table 51).

SUSQ 289.1 had two increasing and 12 decreasing trends in fiscal year 2002. The two increasing trends were in unadjusted and flow-adjusted total chloride. Strong, significant, decreasing trends were found for both unadjusted and flow-adjusted concentrations of total ammonia, total nitrogen, total phosphorus, total manganese, total iron, and flow-adjusted total aluminum. Significant, decreasing trends occurred for unadjusted concentrations of total aluminum (Table 19).

Susquehanna River at Marietta, Pa. (SUSQ 44.5)

The Susquehanna River at Marietta, Pa., (SUSQ 44.5) had a nonimpaired biological community in August 2001. This site had the best scores for percent Ephemeroptera (26.43 percent) and percent Chironomidae (zero percent) metrics of all the Pennsylvania-Maryland streams. Only four taxa were organic pollution intolerant. Those four taxa were *Stenonema, Isonychia, Macrostemum*, and *Psychomyia*. No parameters exceeded water quality standards; however, water quality analysis indicated that conductivity, total and dissolved solids, total chloride, total sulfate, total and dissolved phosphorus, total and dissolved orthophosphates, total organic carbon, and total and dissolved nitrite were elevated at this station (Table 52).

There were three increasing trends and 11 decreasing trends at SUSQ 44.5 during fiscal year 2002. The increasing trends were strong, significant trends for unadjusted and flow-adjusted total chloride and a significant trend for unadjusted total solids. Strong, significant, decreasing trends existed for unadjusted and flow-adjusted total ammonia, total phosphorus, total iron, total aluminum, total manganese, and for flow-adjusted total sulfate (Table 19).

Susquehanna River at Conowingo, Md. (SUSQ 10.0)

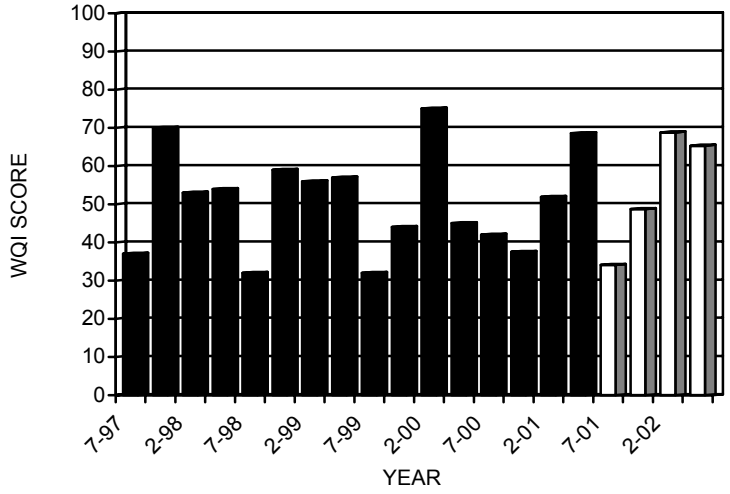
No macroinvertebrate sampling was performed in the Susquehanna River at Conowingo, Md., (SUSQ 10.0) due to deep waters and a lack of riffle habitat. None of the water quality parameters exceeded Pennsylvania or Maryland state standards. In the previous year, dissolved oxygen values exceeded standards; however, values in fiscal year 2002 showed improvement from values around 3 mg/l to values around 8 mg/l. Parameters that exceeded the 90th percentile were total and dissolved ammonia, dissolved nitrite, total organic carbon, total and dissolved manganese, conductivity, total phosphorus, total sulfate, total iron, total orthophosphate, turbidity, dissolved oxygen, and total aluminum.

Table 51. Water Quality Summary Susquehanna River (SUSQ 289.1) at Sayre, Pa.

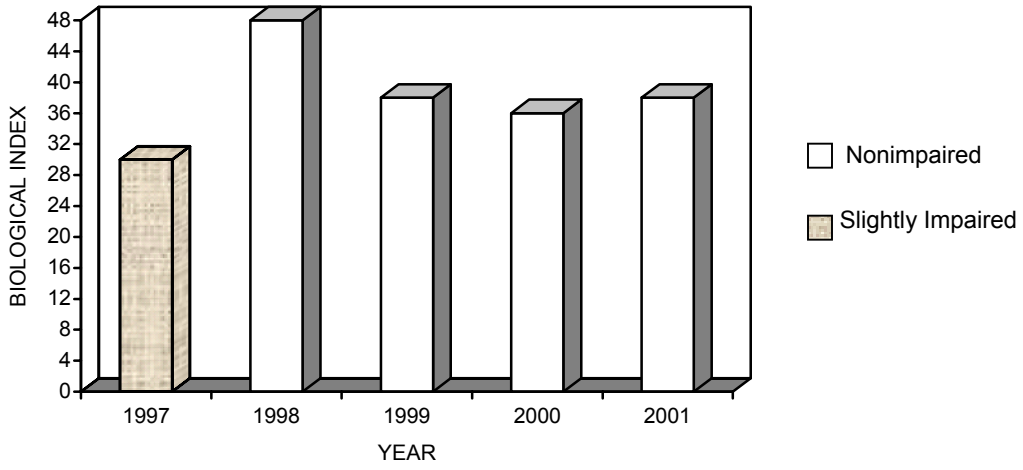
Parameters Exceeding Standards				
Parameter	**Date**	**Value**	**Standard**	**State**
None				

Date	WQI	Parameters Exceeding 90th Percentile							
07/24/01	34.1	None							
11/05/01	48.7	None							
02/25/02	68.8	DO	DN	TN	DNH3	TNH3	DNO3	TNO3	TP
04/22/02	65.3	DN	TN	DNO2	TNO2	DNO3	TNO3	TP	

Biological and Habitat Summary	
Number of Taxa	17
Diversity Index	2.2
RBP Score	38
RBP Condition	Nonimpaired
Total Habitat Score	156
Habitat Condition Category	Excellent



Water Quality Index



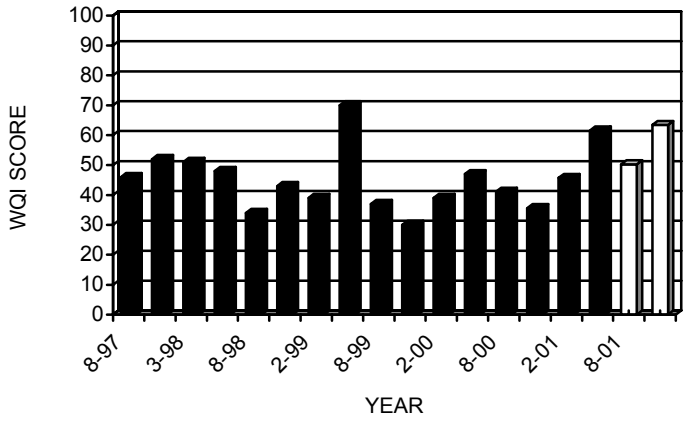
Biological Index

Table 52. Water Quality Summary Susquehanna River (SUSQ 44.5) at Marietta, Pa.

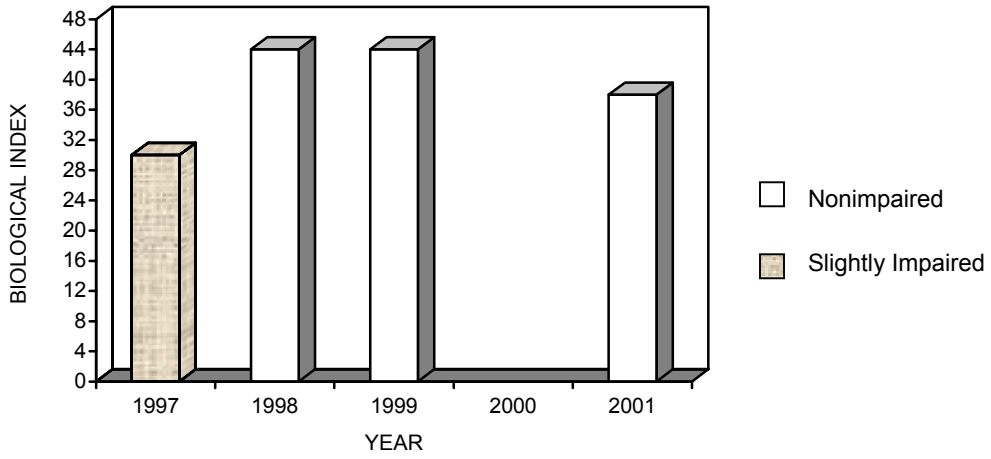
Parameters Exceeding Standards				
Parameter	**Date**	**Value**	**Standard**	**State**
None				

Date	WQI	Parameters Exceeding 90th Percentile							
08/01/01	50.3	COND	DS	TS	TOC	TCl	TSO4		
11/13/01	63.4	DS	TS	DNO2	TNO2	DP	TP	DPO4	TPO4
		TCl							

Biological and Habitat Summary	
Number of Taxa	18
Diversity Index	2.3
RBP Score	40
RBP Condition	Nonimpaired
Total Habitat Score	145
Habitat Condition Category	Excellent



Water Quality Index



Biological Index

Total manganese exceeded the 90th percentile in all four seasons (Table 53). SUSQ 10.0 had the highest values for dissolved nitrite (0.09 mg/l), total aluminum (518 µg/l), and turbidity (12.5 ntu) of all the interstate streams (Table A2).

At SUSQ 10.0, two increasing trends and 12 decreasing trends were observed. The only increasing trends were strong, significant, increasing trends in unadjusted and flow-adjusted total chloride. Strong, significant, downward trends occurred in both unadjusted and flow-adjusted total nitrogen, total phosphorus, total iron, total aluminum, and total manganese and unadjusted total ammonia. A significant, decreasing trend was evident in flow-adjusted total ammonia (Table 19).

Tioga River (TIOG 10.8)

The Tioga River at Lindley, N.Y., (TIOG 10.8) had a slightly impaired biological community during July 2001, and habitat conditions were considered excellent with large deep riffles. Total iron and total aluminum exceeded the New York aquatic standards in April 2002. Parameters that exceeded the 90th percentile were dissolved oxygen, dissolved nitrite, total and dissolved manganese, total and dissolved solids, total sulfate, total iron, total aluminum, total orthophosphate, and turbidity (Table 54).

Higher total iron and total aluminum values at this site may have been due to acid mine drainage in the headwaters of the Tioga River. The Tioga-Hammond Reservoir, located upstream of TIOG 10.8, alleviated 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.

TIOG 10.8 had only one increasing trend and 12 decreasing trends. A strong, significant increase was evident in flow-adjusted aluminum. Strong, significant, decreasing trends were found for adjusted and unadjusted total ammonia, total nitrogen, total phosphorus, total sulfate, total manganese, and for unadjusted total iron. A significant, decreasing trend occurred in unadjusted total solids (Table 19).

Group 3 Sites

Babcock Run (BABC)

During the 2001-2002 sampling season, the macroinvertebrate community of Babcock Run near Cadis, Pa., was designated slightly impaired. This site scored fairly well in percent Ephemeroptera (30.5 percent) and Shannon-Weaver (2.25) metrics. Ephemeroptera taxa present in Babcock Run included *Acentrella* (Ephemeroptera: Baetidae), *Cinygmula* (Ephemeroptera: Heptageniidae), *Epeorus*, *Stenacron* (Ephemeroptera: Heptageniidae), *Stenonema,* and *Paraleptophlebia* (Ephemeroptera: Paraleptophlebiidae). Physical habitat conditions were mostly forested and designated excellent, and all field chemistry parameters were normal.

Beagle Hollow Run (BEAG)

Nonimpaired biological conditions existed at Red House/Beagle Hollow Run near Osceola, Pa., during May 2002. Pollution intolerant taxa at this site included, *Prosimulium* (Diptera: Simuliidae), *Hexatoma, Limnophila, Ameletus* (Ephemeroptera: Ameletidae), *Drunella* (Ephemeroptera: Ephemerellidae), *Epeorus, Paraleptophlebia, Sweltsa* (Plecoptera: Chloroperlidae), *Leuctra, Amphinemura* (Plecoptera: Nemouridae), *Isoperla* (Plecoptera: Perlodidae), *Wormaldia* (Trichoptera: Philopotamidae), and *Rhyacophila*. Habitat conditions were considered excellent, and all field chemistry parameters were within normal ranges.

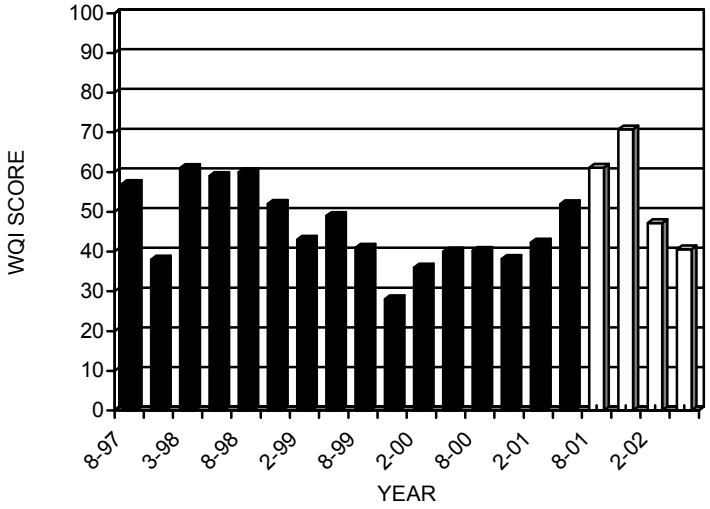
Bill Hess Creek (BILL)

Bill Hess Creek near Nelson, Pa., was designated slightly impaired although in 2000-2001 it served as the reference site for the Group 3 streams.

Table 53. Water Quality Summary Susquehanna River (SUSQ 10.0) at Conowingo, Md.

Parameters Exceeding Standards				
Parameter	**Date**	**Value**	**Standard**	**State**
None				

Date	WQI	Parameters Exceeding 90th Percentile							
08/01/01	61.1	DNH3	TNH3	DNO2	TOC	DMn	TMn		
11/12/01	70.8	COND	DNH3	TNH3	TP	TSO4	TFe	TMn	TPO4
		TURB	DO						
02/20/02	47.2	DO	TFe	DMn	TMn	TAl	TURB		
04/18/02	40.6	TMn	TURB						



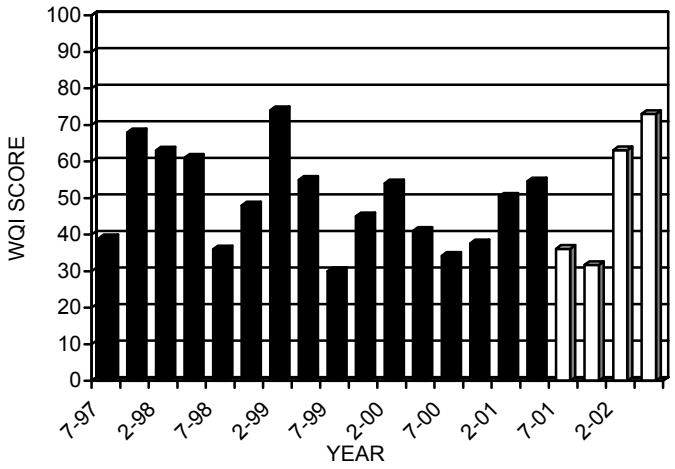
Water Quality Index

Table 54. Water Quality Summary Tioga River at Lindley, N.Y.

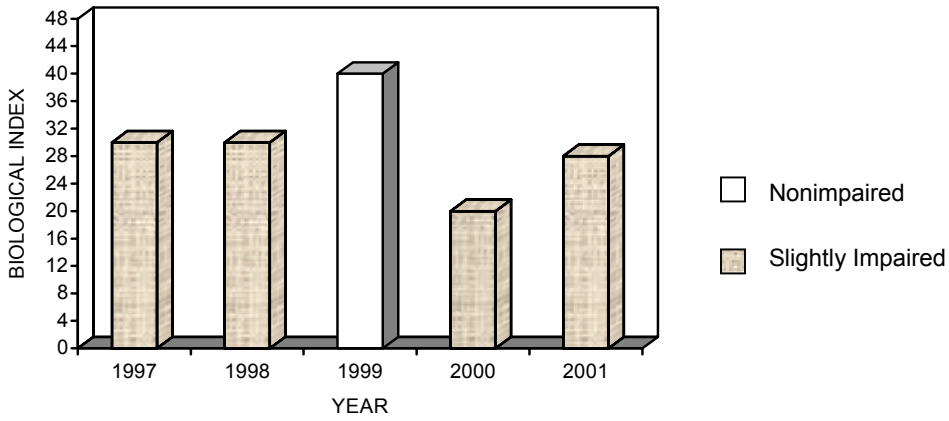
Parameters Exceeding Standards				
Parameter	**Date**	**Value**	**Standard**	**State**
TFe	04/23/02	408 µg/l	300 µg/l	N.Y. aquatic (chronic)
TAl	04/23/02	314 µg/l	100 µg/l	N.Y. aquatic (chronic)

Date	WQI	Parameters Exceeding 90th Percentile							
07/23/01	36.1	None							
11/06/01	31.7	None							
02/26/02	63.1	DO	DNO2	TSO4	DMn	TMn			
04/23/02	73	DS	TS	TSO4	TFe	DMn	TMn	TAl	TPO4
		TURB							

Biological and Habitat Summary	
Number of Taxa	18
Diversity Index	2.2
RBP III Score	28
RBP III Condition	Slightly Impaired
Total Habitat Score	163
Habitat Condition Category	Excellent



Water Quality Index



Biological Index

The sample taken at Bill Hess Creek scored well in taxa richness (21), percent Ephemeroptera (34.5 percent), and Shannon-Weaver Diversity Index (2.38). The habitat was rated excellent with woody debris present and some moss and algae covering the rocks. However, some signs of disturbance were evident such as a four-wheeler trail crossing through the stream and the remnants of a concrete bridge. All field chemistry parameters were within acceptable limits, although conductivity (285 µmhos/cm) and alkalinity (96 mg/l) were the highest of the Group 3 streams (Table A3).

Bird Creek (BIRD)

Bird Creek near Webb Mills, N.Y., was designated slightly impaired. This site had a high percent Ephemeroptera metric score (49.2 percent), and was dominated by *Drunella*. The habitat was designated excellent, and was located in a predominantly forested area. All field chemistry parameters fell within acceptable ranges.

Biscuit Hollow (BISC)

Slightly impaired biological conditions existed at Biscuit Hollow near Austinburg, Pa., during this survey. The most abundant taxa present at this site were *Amphinemura*. The physical habitat at this site was considered partially supporting, with a poor riparian vegetative zone width, frequency of riffles, instream cover, sediment deposition, and epifaunal substrate. The site had eroded banks and was located in an agricultural area downstream of a beaver dam. Field chemistry parameters were within normal ranges.

Briggs Hollow Run (BRIG)

Briggs Hollow Run near Nichols, N.Y., was designated slightly impaired during the 2002 sampling season. It had the best Hilsenhoff Biotic Index (0.51) and percent Chironomidae (1.54 percent) metric scores, along with a good score for percent Ephemeroptera (48.5 percent). Pollution intolerant taxa included: *Hexatoma, Ameletus*, *Ephemerella, Cinygmula, Epeorus, Leucrocuta, Paraleptophlebia, Haploperla* (Plecoptera: Chloroperlidae), *Leuctra, Amphinemura, Acroneuria*, and *Isoperla*. The site was dominated by the pollution-tolerant taxa Chironomidae in May 2001; however, in May 2002, the percent Chironomidae metric was low and the site was dominated by *Haploperla* and *Epeorus*. The physical habitat was designated supporting with poor bank stability and a small riparian vegetative zone. The area was agricultural with a horse pasture along the stream. All field chemistry parameters were within acceptable limits.

Bulkley Brook (BULK)

Bulkley Brook near Knoxville, Pa., had a slightly impaired biological community and excellent habitat conditions during the 2001-2002 sampling season. The percent Ephemeroptera metric score (36.1 percent) was good at this site. The habitat was rated excellent, with ample stream cover and woody debris. Although the riparian zone was wide, the stream had a high amount of sediment deposition. 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 2002. This site had good taxonomic richness (21), percent dominant taxa (16.2 percent), and Shannon-Weaver Index (2.54) metric scores. The physical habitat of the stream was designated supporting with poor velocity/depth regimes and a large amount of algae. All field chemistry parameters were normal.

Cook Hollow (COOK)

Cook Hollow near Austinburg, Pa., had a slightly impaired biological community. This site scored well in the taxonomic richness (20) and Shannon-Weaver (2.31) metrics, but poorly in percent Chironomidae. Chironomidae dominated this sample with 52 Chironomidae comprising 37 percent of the sample. The habitat was supporting, 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 slightly impaired with an excellent physical habitat. This site had the highest number of taxa (24) of all Group 3 sampling sites, and the second highest Shannon-Weaver Diversity Index value (2.6). An abandoned beaver dam was located upstream of the sampling site on Deep Hollow Brook. The field chemistry values improved from last year. Dissolved oxygen improved from 4.99 mg/l to 8.78 mg/l, alkalinity improved from 8 mg/l to 12 mg/l, and the temperature improved from 18.2 to 13.0 degrees Celsius from 2001 to 2002, respectively. Although improved, the alkalinity level is still lower than the Pennsylvania state standard for aquatic life.

Denton Creek (DENT)

Denton Creek near Hickory Grove, Pa., had a moderately impaired biological community during May 2002. DENT received low metric scores, particularly in Hilsenhoff Biotic Index (5.38), EPT taxa (5), and percent Chironomidae (45.9 percent). The sample was dominated by 62 Chironomidae comprising 45.9 percent of the sample. This site had the lowest pH (6.8) and alkalinity (10.0) of all the Group 3 sites (Table A3). All the field chemistry parameters were within acceptable limits, except alkalinity, which was lower than the Pennsylvania state standard for aquatic life. The habitat was rated excellent with high scores for frequency of riffles and velocity/depth regimes. This sampling site is located downstream of Hawkins Lake; however, swimming, boating, and camping are not allowed at this lake.

Dry Brook (DRYB)

Dry Brook at Waverly, N.Y., was designated severely impaired in May 2002 due to biological scores of zero in all the metrics except percent Ephemeroptera and Shannon-Weaver Diversity Index. DRYB had the lowest scores of all Group 3 streams in taxonomic richness (9) and EPT Index (4). Chironomidae dominated this sample with 86 comprising 62.3 percent of the sample. This stream runs directly through residential and commercial areas in the town of Waverly, and is rated partially supporting in habitat condition due to channel alteration and lack of vegetated riparian zone. All field chemistry parameters were within acceptable limits, although the temperature (16.1 degrees Celsius) was the highest of all Group 3 sites (Table A3).

Little Wappasening Creek (LWAP)

The biological community of Little Wappasening Creek near Nichols, N.Y., was designated nonimpaired in May 2002, which was an improvement from the moderately impaired rating during the 2001 sampling season. The site had high taxonomic richness (21), percent Ephemeroptera (53.1 percent), EPT Index (15), and Shannon-Weaver Diversity Index (2.37) values compared to other Group 3 sites. Pollution intolerant taxa at this site included *Prosimulium*, *Hexatoma, Ameletus, Ephemerella, Cinygmula, Epeorus, Paraleptophlebia, Haploperla, Sweltsa*, *Leuctra, Amphinemura, Acroneuria, Isoperla*, and *Neophylax* (Trichoptera: Uenoidae). The physical habitat also was improved greatly from designated nonsupporting to excellent. In 2001, dredging equipment was found in the stream and timber was being removed from the streambanks. In 2002, no evidence of dredging or timber removal was noted, and there was adequate woody debris and stream cover. All field chemistry parameters were normal.

Parks Creek (PARK)

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 nonimpaired biological community during the 2002 sampling season. This site had good taxonomic richness (22), Hilsenhoff Biotic Index (1.2), percent Chironomidae (3.3 percent), and the highest EPT Index (18) of all Group 3 streams. A number of pollution intolerant taxa existed at the Parks Creek sampling site, including *Prosimulium, Hexatoma*, *Ameletus, Ephemerella, Cinygmula, Epeorus, Paraleptophlebia, Haploperla, Sweltsa, Leuctra, Amphinemura*, *Isoperla, Wormaldia*, and *Rhyacophila*. The site had a supporting habitat, unlike the previous rating of nonsupporting; however, the site still

received low ratings for condition of banks and sediment deposition. All field chemistry parameters were within acceptable ranges.

Prince Hollow Run (PRIN)

The biological community of Prince Hollow Run near Cadis, Pa., was designated severely impaired with a partially supporting habitat. There was evidence of dredging, heavily eroded banks, and human debris. Furthermore, the site was located in an agricultural area with a thin vegetated riparian zone, poor vegetative protective cover, poor condition of banks, sediment deposition, and lack of riffles. PRIN had a poor Hilsenhoff Biotic Index score (5.44), and the worst metric scores in percent dominant taxa (83.7 percent), percent Chironomidae (83.7 percent), and Shannon-Weaver Diversity Index (0.83) of all Group 3 sites. The field chemistry parameters were within limits; however, the temperature was the highest (16.1 degrees Celsius) and the dissolved oxygen was the lowest (7.94 mg/l) of all the Group 3 sites (Table A3).

Russell Run (RUSS)

The biological community of Russell Run near Windham, Pa., was designated slightly impaired with a supporting habitat. The stream channel appeared to be rather transient, and the condition of banks received a low rating. The habitat had improved from the previous year when the stream had been channelized and the right bank timbered close to the time of sampling. 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 good metric scores for Hilsenhoff Biotic Index and percent Chironomidae, and the highest metric score for percent Ephemeroptera. Ephemeropteran taxa present at this site included *Acerpenna* (Ephemeroptera: Baetidae), *Baetis* (Ephemeroptera: Baetidae), *Ephemerella, Cinygmula, Epeorus, Isonychia*, and *Paraleptophlebia*. The most abundant taxa at this site was the organic pollution intolerant *Epeorus* (65). Dredging was being done on the stream below where the sample was taken, and possibly had been done in the sampling location previously. All field chemistry parameters were within normal ranges.

Smith Creek (SMIT)

The biological conditions at Smith Creek near East Lawrence, Pa., were designated moderately impaired, while the stream had supporting habitat conditions. This site had a low percent Ephemeroptera metric score; however, the dominant taxon was the pollution intolerant stonefly *Amphinemura* (86). The water level was low at the time of sampling and the stream was impacted by large amounts of silt and sediment. There were no extreme values in the field chemistry parameters.

Strait Creek (STRA)

A moderately impaired biological community existed at Strait Creek near Nelson, Pa., which was a decrease from the nonimpaired rating in fiscal year 2001. One of the largest differences was that the 2001 sample had four taxa of Trichoptera, whereas no Trichoptera taxon was present in 2002. Also, the most abundant taxon changed from *Paraleptophlebia* (34) to *Psephenus* (61). This change in dominant taxa may be because *Psephenus* is a scraper, which feeds on algae. Large amounts of algae and water cress were noted in the stream. The physical habitat was designated supporting due to lack of vegetative cover on the banks and poor velocity/depth regimes. All field chemistry parameters were within normal limits, although alkalinity was rather high (72 mg/l) relative to the other Group 3 streams (Table A3).

White Branch Cowanesque River (WBCO)

During May 2002, moderately impaired conditions existed at White Branch Cowanesque River near North Fork, Pa. This site had been nonimpaired in May 2000 with a number of pollution intolerant taxa; however, during May 2001 and May 2002, it has been moderately impaired. WBCO scored poorly for all the metrics with the lowest ranking of all the Group 3

sites for Hilsenhoff Biotic Index (5.67) and percent Ephemeroptera (1.37 percent) metrics. The sample was dominated by the pollution tolerant taxa Chironomidae (62) comprising 42.5 percent of the sample. The habitat was partially supporting due to low scores in sediment deposition, embeddedness, and instream cover. The stream discharge was high at the time of sampling, and the water was turbid. Cows had direct access to the stream in a pasture upstream of the sampling site. Also, there were silt fences located on the right bank of the stream suggesting that work was being done near the sampling site. Despite these disturbances, field chemistry measurements were within acceptable ranges. In fact, dissolved oxygen was the highest value (12.59 mg/l) of any of the Group 3 streams, which would not be expected since this site was downstream of a dam; however, the stream was at high flow due to recent rains (Table A3).

White Hollow (WHIT)

White Hollow near Wellsburg, N.Y., was designated as the reference site for Group 3 streams in fiscal year 2002. This site had the highest number of taxa (23) and number of EPT (16), and also had the best scores in percent dominant taxa (14.17 percent) and Shannon-Weaver Diversity Index (2.70). Macroinvertebrate taxa with a Hilsenhoff tolerance value of three or less included *Prosimulium*, Antocha, Dicranota, *Hexatoma*, *Ameletus*, *Ephemerella*, *Epeorus*, *Haploperla*, *Sweltsa*, Leuctra, *Amphinemura*, *Ostrocerca* (Plecoptera: Nemouridae), *Isoperla*, *Yugus* (Plecoptera: Perlodidae), *Diplectrona, Wormaldia*, and *Rhyacophila*. The physical habitat was designated excellent with good stream cover from a largely coniferous forest. 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.

Several management implications can be extracted from the chemical water quality, macroinvertebrate community, and physical habitat data collected from sampling areas. A Pearson Product Moment Correlation was performed for each reference category for average WQI score, RBP III score, and physical habitat score. Statistically significant relationships ($p<0.05$) observed among the chemical characteristics, the biological communities, and physical habitats of the interstate streams are described below. These observations, although based on a small sample size, are presented as possible subject areas for future research and as issues to be considered by aquatic resource managers, local interest groups, elected officials, and other policy-makers.

New York – Pennsylvania Sites

The nine sites in this reference category have shown and continue to show a large degree of variability in water quality. There was no significant correlation between RBP III score and water chemistry (WQI score), and no significant correlation between RBP III score and habitat. In fiscal year 1999 and fiscal year 2000, a significant ($p<0.05$) positive correlation between RBP III score and habitat score existed; however, that correlation was not observed in the data for fiscal year 2001 or fiscal year 2002. The habitat in the New York-Pennsylvania border streams often is noted to be unstable due to the glacial history of these streams and the practice of dredging for gravel in streams.

Pennsylvania – Maryland Sites

There was no significant correlation between RBP III score and water chemistry, and no significant correlation between RBP III score and habitat between the eight Pennsylvania-Maryland border sites. In fiscal year 2001, there was a significant ($p<0.05$) negative correlation between biological score and WQI. There were no significant correlations noted during fiscal year 2000; however, during the 1999 fiscal year, a significant negative correlation also existed