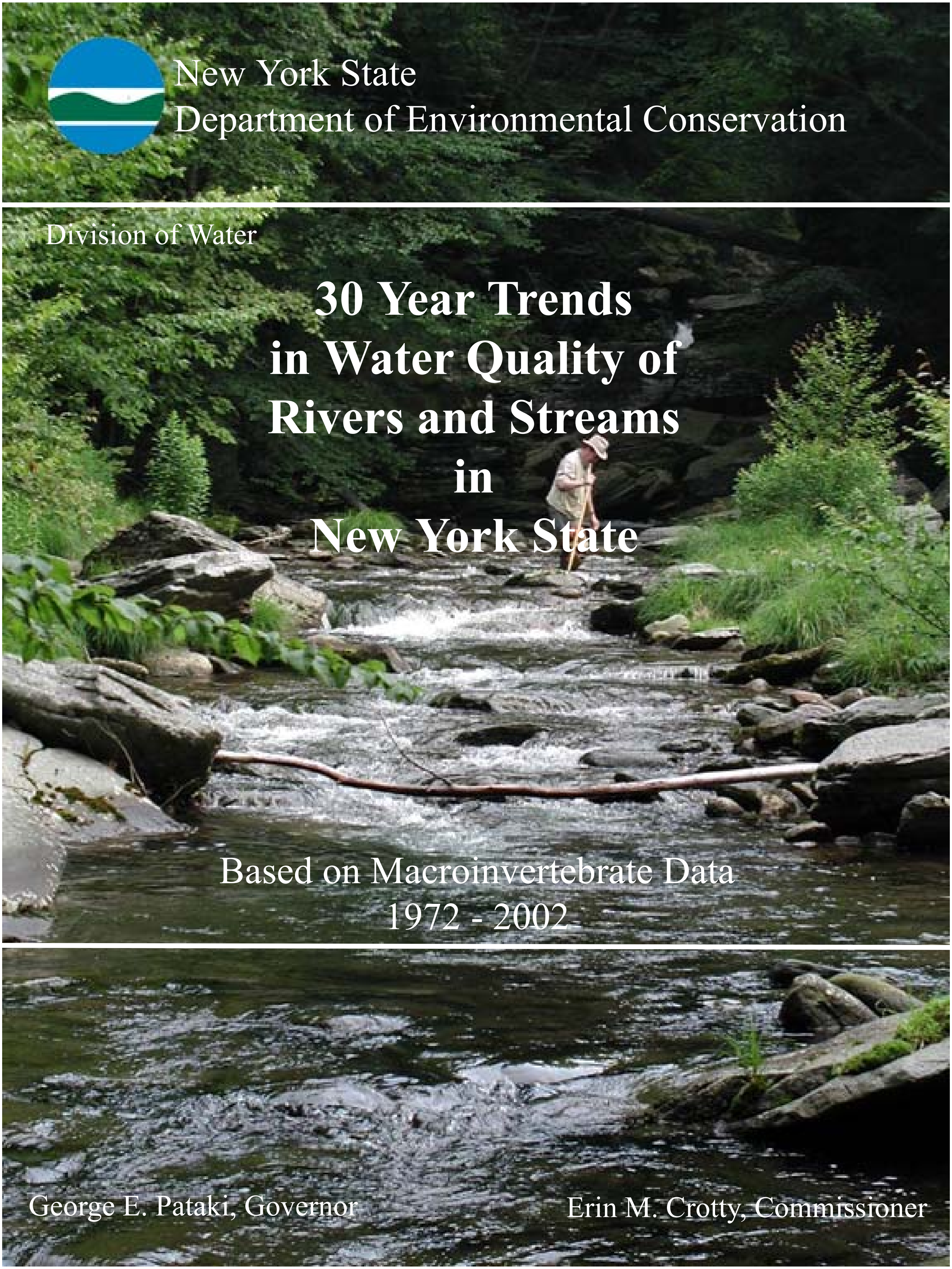

New York State
Department of Environmental Conservation

Division of Water

30 Year Trends in Water Quality of Rivers and Streams in New York State

Based on Macroinvertebrate Data
1972 - 2002

George E. Pataki, Governor

Erin M. Crotty, Commissioner

30 YEAR TRENDS IN WATER QUALITY OF RIVERS AND STREAMS IN NEW YORK STATE BASED ON MACROINVERTEBRATE DATA 1972-2002

2004

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SUMMARY

Since 1972 the Stream Biomonitoring Unit has been using benthic macroinvertebrate communities to monitor and assess water quality in New York State streams . The 20th anniversary of the Clean Water Act and of the Stream Biomonitoring Unit in 1992 provided the impetus for the first examination of temporal water quality trends in New York State. “20 Year Trends in Water Quality of Rivers and Streams in New York State based on Macroinvertebrate Data”, published in 1993, provided a comprehensive summary of findings on rivers and streams of New York State and examined temporal trends in water quality from 1972 to 1992. The present effort, a companion to the 1993 report, follows up on that document and examines water quality trends in the State from 1992-2002.

Macroinvertebrates are larger-than-microscopic invertebrate animals that inhabit aquatic habitats; freshwater forms are primarily aquatic insects, worms, clams, snails, and crustaceans. They are widely used today as indicators of water quality. Benthic macroinvertebrate community data lends itself well to the discernment of temporal trends in water quality. In addition to the attributes inherent in biological monitoring, comparability of our data is aided by the advantages of similarity in sampling methods, sampling sites, and data analysis, as well as few personnel changes. The continuity within the Stream Biomonitoring Unit since 1972 has made possible temporal trend analysis that takes full advantage of the data collected in the 1972-2002 period.

From 1993 to 2002, the Stream Biomonitoring Unit sampled macroinvertebrates at 1532 sites on 917 streams in New York State. A great majority of these sites were not sampled prior to 1993, and thus are unavailable for determining water quality trends for the 1972-2002 period. Of the sites previously sampled, 278 allow temporal trend analysis.

However these most recently sampled sites do provide a positive picture of current water quality. Of the 1532 currently monitored sites (those sampled since 1992), 45% are assessed as non-impacted, 41% as slightly impacted, 13% as moderately impacted, and 1% as severely impacted. Since non-impacted and slightly impacted sites are considered to meet designated uses, fully 86% of the State’s assessed waters are considered to support aquatic life uses.

The probable causes of impacts at those sites assessed as other than non-impacted are dominated by nonpoint source nutrient enrichment, affecting 52% of these sites. Other causes are: 15% complex (municipal/industrial inputs), 11% organic wastes (sewage and animal wastes), 6% toxicity, 6% impoundment, 5% siltation, and 5% undetermined.

With regard to water quality trends, 20% of the temporal trends sites improved since 1992, 19% declined, and 61% showed no change. Most of the improvements (64%) were attributable to improved treatment or elimination of municipal and/or industrial inputs. Most of the declines in water quality (63%) are found to be previously non-impacted sites that have declined due to nonpoint source nutrient enrichment. These account for 76% of the declines. A secondary cause of declined water quality is in the combined categories of organic wastes and municipal/industrial inputs, responsible for 24% of the declines overall. Many of these are considered to be caused by aging infrastructure, specifically wastewater treatment plants that were built or upgraded in the 1970's and 1980's, and are now functioning beyond capacity or at reduced levels of efficiency.

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INTRODUCTION

The Stream Biomonitoring Unit was begun in New York State in 1972 with the mandate of monitoring and assessing the water quality of the State's rivers and streams using benthic macroinvertebrate communities. Since then the Unit has sampled most of the major rivers and streams across the State, amassing a large amount of biological data. Most of the reports of these data have emphasized spatial trends in water quality, rather than temporal trends.

The 20th anniversary of the Clean Water Act in 1992 provided the impetus for the first examination of temporal biologically-based water quality trends in New York State. “Twenty Year Trends in Water Quality of Rivers and Streams in New York State Based on Macroinvertebrate Data,” published in 1993, provided a comprehensive summary of findings on rivers and streams of New York State and examined temporal trends in water quality from 1972 to 1992. The present effort, a companion to the 1993 report, follows up on that document and examines water quality trends in the State from 1992-2002.

The biomonitoring begun in 1972 by the Stream Biomonitoring Unit and the Avon Pollution Investigations Unit was a pioneer effort in which few states were engaged. Today water quality monitoring - biological as well as chemical - is mandated by the Environmental Protection Agency, and most states have a biomonitoring program that uses benthic macroinvertebrate communities as water quality indicators. In New York State, the effort that began in 1972 was the second round of statewide biomonitoring surveys. The first was conducted by the Conservation Department in the 1926-1939 period, and documented many cases of severe pollution in the State's rivers and streams.

Biological monitoring as applied here refers to the use of resident benthic macroinvertebrate communities as indicators of water quality. Macroinvertebrates are larger-than-microscopic invertebrate animals that inhabit aquatic habitats; freshwater forms are primarily aquatic insects, worms, clams, snails, and crustaceans. Nearly all streams are inhabited by a community of benthic macroinvertebrates. The species comprising the community each occupy a distinct niche defined and limited by a set of environmental requirements. The composition of the macroinvertebrate community is thus determined by many factors, including habitat, food source, flow regime, temperature, and water quality. The community is presumed to be controlled primarily by water quality if the other factors are determined to be constant or optimal. Community components which can change with water quality include species richness, diversity, balance, abundance, and presence/absence of tolerant or intolerant species. Various indices or metrics are used to measure these community changes. Assessments of water quality are based on metric values of the community, compared to expected metric values. The complete rationale for biomonitoring, in addition to the methods for its application are contained in Appendices 1-10.

Benthic macroinvertebrate community data lends itself well to the discernment of temporal trends in water quality. In addition to the attributes inherent to biological monitoring, comparability of our data is aided by the advantages of similarity in sampling methods, sampling sites, and data analysis, as well as few personnel changes. The biomonitoring continuity within the Stream Biomonitoring Unit has made possible temporal trend analysis that takes full advantage of the baseline of data collected in the 1970's. Biological monitoring using community analysis of macroinvertebrates is only one branch of the overall water quality monitoring program. The other major parts are water column chemistry, sediment chemistry, toxicity testing, fish community analysis, and fish flesh analysis, and macroinvertebrate tissue analysis. The most comprehensive assessment of water quality is one which incorporates all of the above elements. Due to limited resources, it is rarely possible to achieve such a complete assessment at most sites. The water quality assessments given in this report are based solely on macroinvertebrate data, and should be recognized as sometimes differing from comprehensive assessments based on sampling several aspects of the ecosystem.

SUMMARY OF WATER QUALITY TRENDS, 1993-2002

From 1993 to 2002, the Stream Biomonitoring Unit sampled macroinvertebrates at 1532 sites on 917 streams in New York State. Compared to sampling 721 sites on 170 streams for the 1972-1992 period, the last decade represents a major effort to increase the coverage of assessed waters and to provide a better overall picture of water quality in the State. A great majority of these sites were not sampled prior to 1993, and thus are unavailable for generating water quality trends for the 1972-2002 period. However, of the sites previously sampled, 278 allow temporal trend analysis.

With regard to selection of sampling sites, during the 1972-1992 period site selection was often skewed toward impacted stream reaches, and the inventory of assessments for that period was not representative of all flowing waters in the state. In 1996, an effort to move toward more complete coverage of all waters in the State led to a large increase in streams sampled, and also to the selection of sites that were not previously sampled, many of which were non-impacted. Thus the comparison of assessments of all sites from 1992 to 2002 showing an increase in the number of non-impacted sites partially reflects the site selection process.

Examining the current status of all assessed sites, 45% are assessed as non-impacted, 41% as slightly impacted, 13% as moderately impacted, and 1% as severely impacted (Figure 0-1). Whereas non-impacted and slightly impacted sites are considered to meet designated uses, fully 86% of the State's assessed running waters exhibit good water quality, and are considered to support aquatic life uses.

The 1992 water quality assessments showed 36% of sites as non-impacted, 46% slightly impacted, 14% moderately impacted, and 4% severely impacted.

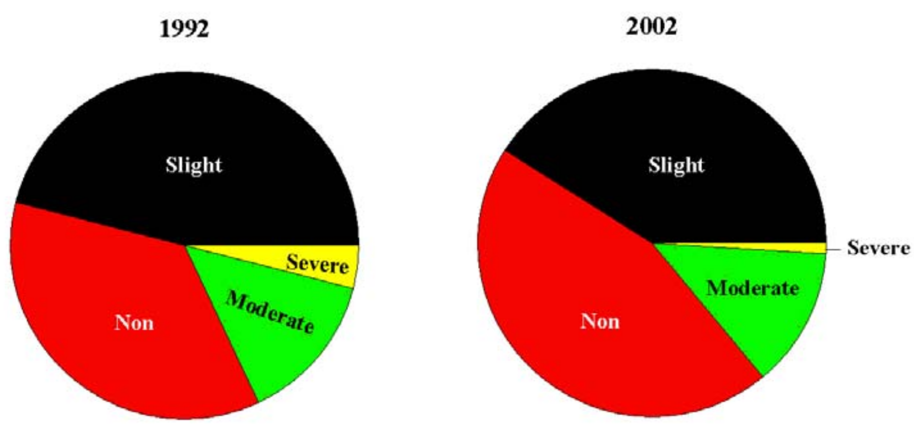


Figure 0-1. Assessed water quality at all sites, 1992 and 2002.

The probable causes of impairment are dominated by nonpoint source nutrient enrichment, affecting 52% of the currently assessed sites other than non-impacted sites. Other causes are: 15% complex (municipal/industrial inputs), 11% organic wastes (sewage and animal wastes), 6% toxicity, 6% impoundment, 5% siltation, and 5% undetermined (Figure 0-2). These probable causes of impairment were determined by Impact Source Determination, a method using faunal models empirically derived from macroinvertebrate data, first developed and applied by the Stream Biomonitoring Unit in 1994 and published in the scientific literature in 2002. Because the method was developed in 1994, no trend comparisons can be made to determine changes in causes of impact.

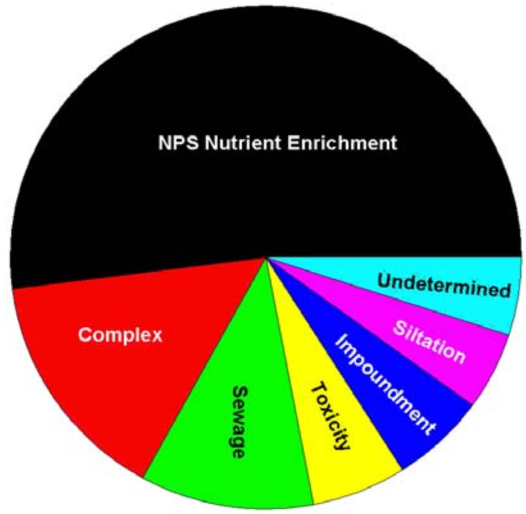


Figure 0-2. Causes of impact at impacted sites.

Water quality trends were determined by comparing assessments at the 278 temporal trends sites before and after 1992. Some of these comparisons are based on a limited number of site visits, and are considered provisional, subject to further monitoring and verification. The breakdown of trends for the 1992-2002 period is: 20% improved, 19% declined, and 61% showing no change. This represents a substantial change compared to trends observed in 1992, specifically an increase in the category of declined water quality (Figure 0-3). Of the improved sites, most (64%) were attributable to improved treatment or elimination of municipal and/or industrial inputs.

Examining the sites where water quality declined, most (63%) are attributable to previously non-impacted sites becoming slightly impacted, mostly (76%) through nonpoint source nutrient enrichment. A typical example of this is Ganargua Creek, in Wayne County. When this stream was sampled in 1974 and 1980, water quality was excellent. The site in Macedon was used as a model for non-impacted water quality. Ganargua Creek has its headwaters in the town of Victor, a rapidly growing suburb of Rochester. In the 1980's and 1990's, development increased along the creek, including the construction of a golf course. Subsequent sampling of the stream in 1995, 1996, 2001 and 2002 showed slightly impacted conditions from nonpoint source nutrient enrichment. The stream exhibits visible signs of enrichment at Macedon, often inundated with duckweed, filamentous algae, moss, and suspended algae.

A secondary cause of declines in water quality is in the combined categories of organic wastes and municipal/industrial inputs, responsible for 24% of the declines overall. Many of these declines are considered to be caused by aging infrastructure, specifically wastewater treatment plants that were built or upgraded in the 1970's and 1980's, and are now functioning beyond capacity or at reduced levels of efficiency.

An example of this type of decline is seen in the Genesee River in Rochester. The river upstream of the canal junction exhibited a substantial decline in water quality from 1989 to 1999. During the 1980's this site had shown greatly improved water quality following the 1977 upgrade of the Gates-Chili-Ogden Sewage Treatment Plant. The number of EPT species (mayflies, stoneflies, and caddisflies) illustrated this change, but these numbers returned to 1974 levels in 1999 (Figure 0-4), and water quality was assessed as severely impacted. This situation is likely to be reversed, since as of late 1999, all Monroe County wastewater treatment facilities now discharge into Lake Ontario.

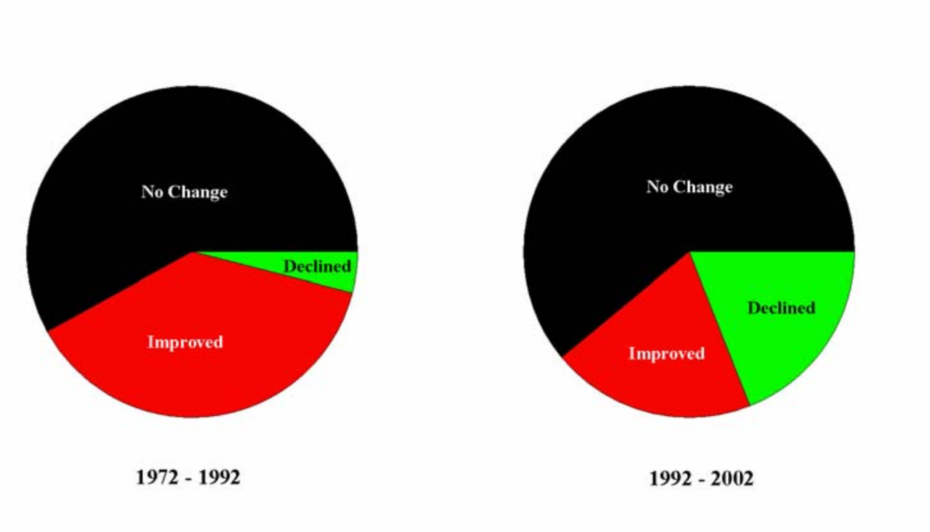


Figure 0-3. Water quality trends, 1972-1992 and 1992-2002.

The "20 year trends" document of 1993 included a list of ten "success stories," improved sites or reaches selected as exemplifying the most striking biological improvements in the State, and a list ten sites or reaches that exhibited severely impacted macroinvertebrate communities. They were included to focus on examples both of outstanding improvements and remaining problems. These lists, now updated to include data to 2002, are included here (Tables 1 and 2). The list of improved streams includes three segments that were on the 1993 list of severely impacted sites. The ten severely impacted streams are highlighted as substantial remaining water quality problems in New York State, as determined by the resident invertebrate fauna. Compared to the list of 1993, seven of the ten streams were removed from the original list, most following documented improvement.

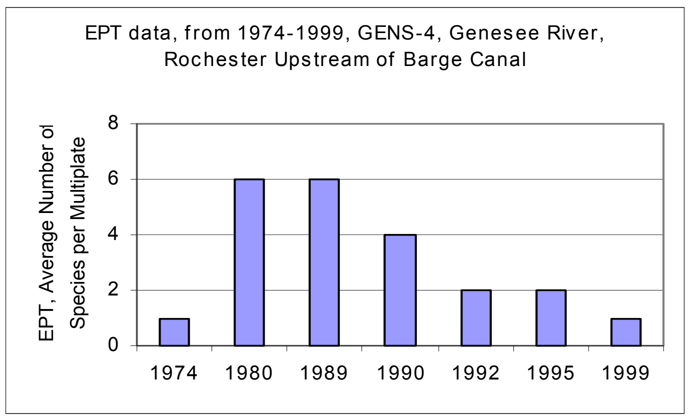


Figure 0-4. Clean-water mayflies, stoneflies, and caddisflies (EPT) in the Genesee River at Rochester, 1974-1999.

COMMENTS ON THE FUTURE OF BIOMONITORING AND STREAM WATER QUALITY IN NEW YORK STATE

In the past ten years biomonitoring efforts increasingly have been directed toward determination of cause of impact. The development of Impact Source Determination has been the first step in this direction, allowing designation of broad categories such as "Municipal/industrial" and "Nonpoint source nutrient enrichment". It is anticipated that further definition within these categories will be advanced. The use of diatom data may be useful in this endeavor. Monitoring of toxic contaminants in macroinvertebrate tissues will likely continue to play a substantial role in future biomonitoring, and the linking of body burdens with benthic community effects may assist in impact source determination.

Greater coverage of streams is envisioned, to include an even higher percentage of all named streams in the State. This can be accomplished through adding personnel to the program, changing the structure of sampling site selection or frequency, or reducing the intensity of sample processing at some sites. The latter option has been implemented in recent years through the implementation of field screening methods, which call for not processing samples at sites which pass screening. The aspect lost in this procedure is the capability of using the data for specific comparisons of metrics in tracking long-term trends.

Many of the sampling sites listed in this document had no prior data, so that temporal trend analyses could not include these sites. This underscores the need for good baseline data for making these comparisons. The capacity for comparing current data to historical data depends on continuity of methods. While some components of biological monitoring will change with more refined procedures and taxonomy, it is important to maintain continuity in the biological methods and sampling sites, in order to preserve comparability of data to the baseline of data established. Another integral part of this continuity is preservation or archiving of specimens, which can then be used for direct comparison with future collections

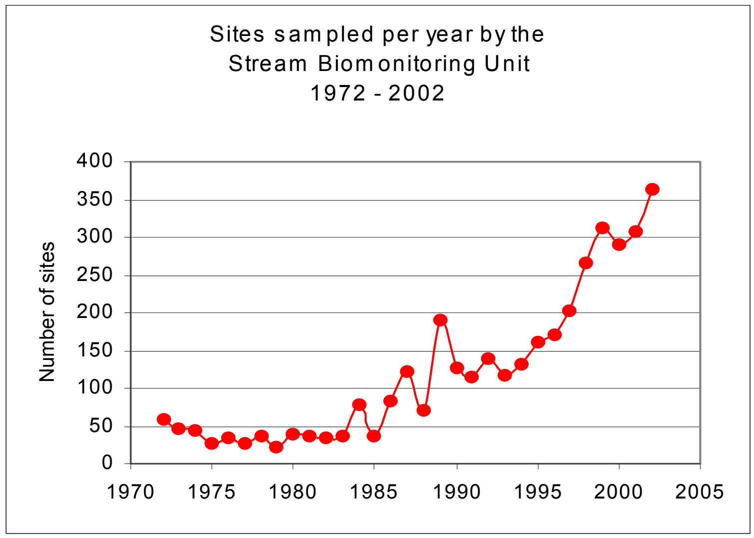


Figure 0-5. Sites sampled per year by the Stream Biomonitoring Unit, 1972-2002.

Biological monitoring during the 1972-1992 period using macroinvertebrates revealed many water quality changes. Most of the improvements were the result of increased treatment or elimination of single point discharges. Monitoring during the 1993-2002 period revealed additional improvements, but an equal number of declines in water quality, some attributable to aging infrastructure of the 1970's and 1980's, but more attributable to nonpoint source contributions. These include urban/suburban runoff, agricultural runoff, and atmospheric deposition. Nonpoint source contributions are expected to continue to exert a major influence on stream water quality. Maintaining aging infrastructure through available funding and NYSDEC technical assistance to municipalities must remain a priority for managing point source discharges, and preventing reversal of the gains in water quality in the 1970's and 1980's. This, and expanding development, changing land use, and the subsequent increase in impervious surfaces are seen as the greatest challenges of the future to water quality in New York State. Recent initiatives such as permitting stormwater discharges, along with continued funding of a wide range of other nonpoint source reduction programs and projects, are positive steps toward meeting these challenges.

TABLE 1. TEN SUCCESS STORIES: OUTSTANDING IMPROVEMENTS SINCE 1992.

1. Buffalo River, Buffalo

Water quality has continued to improve in the Buffalo River. Caddisflies were first collected in 1988, and more sensitive mayflies were first collected in 2000. The river has progressed from severely impacted to slightly impacted from 1976 to 2000, based on resident macroinvertebrate communities.

2. Barge Canal, Gasport

This site exhibited moderate impact in 1975 sampling, and has improved steadily since, displaying faunas of several species of mayflies and caddisflies. Diminished municipal/industrial inputs upstream is the likely cause of improvement.

3. Tioughnioga River, Cortland

Mayflies, stoneflies, caddisflies, and riffle beetles were found at this site in 1997, a substantial improvement over 1992 samples, when caddisflies, stoneflies, and riffle beetles were eliminated from the benthic fauna. Improvement is attributable to the 1995 change in sewage treatment process at the Cortland (C) Wastewater Treatment Facility.

4. Owasco Outlet, Auburn

Improvements in Owasco Outlet are linked to substantial upgrades in the Auburn (C) Sewage Treatment plant in 1995. Water quality in Owasco Outlet is currently assessed as slightly impacted at all sites.

5. Black River, Dexter

Multiplate sampling in 1997 and 2002 at this site showed substantial improvement, apparently resulting from the 1992 upgrade of the Dexter (V) Sewage Treatment Plant. The site exhibited moderately impacted water quality in 1986 and 1991 multiplate sampling, with high numbers of tolerant midges and worms reflecting organic inputs.

6. Upper Hudson River, Fort Edward to Waterford

Sampling in 2001 showed non-impacted water quality from Fort Edward to Waterford, with diverse macroinvertebrate communities of mayflies, stoneflies, and caddisflies. Improvement is attributed in part to improved treatment of upstream paper mill wastes. PCB levels in macroinvertebrate tissues remain high in the Upper Hudson River, contributing to elevated levels in fish.

7. Mohawk River, Fonda

Multiplate samples from this site that were dominated by sewage-tolerant worms in 1990 and 1995 were dominated by midges and mayflies in 2000. A possible reason for improvement is the 1991 upgrade of the Gloversville-Johnstown Wastewater Treatment Facility, which discharges into Cayadutta Creek, joining the Mohawk River at Fonda.

8. Patroon Creek, Albany

Improvements in Patroon Creek undoubtedly result from the termination of long-time raw sewage discharges into the stream. The occurrence of caddisflies (Trichoptera) in 1997 and riffle beetles (Coleoptera: Elmidae), mayflies (Ephemeroptera) in 1998, and stoneflies (Plecoptera) in 2002 are signs of continuing recovery in the stream. Known problems remain in the creek, leaving room for further improvement.

9. Ramapo River, Harriman

Macroinvertebrate sampling in 1986, 1991, 1993, and 1998 documented successive improvement in water quality following expansion in treatment capacity at the Orange County Sewer District # 1. The discharge currently has a minor and short-lived impact on the river's water quality.

10. Wawayanda Creek, Warwick

In 1994, the Warwick (V) Sewage Treatment Plant completed extensive upgrades. The downstream segment had been listed as one of the ten worst water quality problems in the State, based on sampling in 1989. Sampling in 1995 documented substantial recovery, with mayflies being found at the formerly severely impacted site.

TABLE 2. TEN REMAINING PROBLEMS: SEVERELY IMPACTED SITES

The following streams are highlighted as substantial remaining water quality problems in New York State, as determined by the resident invertebrate fauna. All exhibit severe biological impact.

1. Slater Creek, Rochester

Severely impacted water quality was assessed for this small stream in Greece, apparently caused by sewage wastes. The invertebrate fauna was dominated by sewage-tolerant worms, midges, snails, and sowbugs. The stream is proposed for inclusion in the draft Section 303(d) list of impaired waters.

2. Genesee River, Rochester

The Genesee River entering Rochester upstream of the canal junction has exhibited a substantial decline in water quality since 1992. The number of sensitive species (EPT) has now returned to 1974 levels, when water quality was assessed as severely impacted. This situation is likely to be reversed, since as of late 1999, Monroe County wastewater treatment facilities no longer discharge into the Genesee River.

3. Crane Brook, Montezuma

Severe impact was documented at this site in 2002, apparently caused by an unpermitted potato processing plant discharge. Specific conductance at the site was 6979 µmhos, and dissolved oxygen was only 0.8 mg/l. This situation is reported to be undergoing enforcement efforts.

4. Harbor Brook, Syracuse

Water quality appears unchanged from 1989 conditions, assessed as severely impacted. Conductance is very high, although some of this is likely of natural origin. The macroinvertebrate fauna is limited mostly to tolerant worms, midges, and snails. Stream habitat is also poor at this site. CSO abatement plans are underway to address these problems.

5. Ninemile Creek, Syracuse

Water quality remains very poor in this stream. Conductance is very high, dissolved oxygen is low, and the macroinvertebrate fauna is limited mostly to tolerant worms, midges, snails, scuds, and a few caddisflies. Stream habitat is also poor at this site. Talks are underway with Honeywell to address remedial actions for the creek.

6. Onondaga Creek, Syracuse

Water quality remains severely impacted at the Syracuse site, as in 1989. The macroinvertebrate fauna is composed entirely of tolerant worms and midges. Combined sewer overflows are the apparent cause of impact in this stream, and chlorides are very high. CSO abatement plans are underway to address these problems.

7. Hallocks Mill Brook, Amawalk

Downstream of the Yorktown Heights Wastewater Treatment Facility, the fauna clearly reflects impacts of organic wastes, exhibiting a reduced fauna of tolerant midges, worms, and leeches. Very high ammonium levels have also been documented at this site. The stream is proposed for inclusion in the draft Section 303(d) list of impaired waters.

8. Quaker Creek, Snufftown

Severe water quality impacts in Quaker Creek were measured in 1994 and 1995, downstream of the Florida (V) Sewage Treatment Plant. The greatest impacts occurred 3.3 miles downstream of the discharge, and were likely exacerbated by water withdrawals from the stream by local onion growers. The stream is proposed for inclusion in the draft Section 303(d) list of impaired waters.

9. Hutchinson River, Mount Vernon

The entire invertebrate fauna at this site consisted of 2 species of sewage-tolerant worms, pointing to a major sewage input in the half-mile reach above East Sanford Boulevard. The river is included in the Section 303(d) list of impaired waters.

10. Lemon Creek, Pleasant Plains (Staten Island)

The fauna in 1996 and 1998 consisted entirely of tolerant midges, worms, and snails. The problem is attributable to discharges of failing septic systems. Daytime dissolved oxygen at this site was only 3.7 ppm (42% saturation). Programs are underway installing sanitary sewers and handling storm flows, and should improve the quality of this waterbody in the future.

A CHRONOLOGY OF THE STREAM BIOMONITORING UNIT FROM 1992-2002

1992: Percent Model Affinity was published in the Journal of the North American Benthological Society, and began to be routinely used as a metric in New York State. 3 personnel, 138 sites sampled.

1993: "Twenty year trends in water quality of rivers and streams in New York State based on macroinvertebrate data" was completed. Doug Reed worked with the Unit as a Student Intern. A field screening procedure was developed and used. 3 personnel, 118 sites sampled.

1994: Impact Source Determination was developed to determine types of stress impacting stream water quality. 3 personnel, 132 sites sampled.

1995: Peter Mack left the Bureau; the Unit moved with the USGS to new facilities at Rensselaer Technology Park. The Unit gained computer access to the Internet. 3 personnel, 160 sites sampled.

1996: Maria Hanby worked with the Unit on a part-time basis. The Unit was transferred to the Bureau of Watershed Assessment and Research, under Italo Carcich. Fred Van Alstyne became Section Chief. 3 personnel, 166 sites sampled.

1997: Fish sampling was coordinated with macroinvertebrate Rapid Assessment sampling for several streams, in a cooperative effort with Doug Carlson. Diana Heitzman worked with the Unit on a part-time basis. 3 personnel, 203 sites sampled.

1998: GPS units began to be used routinely in field sampling. Steven Le Pennec worked for the Unit. 3 personnel, 266 sites sampled

1999: Diana Heitzman began working with the Unit on a permanent basis. Dr. Sophia Passy began in a post-doctoral position to develop diatom protocols for biomonitoring. Jeff Myers became Section chief. 4 personnel, 311 sites sampled.

2000: Diatom protocols for biomonitoring were developed by Sophia Passy. A. J. Smith worked with the Unit as summer intern. 4 personnel, 291 sites sampled.

2001: Digital microphotographs of invertebrates comprised a pictorial identification key produced for the DEC website by Larry Abele. The first all-digital stream assessment report was completed. A.J. Smith worked again as Summer Intern. Katie DeGoosh worked with the Unit on a Student Research project.
4 personnel, 308 sites sampled

2002: Alexander J. Smith began with the Unit on a permanent basis. Italo Carcich and Fred Van Alstyne retired. Sandi Allen became Division Director, Jeff Myers became acting Bureau Director, and Margaret Novak became acting Section Chief. Jessica Bennett worked with the Unit on a Student Research project. Impact Source Determination was published in the Northeastern Naturalist. Computerized data entry was developed for recording laboratory data directly. 5 personnel, 364 sites sampled.

The Stream Biomonitoring Unit, 2002. Left to right: Robert Bode, Margaret Novak, Lawrence Abele, Alexander Smith, Diana Heitzman.

A SUMMARY OF SOME BIOMONITORING CONCEPTS REFERRED TO IN THE TEXT. More complete descriptions of methods and a glossary are in the Appendices.

KICK SAMPLING: This is the method of sampling macroinvertebrates from wadeable streams with riffles. An aquatic net is positioned in the water at arm's length downstream and the stream bottom is disturbed by foot, so that the dislodged organisms are carried into the net. Sampling is continued for a specified time and for a specified distance in the stream.

MULTIPLATE SAMPLING: Multiplates (multiple-plate samplers) are artificial substrate sampling devices used in flowing waters considered too deep for kick sampling. Artificial substrates obtain a macroinvertebrate sample by providing a substrate for macroinvertebrate colonization for a fixed exposure period (5 weeks), after which the sampler is retrieved and the attached organisms are harvested. The use of artificial substrate samplers allows the comparison of results from different locations and times by providing uniformity of substrate type, depth, and exposure period. The sampler design is 3 square hardboard plates, separated by spacers, mounted on a turnbuckle. Samplers are usually hung from navigation buoys or floats.

ISD: Impact Source Determination (ISD) is the procedure used by the Stream Biomonitoring Unit for identifying types of impacts that exert deleterious effects on a waterbody. Impact Source Determination uses similarity to community types or models to ascertain one of seven primary factors influencing the fauna: organic wastes, toxic, sewage, nonpoint source nutrient enrichment, siltation, impoundment, or natural.

EPT: EPT denotes the total number of species of mayflies (Ephemeroptera), stoneflies (Plecoptera), and caddisflies (Trichoptera) found in an average 100-organism subsample. These are considered to be mostly clean-water organisms, and their presence generally is correlated with good water quality.

LEVELS OF IMPACT: 4 levels of water quality impact are used: Non-impacted denotes very good water quality. Water quality is not limiting to fish survival or propagation. This level of water quality includes both pristine habitats and those receiving discharges which minimally alter the biota. Slightly impacted denotes good water quality. The macroinvertebrate community is slightly but significantly altered from the pristine state. Water quality is usually not limiting to fish survival, but may be limiting to fish propagation. Moderately impacted denotes poor water quality. The macroinvertebrate community is altered to a large degree from the pristine state. Water quality often is limiting to fish propagation, but usually not to fish survival. Severely impacted denotes very poor water quality. The macroinvertebrate community is limited to a few tolerant species. Water quality is often limiting to both fish propagation and fish survival.

FIELD SCREENING: Biological assessments at some sites are on-site determinations. If a determination is made that water quality is apparently free of impacts, no further sampling or sample analysis is required. If the assessment results in an assessment other than non-impacted, the sample is preserved for laboratory processing. The screening method uses on-site examination of the sample to determine if five criteria are met. If these are met, the site is determined to be non-impacted.

EXPLANATION OF COMPONENTS OF THIS DOCUMENT

Arrangement by drainage basin

Materials in this document are arranged in numerical order by drainage basin. Drainage basins are numbered from 1 to 17, generally west to east across New York State (Figure 0-6). Each section contains a map of the sampling sites, a list of sampling sites, assessments of water quality at all sites, reports of macroinvertebrate water quality studies within the basin, and a stream-by-stream narrative of all streams sampled in the last ten years.

Map of sampling sites

The maps include all sites within the drainage basin that were sampled by the Stream Biomonitoring Unit between 1992 and 2002. Sites that were not sampled in the last ten years are not included since they have no recent biological assessment. Water quality assessments for sites range from non-impacted to severely impacted, as determined by macroinvertebrate community indices. These assessments may not be the same as assessments based on water column or sediment data.

List of sampling sites

All sites sampled by the Stream Biomonitoring Unit between 1972 to 2002 are listed, with the year sampled (e.g. 82 = 1982). This list does not contain sampling by the NYS DEC Avon Pollution Investigations Unit. Station numbers with four-letter identifiers are Stream Biomonitoring Unit identification numbers and codes. Codes for some tributaries are those of the larger stream which it flows into (e.g. the code for the Raquette River is STLW, the St. Lawrence River code). Station numbers proceed from upstream to downstream; station numbers for some tributaries were originally assigned as part of the larger stream numbering system (e.g. Grass River station numbers are 13-14).

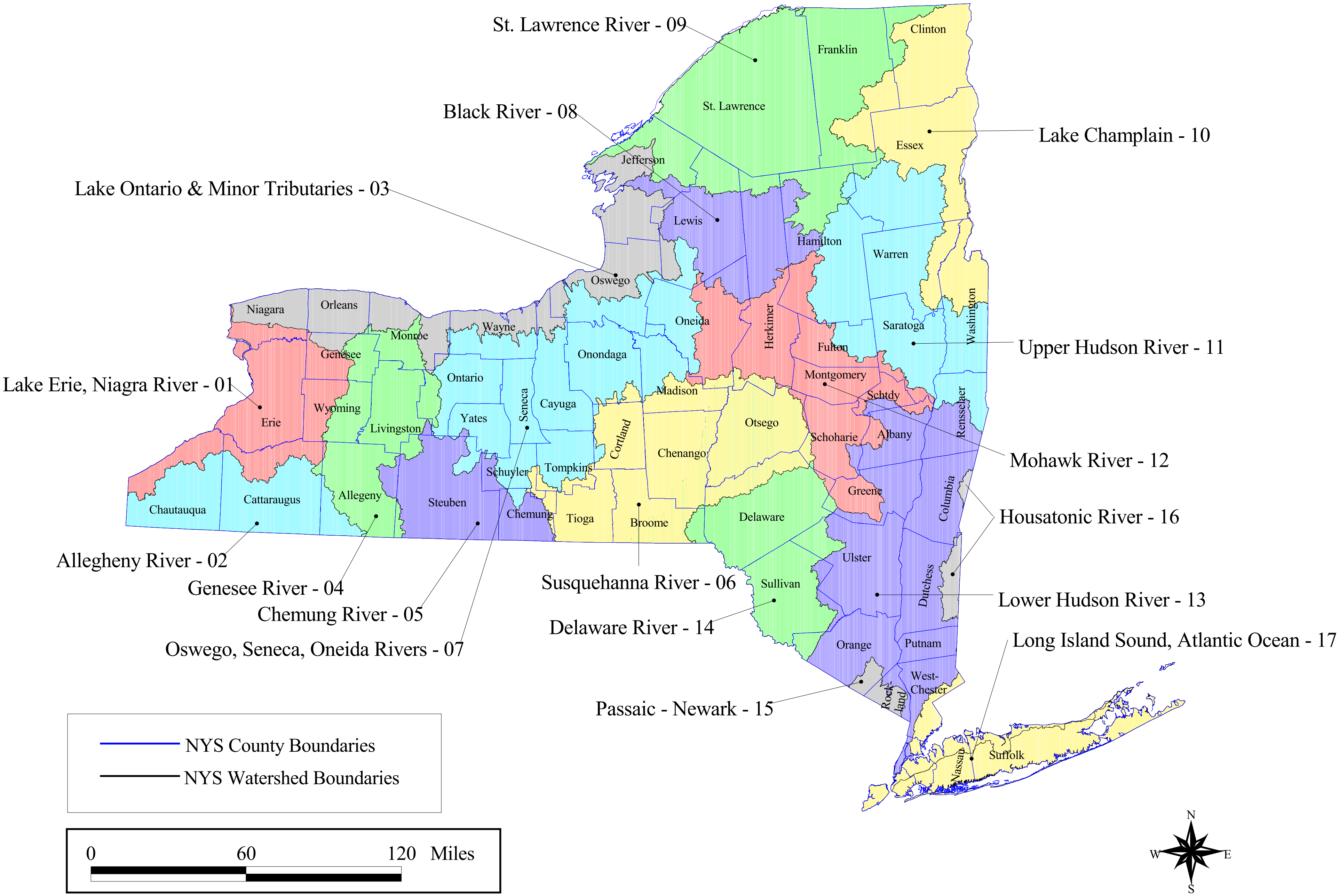
Assessments of water quality

Temporal trends in water quality are given for sites in the last ten years, ranging from non-impacted to severely impacted. Under “Change from 1992" a site is listed as either improved, declined, no change, or no prior data, the latter used for sites not sampled prior to 1993.

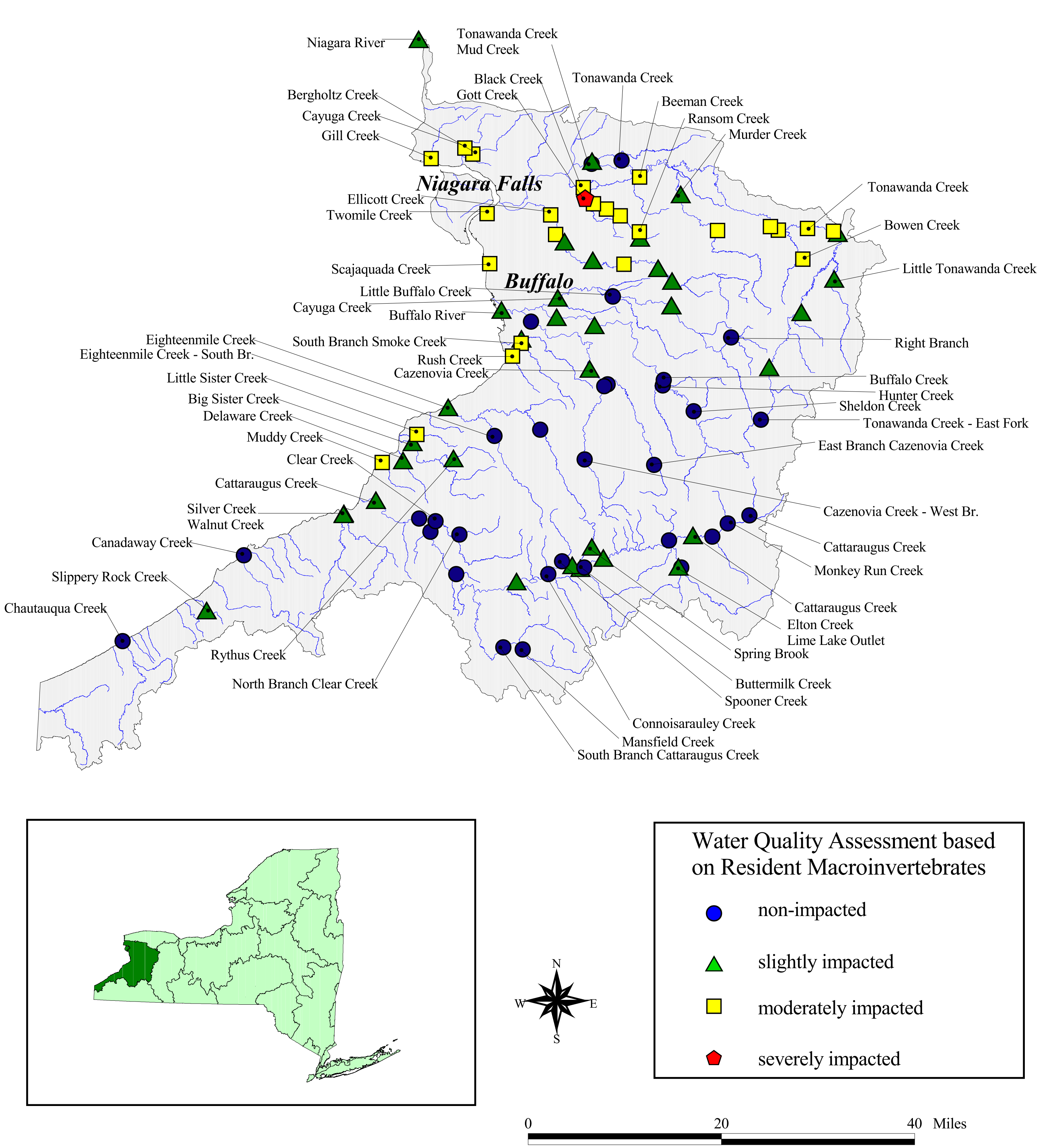
Reports of water quality

This list includes known reports of macroinvertebrate sampling within the drainage basin. Information on obtaining these is found at the end of this document. Reports designated as New York State Department of Health represent work of the Stream Biomonitoring Unit from 1972 to 1986, before the Unit was transferred to the New York State Department of Environmental Conservation.

New York State Drainage Basins



Lake Erie & Niagara River Drainage Basin



LAKE ERIE-NIAGARA RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED							
BARGE CANAL, WEST (WCAN)									
01	North Tonawanda, Rte. 62 bridge	75	81						
02	Pendleton, west of Tonawanda Creek confluence	75	81						
BEEMAN CREEK (BMAN)									
01	Wolcottburg, Rapids Rd. bridge							00	
BERGHOLTZ CREEK (BERG)									
01	Niagara Falls, Williams Rd. bridge							00	
BIG SISTER CREEK (BSIS)									
01	Evans Center, Rte. 5 bridge					93	94	00	01
BLACK CREEK (BLKE)									
01	Swormville, Smith Rd. bridge							00	
BOWEN CREEK (BOWE)									
01	North of Alexander, Pike Rd. bridge							00	
BUFFALO CREEK (BUFC)									
01	Wales Center, Rte. 20A bridge							00	
03	Gardenville, Rte. 277	76	82		88	93	94	00	01
03A	Elma, Knabb Rd.			87					
BUFFALO RIVER (BUFF)									
06	Buffalo, Bailey Ave. bridge	76	82						
07	Buffalo, Ohio St. bridge	76	82	87	88	93		00	
08	Buffalo, near mouth		82						
BUTTERMILK CREEK (BUTT)									
01	West of Thomas Corners, Thomas Corners Rd. bridge							00	
CANADAWAY CREEK (CWAY)									
01	Dunkirk, Rte. 5 Bridge			87	88	93	94	00	
CATTARAUGUS CREEK (CATT)									
00	East Arcade, East Arcade Rd. bridge								01
01	Arcade, Water St. bridge						94		
02	Arcade, North Woods Rd. bridge						94		
03	Sardinia, McKinstry Rd. bridge						94		
04	Springville, Rte. 240 (Vaughn St.) bridge						94	00	
05	Below Springville, Scoby Hill Rd. bridge						94		
06	Zoar, N. Otto Rd. bridge						94		
07	Gowanda, Rte. 39 bridge			87	88		94	00	

LAKE ERIE-NIAGARA RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED								
CATTARAUGUS CREEK (CATT) cont'd										
07A	South Branch, Otto, Rte. 11 bridge								00	
08	Versailles, below Versailles Plank Rd. bridge							94		
09	Irving, Rte. 20			87	88			94	00	01
CAYUGA CREEK (YUGA)										
A	Alden, Three Rod Rd. bridge						93			
00	Alden, Rte. 354 bridge			87						
01	Lancaster, Bowen Rd.	76	82		88				00	
02	Depew, Rte. 277 bridge	76	82			90	93	94	00	01
CAYUGA CREEK (CYGA)										
01	Niagara Falls, Rte.182 bridge								00	01
CAZENOVIA CREEK (CAZE)										
04A	Below East Aurora, Rte. 20		82							
04B	East Aurora, Willardshire Rd. bridge		82		88					
05	West Seneca, Seneca St.	76	82							
05A	Buffalo, Parkside Dr. bridge							94	00	01
CAZENOVIA CREEK, EAST BRANCH (CAZE)										
02	Holland, Glenwood Rd. Bridge								00	
04	East Aurora Mill Rd.	76	82							
04C	East Aurora, Jewett Holmwood Rd. bridge			87				94	00	
CAZENOVIA CREEK, WEST BRANCH (CAZE)										
01	Colden, Rte. 240 Bridge								00	
04D	East Aurora, West Branch, Jewett Holmwood Rd.			87				94	00	
CHAUTAUQUA CREEK (CHAU)										
01	Barcelona, Rte. 5 bridge			87	88		93	94	00	01
CLEAR CREEK (CATT)										
08A	Versailles, above Versailles Plank Rd. bridge							94		
08AA	Taylor Hollow, Rte. 62 bridge								00	
08B	Iroquois, Rte. 438 bridge								00	
CONNOISARAULEY CREEK (CONN)										
01	East Otto, Hammond Hill Rd. bridge								00	
DELAWARE CREEK (DELC)										
01	Angola, Rte. 5 bridge								00	

LAKE ERIE-NIAGARA RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED					
EIGHTEENMILE CREEK (TEEN)							
A	North Boston, Rte. 277 bridge					00	
01	Highland-on-the-Lake, Rte. 5 bridge	87	88	93	94	00	01
B	(South Branch) Eden Valley, Eden Valley Rd. bridge					00	
ELLICOTT CREEK (ELLI)							
01	Alden Center, Sandbridge Rd. bridge						01
02	Wende, Walden Ave. bridge						01
03	Lancaster, Pavement Rd.						01
04	Bowmanville, Main St. bridge						01
05	Williamsville, Mill St.					00	01
06	Williamsville, Sheridan Ave. (Rte. 324) bridge			93	94	00	01
07	Amherst, St. Rita's Lane bridge						01
ELTON CREEK (ELTO)							
01	Delevan, Rte.e. 16 bridge					00	
GILL CREEK (GILL)							
01	Niagara Falls, Rte. 384 bridge					00	
GOTT CREEK (GOTC)							
01	Swormville, N. French Rd. bridge					00	
HUNTER CREEK (HUNE)							
01	Wales, Hunter Creek Rd. bridge					00	
LIME LAKE OUTLET (LIMO)							
01	Delevan, Mill St. bridge					00	
LITTLE BUFFALO CREEK (LBUF)							
01	East Lancaster, Bowen Rd. bridge					00	
LITTLE SISTER CREEK (LSIS)							
01	Evans Center, Rte. 5					00	
LITTLE TONAWANDA CREEK (LTON)							
01	East Alexander, Creek Rd. bridge					00	
MANSFIELD CREEK (MANS)							
01	Otto, Scotts Corners Rd. bridge					00	
MONKEY RUN CREEK (MKEY)							
01	Arcade Center, Rte. 98 bridge					00	
MUD CREEK (MUDN)							
01	Millersport, Tonawanda Ck Rd. bridge					00	

LAKE ERIE-NIAGARA RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED							
MUDDY CREEK (MDDE)									
01	Lake Erie Beach, Lake Shore Rd.							00	
MURDER CREEK (MURD)									
04	Pembroke, Lake Rd. bridge							00	
07	Swifts Mills, Rte. 93 bridge					93	94	00	01
NIAGARA RIVER (NIAG)									
00	Buffalo, south of Peace Bridge		82	87	88				
01	Buffalo, south of Strawberry Island, Buoy 1	76	82	87	88	93		00	
01A	Buffalo, Buoy 7							00	
02E	Buffalo, Tonawanda Channel, east of Motor Island	76	82						
02W	Buffalo, Tonawanda Channel, west of Motor Island	76	82						
03E	Buffalo, Tonawanda Channel, east side	76	82						
03W	Buffalo, Tonawanda Channel, west side	76	82						
04E	North Tonawanda, Tonawanda Channel, east side		82						
04W	Niagara Falls, Tonawanda Channel, south	76	82						
05	Chippewa Channel	76							
06	Lewiston	76							
07	Youngstown, Marina buoy B	76	82	87	88	93		00	
RANSOM CREEK (RANS)									
01	Clarence, Ransom Rd. bridge				88				
02	Below Clarence, Brokhaven Rd. bridge				88				
03	Clarence Center, Rte. 217 bridge				88				
04	Below Clarence Center, Conner Rd. bridge			87	88				
05	Swormville, Miles Rd. bridge				88			00	
RIGHT BRANCH (RIGT)									
01	Bennington Center, Rte. 77 culvert							00	
RUSH CREEK (RUCK)									
01	Blasdell, Mile Strio Rd. culvert							00	
RYTHUS CREEK (RYTH)									
01	Pontiac, New Jerusalem Rd. bridge							00	
SCAJAQUADA CREEK (SCAJ)									
01	Buffalo, West Ave. bridge							00	

LAKE ERIE-NIAGARA RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED							
SHELDON CREEK (SHED)									
01	North of Strykersville, Rte. 78 bridge							00	
SILVER CREEK (SILV)									
01	Silver Creek, Rte. 5 bridge					93	94	00	
SLIPPERY ROCK CREEK (SLIP)									
01	Brocton, Rte. 20 bridge							00	
SMOKE CREEK (SMOK)									
01	Lackawanna, South Park Ave. bridge							00	
SMOKE CREEK - SOUTH BRANCH (SMOS)									
01	Lackawanna, South Park Ave.							00	
SPOONER CREEK (SPOO)									
01	South of Springville, Zoar Valley Rd. bridge							00	
SPRING BROOK (CATT)									
04A	Springville, Maple Ave. bridge						94		
04B	Below Springville, Mill St.						94	00	
TONAWANDA CREEK (TONA)									
A	Below Varysburg, Eck Rd. bridge							00	01
B	Attica, Stroh Rd. bridge							00	
C	Above Batavia, Cookson Rd. bridge	84							
D	Above Batavia, Dorman Rd. bridge	84							
E	(East Fork) below Johnsonburg, Rte. 98 bridge							00	
01	Batavia, USGS Gaging Station, above Walnut St.				92				
02	Batavia, Lyon St. bridge	84		88	92			00	
03A	Batavia, River St. bridge	84							
03B	Below Batavia, Rte. 37	84		88	92				
04A	Bushville, Old Mill St.	84			92				
08	East Pembroke, Slusser Rd. bridge	84	87		92				
08A	East Pembroke, Creek Rd. bridge			88					
09	Rapids, Rapids Rd. bridge					93	94		01
10	Millersport, Rte. 78 bridge		87	88				00	
TWENTYMILE CREEK (TWEN)									
01	Robinson Stop, Pennsylvania, Rte. 5 bridge							00	
TWOMILE CREEK (TWOM)									
01	Tonawanda, Fletcher Rd. bridge							00	
WALNUT CREEK (WLNT)									
01	Silver Creek, Rte. 5 bridge					93	94	00	

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE LAKE ERIE - NIAGARA RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Beeman Creek, Wolcottburg	moderately impacted	no prior data
Bergholtz Creek, Niagara Falls	moderately impacted	no prior data
Big Sister Creek, Evans Center	slightly impacted	no prior data
Black Creek, Swormville	moderately impacted	no prior data
Bowen Creek, North of Alexander	moderately impacted	no prior data
Buffalo Creek, Wales Center	non impacted	no prior data
Buffalo Creek, Gardenville	slightly impacted	no change
Buffalo River, Buffalo	slightly impacted	**IMPROVED**
Buttermilk Creek, Thomas Corners	non-impacted	no prior data
Canadaway Creek, Dunkirk	non-impacted	**IMPROVED**
Cattaraugus Creek, East Arcade	non-impacted	no prior data
Cattaraugus Creek, Arcade	non-impacted	no prior data
Cattaraugus Creek, below Arcade	slightly impacted	no prior data
Cattaraugus Creek, Sardinia	non-impacted	no prior data
Cattaraugus Creek, Springville	slightly impacted	no prior data
Cattaraugus Creek, Below Springville	slightly impacted	no prior data
Cattaraugus Creek, Zoar	slightly impacted	no prior data
Cattaraugus Creek, Gowanda	non-impacted	no change
Cattaraugus Creek, South Branch, Otto	non-impacted	no prior data
Cattaraugus Creek, Versailles	non-impacted	no prior data
Cattaraugus Creek, Irving	slightly impacted	**DECLINED**
Cayuga Creek, Alden	slightly impacted	no prior data
Cayuga Creek, Lancaster	non-impacted	**IMPROVED**
Cayuga Creek, Depew	slightly impacted	no change
Cayuga Creek, Niagara Falls	moderately impacted	no prior data
Cazenovia Creek, Buffalo	slightly impacted	no prior data
Cazenovia Creek, East Branch, Holland	non-impacted	no prior data
Cazenovia Creek, East Branch, E. Aurora	non-impacted	no change
Cazenovia Creek, West Branch, Colden	non-impacted	no prior data
Cazenovia Creek, West Branch, E. Aurora	non-impacted	no change
Chautauqua Creek, Barcelona	non-impacted	**IMPROVED**
Clear Creek, Versailles to Iroquois	non-impacted	no prior data
Connoisarauley Creek, East Otto	non-impacted	no prior data
Delaware Creek, Angola	slightly impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE LAKE ERIE - NIAGARA RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Eighteenmile Creek, North Boston	non-impacted	no prior data
Eighteenmile Creek, Highland-on-the-Lake	slightly impacted	no change
Eighteenmile Cr., S. Br., Eden Valley	non-impacted	no prior data
Ellicott Creek, Alden Center	slightly impacted	no prior data
Ellicott Creek, Wende	slightly impacted	no prior data
Ellicott Creek, Lancaster	moderately impacted	no prior data
Ellicott Creek, Bowmanville	slightly impacted	no prior data
Ellicott Creek, Williamsville, Mill St.	slightly impacted	no prior data
Ellicott Creek, Williamsville, Sheridan Ave.	moderately impacted	no prior data
Ellicott Creek, Amherst	moderately impacted	no prior data
Elton Creek, Delevan	non-impacted	no prior data
Gill Creek, Niagara Falls	moderately impacted	no prior data
Gott Creek, Swormville	moderately impacted	no prior data
Hunter Creek, Wales	non-impacted	no prior data
Lime Lake Outlet, Delevan	slightly impacted	no prior data
Little Buffalo Creek, East Lancaster	non-impacted	no prior data
Little Sister Creek, Evans Center	moderately impacted	no prior data
Little Tonawanda Creek, East Alexander	slightly impacted	no prior data
Mansfield Creek, Otto	non-impacted	no prior data
Monkey Run Creek, Arcade Center	non-impacted	no prior data
Mud Creek, Millersport	slightly impacted	no prior data
Muddy Creek, Lake Erie Beach	moderately impacted	no prior data
Murder Creek, Pembroke	moderately impacted	no prior data
Murder Creek, Swifts Mills	slightly impacted	no prior data
Niagara River, Buffalo, south of Peace Bridge	slightly impacted	no prior data
Niagara River, Buffalo, Buoy 1	moderately impacted	**DECLINED**
Niagara River, Buffalo, Buoy 7	severely impacted	no prior data
Niagara River, Youngstown	slightly impacted	no change
Ransom Creek, Swormville	moderately impacted	no change
Right Branch, Bennington Center	non-impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE LAKE ERIE - NIAGARA RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Rush Creek, Blasdell	moderately impacted	no prior data
Rythus Creek, Pontiac	slightly impacted	no prior data
Scajaquada Creek, Buffalo	moderately impacted	no prior data
Sheldon Creek, North of Strykersville	non-impacted	no prior data
Silver Creek, Silver Creek	slightly impacted	no prior data
Slippery Rock Creek, Brocton	slightly impacted	no prior data
Smoke Creek, Lackawanna	slightly impacted	no prior data
Smoke Creek - S. Branch, Lackawanna	moderately impacted	no prior data
Spooner Creek, South of Springville	non-impacted	no prior data
Spring Brook, Springville	slightly impacted	no prior data
Spring Brook, Below Springville	slightly impacted	**IMPROVED**
Tonawanda Creek, Varysburg	slightly impacted	no prior data
Tonawanda Creek, Attica	slightly impacted	no prior data
Tonawanda Creek (East Fork), below Johnsonburg	non-impacted	no prior data
Tonawanda Creek, Batavia, Lyon St.	moderately impacted	no change
Tonawanda Creek, Rapids	non-impacted	no prior data
Tonawanda Creek, Millersport	non-impacted	no change
Twentymile Creek, Robinson Stop	non-impacted	no prior data
Twomile Creek, Tonawanda	moderately impacted	no prior data
Walnut Creek, Silver Creek	slightly impacted	no prior data

REPORTS OF MACROINVERTEBRATE SURVEYS WITHIN THE LAKE ERIE-NIAGARA RIVER WATERSHED

STREAM	YEAR OF SURVEY	REPORT
Buffalo River	1969	GLL
Buffalo River		EPA,1975
Buffalo River	1976	DOH
Cattaraugus Creek	1976	AVON
Cattaraugus Creek	1994	SBU, 1995
Ellicott Creek	2001	SBU, 2002
Erie County streams	1973	Erie Co., 1974
French Creek	1996	SBU, 1997
Niagara River	1968	OME,1968
Niagara River	1976	DOH
Niagara River	1982	DOH, 1983
Tonawanda Creek	1969	DOH
Tonawanda Creek	1984	SBU, 1984
Tonawanda Creek	1992	SBU, 1993
Watershed streams	1987-1988	RIBS, 1990
Watershed streams	1993-1994	RIBS, 1997
Watershed streams	2000-2001	RIBS (unpubl.)

AVON	Avon Pollution Investigations Unit, Div. of Fish & Wildlife, NYS DEC
DOH	New York State Department of Health
EPA	United States Environmental Protection Agency
Erie Co.	Erie County Soil and Water Conservation District
GLL	Great Lakes Laboratory
OME	Ontario Ministry of the Environment
RIBS	Rotating Intensive Basin System, Statewide Waters Assessment Section, NYS DEC
SBU	Stream Biomonitoring Unit, Division of Water, NYS DEC

Beeman Creek

Based on 2000 macroinvertebrate sampling at Wolcottsburg, water quality was assessed as moderately impacted, likely by municipal/industrial inputs. The fauna was dominated by caddisflies and scuds. No prior data were available for this stream.

Bergholtz Creek

Water quality was assessed as moderately impacted, based on 2000 macroinvertebrate sampling in Niagara Falls. Organic wastes were the likely source of impact, as determined by Impact Source Determination. The fauna was dominated by sewage-tolerant sowbugs.

Big Sister Creek

Slightly impacted water quality was assessed for the site in Evans Center, based on 2001 macroinvertebrate sampling. Nutrient enrichment and municipal/industrial inputs were the likely source of impacts. The fauna was dominated by facultative and tolerant midges. The site was previously assessed as moderately impacted in 1993 and 2000, and non-impacted in 1994. Due to the fluctuating water quality assessments, continued monitoring is recommended for this site.

Black Creek

Based on 2000 macroinvertebrate sampling at Swormville, water quality was assessed as moderately impacted, by municipal/industrial inputs. A few mayflies and caddisflies were found, but most of the fauna was dominated by pollution-tolerant crustaceans. No prior data were available for the stream.

Bowen Creek

Moderately impacted water quality was assessed for the site in Alexander, based on 2000 macroinvertebrate sampling. Organic wastes were the likely source of impact, as determined by Impact Source Determination. The fauna was heavily dominated by pollution-tolerant sowbugs. No prior data were available for the stream.

Buffalo Creek

Upstream water quality at Wales Center is currently assessed as non-impacted. The 2000 macroinvertebrate sample was field-assessed as passing screening, and the sample was not laboratory-processed. Water quality assessments for Buffalo Creek at Gardenville have fluctuated, but still remain as slightly impacted, similar to assessments from 1976 to1988. When sampled during high-flow years - 1994 and 2000 - water quality was assessed as non-impacted, while samplings during low-flow years - 1993 and 2001- result in assessments of slight impact. These results tend to show that point sources are the primary factors causing impact, being less-diluted during low-flow years. Siltation has been indicated to be a factor at the Gardenville site.

Buffalo River

Water quality has improved dramatically in the Buffalo River since it was first sampled in 1976. The river has progressed from severely impacted in 1976 to moderately impacted in 1988 to slightly impacted in 1993 and 2000, based on resident macroinvertebrate communities. Municipal/industrial inputs are the likely stressor. Caddisflies were first collected in 1988, and more sensitive mayflies were first collected in 2000. In the 2000 multiplate samples, 4 species of

Buffalo River

4 species of mayflies were documented in 2000 sampling for the first time. From left; *Stenonema femoratum*, *Stenacron interpunctatum*, Ephemerellidae, *Caenis spp.*.

Figure 1-1. Mayflies from the Buffalo River, 2000.

clean-water mayflies were found at the Ohio Street bridge site. Zebra mussels are now numerous in the river, and are occasionally numerous enough to invalidate the multiplate samples.

Buttermilk Creek

Water quality is assessed as non-impacted for this tributary of Cattaraugus Creek, based on 2000 macroinvertebrate sampling in Thomas Corners. The stream habitat was considered good, with a mix of rock, rubble, gravel, and sand. Clean-water mayflies heavily dominated the fauna, and dragonfly larvae were also numerous.

Canadaway Creek

Improvement is indicated for this stream, but needs verification. The 2000 assessment of non-impacted was based only on field screening during a high-flow year. The 1994 assessment of non-impacted was from a laboratory-processed sample, but also during a high-flow year. The prior year, a low-flow year, yielded an assessment of moderately impacted. The 1988 assessment indicated slight impact. The invertebrate fauna continues to be dominated by filtering caddisfly larvae, but populations of mayflies and stoneflies are also maintained.

Cattaraugus Creek

Overall water quality in the creek ranges from good to very good. Non-impacted conditions were documented for East Arcade and Arcade. Slightly impacted water quality was assessed for the site at Springville, based on 1994 and 2000 samples. Nonpoint nutrient enrichment and siltation are the likely causes of impact. At Gowanda, water quality was assessed as non-impacted in 2000 macroinvertebrate sampling, although some nutrient enrichment and siltation were present.

Conditions at this site appear similar to those sampled in 1988. At Irving, water quality was found to be slightly impacted in 1994 and 2001, compared to non-impacted in 1987 and 1988. It was assessed as non-impacted in 2000, but this was based on a field determination during a high-flow year, and is considered less reliable than the 2001 sampling. Water quality at Irving is considered as declined, but needs verification. The South Branch of Cattaraugus Creek was assessed as non-impacted, based on 2000 macroinvertebrate sampling at Otto.

Cayuga Creek (Erie County)

Water quality at Lancaster was assessed as non-impacted, based on 2000 macroinvertebrate sampling. The fauna was dominated by clean-water mayflies and caddisflies. This represents an improvement in water quality compared to the years from1976 to 1988, when slight impact was documented. Slightly impacted water quality was assessed for the site in Depew, based on 2000 and 2001 macroinvertebrate sampling. Nonpoint source nutrient enrichment and siltation were the primary causes of impact. Similar conditions at this site were documented in 1993 and 1994, maintaining good water quality following well-documented improvements in the 1980's. Sampling upstream at Alden in 1993 indicated slight impact, likely due to nonpoint source nutrient enrichment.

Cayuga Creek (Niagara County)

Water quality was assessed as moderately-impacted at the Niagara Falls site, based on sampling in 2000 and 2001. Specific conductance was high at this site, and Impact Source Determination indicated that toxic inputs were the primary causes of impact. The macroinvertebrate fauna was dominated by tolerant sowbugs and riffle beetles.

Cazenovia Creek

Water quality in Cazenovia Creek currently ranges from non-impacted to slightly impacted, as in 1992. The most downstream site, in Cazenovia Park in Buffalo, displayed a diverse fauna of clean-water mayflies, stoneflies, and caddisflies in 2000 and 2001 samplings. The water quality assessment was non-impacted in 2000, a high-flow year, and slightly impacted in 2001, a low-flow year. Nonpoint source nutrient enrichment is the primary stressor. The site was assessed as non-impacted in 1994. Previous sampling of the creek, 2 miles upstream in West Seneca, showed the creek to be slightly impacted in 1976 and 1982. The East Branch and West Branch, both sampled at Jewett Holmwood Road just upstream of their confluence, exhibited non-impacted conditions in 1994 and 2000. Upstream locations at Colden on the West Branch and Holland on the East Branch were also assessed as non-impacted in 2000 sampling.

Chautauqua Creek

Improved water quality is indicated for this stream. Water quality was assessed as non-impacted in both 2001 and 2000 at the site in Barcelona, although the 2000 assessment was based only on field screening. It was assessed as non-impacted in 1994, a high-flow year, but slightly impacted in 1993, a low-flow year, and in 1987 and 1988. Based on the last three assessments, water quality is considered non-impacted. The improvements may be related to the 1988 upgrade of the Westfield (V) Wastewater Treatment Facility, located 2 miles upstream.

Clear Creek
Water quality was assessed as non-impacted for this tributary of Cattaraugus Creek, based on 2000 macroinvertebrate sampling at Taylor Hollow and Iroquois. Clean-water mayflies dominated the fauna. No prior data were available for the stream.

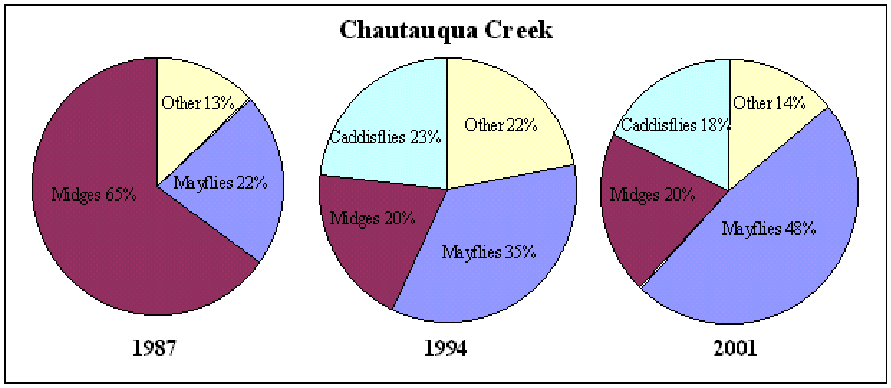


Figure 1-2. Faunal changes in Chautauqua Creek, 1987-2001.

Connoisarauley Creek
Based on a single sampling and field assessment in 2000, water quality is assessed as non-impacted. Clean-water stoneflies were very numerous at the East Otto site, with caddisflies, mayflies, dragonflies and beetles also were present. No water quality problems were indicated.

Delaware Creek
Water quality was assessed as slightly-impacted, based on 2000 macroinvertebrate sampling at Angola. The fauna was dominated by facultative midges and black fly larvae, and municipal/industrial inputs was the likely cause of impact.

Eighteenmile Creek
Slightly impacted water quality was assessed for the site at Highland-on-the-Lake, based on macroinvertebrate sampling in 2000 and 2001. The primary cause of impact was determined to be nonpoint source nutrient enrichment. Non-impacted water quality was documented for upstream sites at North Boston and Eden Valley (South Branch) in 2000, based on field assessments.

Ellicott Creek
Water quality in Ellicott Creek has ranged between slightly and moderately impacted. Most of the impact is in the lower portion of the creek in Amherst. A site upstream of Bowmansville was assessed as moderately impacted in the 2001 sampling, but poor habitat may be partially responsible for that determination. The Sheridan Avenue site between Williamsville and Amherst was clearly moderately impacted in the 1993 and 1994 samplings, and again in 2001. The sampling in 2000, a high-flow year, yielded only slight impact at this site, with 2 species of mayflies found. Nonpoint source runoff is considered to be the major cause of impact, with municipal/industrial inputs indicated for the lower portion of the stream. Fish collections by Doug Carlson (NYSDEC Fisheries) at 7 sites in 2001 showed similar trends as the macroinvertebrates (Figure 1-3).

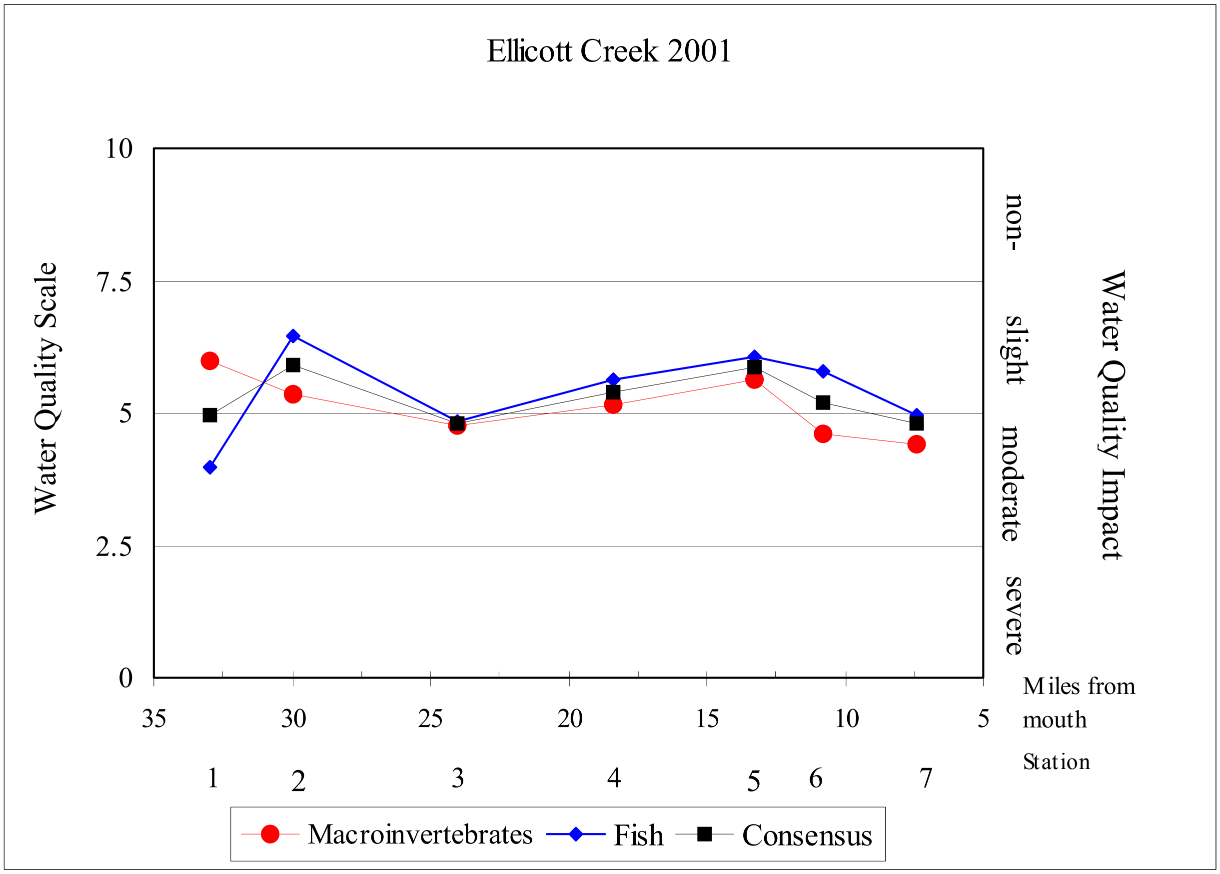


Figure 1-3. Ellicott Creek water quality as determined by macroinvertebrate and fish sampling, 2001.

<u>Elton Creek</u>

Based on a single sampling and field assessment in 2000, water quality was assessed as non-impacted. Clean-water stoneflies, caddisflies, mayflies, and beetles were present. The habitat was excellent, and no water quality problems were indicated.

<u>Gill Creek</u>

Moderately impacted water quality was assessed for the Niagara Falls site, based on 2000 macroinvertebrate sampling. Impact Source Determination indicated that municipal/industrial inputs were the primary cause of impact. No prior data were available for the stream.

<u>Gott Creek</u>

Based on 2000 macroinvertebrate sampling at Swormville, water quality was assessed as moderately impacted, likely by organic wastes. The fauna was heavily dominated by sewage-tolerant worms, and scuds. The substrate at this site was predominantly mud, and the data were analyzed using criteria for sandy streams and for soft sediments.

Hunter Creek

Based on a field assessment at Wales in 2000, water quality was assessed as non-impacted. Clean-water mayflies, stoneflies, caddisflies, and beetles were present. No water quality problems were indicated.

Lime Lake Outlet

Water quality was assessed as slightly-impacted at Delevan, based on 2000 macroinvertebrate sampling. Several species of clean-water mayflies and caddisflies were present, and impacts appeared to be minor. Nonpoint source nutrient enrichment is the likely stressor.

Little Buffalo Creek

Based on a single sampling and field assessment in East Lancaster in 2000, water quality was assessed as non-impacted. Clean-water mayflies, stoneflies, caddisflies, and beetles were present. No water quality problems were indicated.

Little Sister Creek

Water quality was assessed as moderately impacted, based on 2000 macroinvertebrate sampling in Evans Center. The fauna was dominated by midges and scuds, and Impact Source Determination indicated that the municipal/industrial input category was the primary cause of impact.

Little Tonawanda Creek

Slightly impacted water quality was assessed for the site in East Alexander, based on 2000 macroinvertebrate sampling. Nonpoint source nutrient enrichment was the likely source of impact.

Mansfield Creek

Based on a single sampling and field assessment in Otto in 2000, water quality was assessed as non-impacted. Clean-water mayflies, stoneflies, caddisflies, beetles, and dragonflies were present. No water quality problems were indicated.

Monkey Run Creek

Water quality was assessed as non-impacted, based on 2000 macroinvertebrate sampling in Arcade Center. Clean-water mayflies and caddisflies dominated the fauna.

Mud Creek

Based on a single sampling and field assessment in Millersport in 2000, water quality was assessed as slightly impacted. No riffle habitat was available to sample, reducing the efficacy of the assessment. Some caddisflies and mayflies were present. The status of this stream needs verification.

Muddy Creek

Water quality was assessed as moderately-impacted, based on 2000 macroinvertebrate sampling at Angola. Impact Source Determination indicated that municipal/industrial inputs of a toxic nature were the likely cause of impact.

Murder Creek

Murder Creek has been sampled four times at two locations during the last ten years. Water quality has ranged from slightly to moderately impacted, based on resident macroinvertebrate communities. At Swifts Mills, the downstream site, water quality was assessed as moderately impacted in 1993, but slightly impacted in 1994, 2000, and 2001. Impact Source Determination indicated that nonpoint enrichment and inputs from municipal/industrial facilities are likely sources. Based on 2000 sampling, water quality upstream at Pembroke was considered to be moderately-

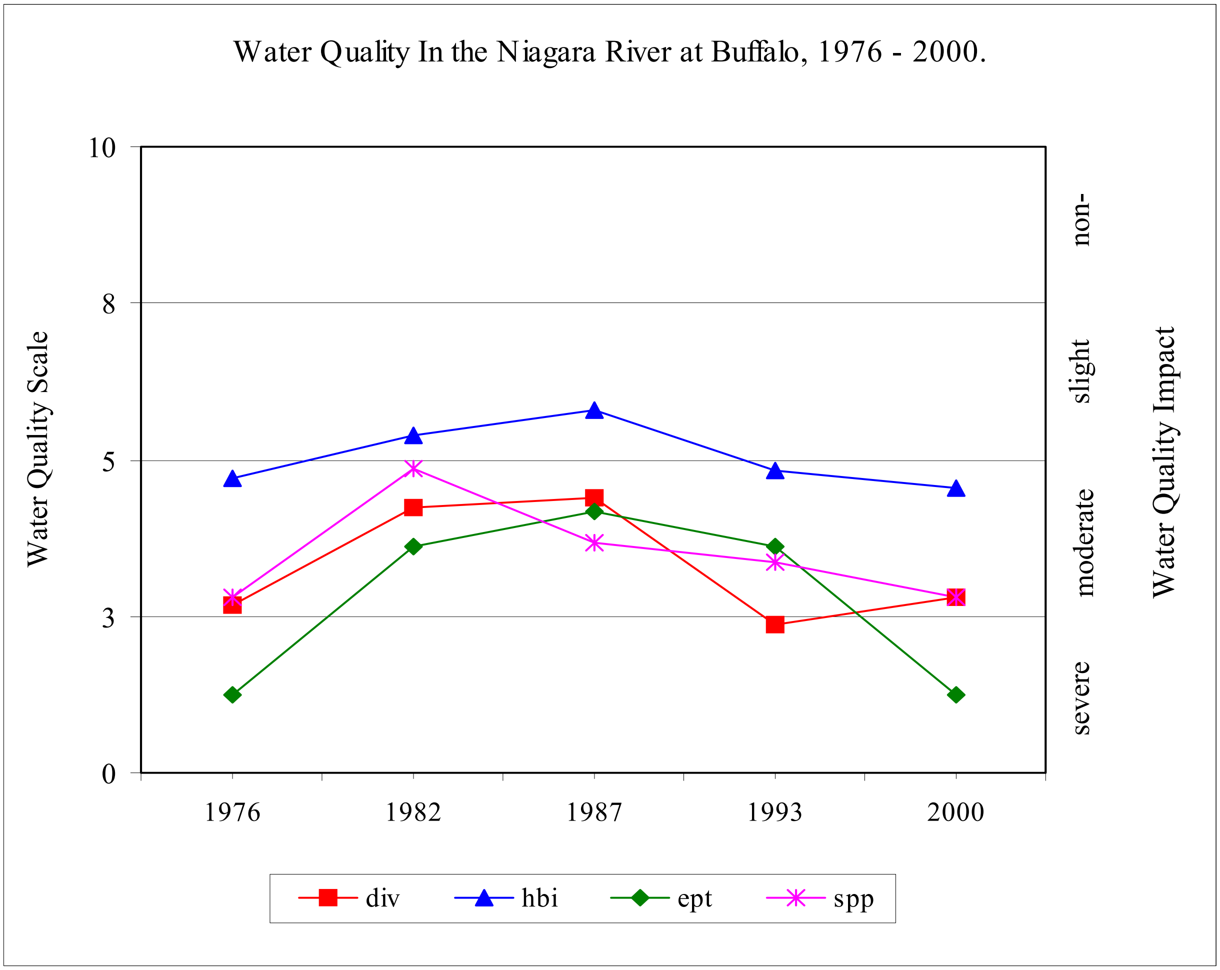


Figure 1-4. Water quality in the Niagara River at Buffalo, 1976-2000. DIV= species diversity, SPP= species richness, HBI= Hilsenhoff biotic index, EPT= richness of mayflies, stoneflies, and caddisflies,

impacted, with toxic inputs the likely cause.

Niagara River

The Niagara River site in Buffalo was assessed as moderately impacted, based on macroinvertebrate multiplate sampling in 2000. The fauna was very limited, consisting mostly of midges, worms, and scuds. The results represent a decline from conditions documented in 1982-1993; the fauna sampled in 2000 was similar to that sampled in 1976 (Figure 1-4). No cause is given for the decline in biological communities at this site, although they may have been influenced by the influx of zebra mussels in Lake Erie. The loss of filter-feeding caddisflies from the site is likely due to zebra mussels exploiting this planktonic resource. In the 2000 sampling, it appeared that the multiplate samples at this site (Buoy 1) were being influenced by the plume of a creek entering the river. To monitor this possibility, an additional site was sampled (Buoy 7) one half mile downstream; results from this sampling showed severe impact. At the Youngstown site, water quality was assessed as slightly impacted, based on 2000 macroinvertebrate multiplate sampling. Samples were dominated by midges and scuds. The invertebrate communities were similar to previous collections at this site since 1982.

Ransom Creek

Water quality was assessed as moderately impacted, based on 2000 macroinvertebrate sampling in Swormville. Impact Source Determination indicated that organic and toxic inputs were the likely causes of impact. Although the only assessment is based on this single sampling, it appears that the impacts previously documented for the creek have not been remediated.

Right Branch

Water quality was assessed as non-impacted, based on 2000 macroinvertebrate sampling at Bennington. Clean-water mayflies and caddisflies were numerous, although nonpoint source nutrient enrichment was also indicated.

Rush Creek

Water quality was assessed as moderately impacted, based on 2000 macroinvertebrate sampling at Woodlawn. Impact Source Determination indicated that municipal/industrial inputs of a toxic nature were the likely cause of impact.

Rythus Creek

Slightly impacted water quality was assessed for this site, based on 2000 macroinvertebrate sampling at Pontiac. The fauna was diverse, and only siltation was indicated as a source of impact.

Scajaquada Creek

Based on 2000 macroinvertebrate sampling in Buffalo, water quality was assessed as moderately impacted. The fauna was heavily dominated by sewage-tolerant worms, snails, and scuds. Municipal/industrial inputs were the likely cause of the impact. The substrate at this site was predominantly sand and silt, and sandy stream criteria were used to evaluate the data. The fauna was dominated by tolerant worms, snails, scuds, and midges. Zebra mussels were also found at this site.

Sheldon Creek

Based on a single sampling and field assessment near Strykersville in 2000, water quality was assessed as non-impacted. Clean-water mayflies, stoneflies, caddisflies, and beetles were present. No water quality problems were indicated.

Silver Creek

Slightly impacted water quality was assessed for the Silver Creek site, based on 2000 macroinvertebrate sampling. Nonpoint source nutrient enrichment was the likely source of impact.

This site was similarly assessed as slightly impacted in 1993 and 1994.

Slippery Rock Creek

Slightly impacted water quality was assessed for the site in Brocton, based on 2000 macroinvertebrate sampling. Nonpoint source nutrient enrichment was the likely source of impact.

Smoke Creek

Slightly impacted water quality was assessed for the site in Lackawanna, based on 2000 macroinvertebrate sampling. Impact Source Determination identified municipal/industrial effects and nonpoint sources effects, indicating that urban runoff is likely the primary stressor.

Smoke Creek, South Branch

Water quality was assessed as moderately-impacted, based on 2000 macroinvertebrate sampling in Lackawanna. Impact Source Determination indicated that nonpoint nutrient enrichment was the likely cause of impact.

Spooner Creek

Water quality was assessed as non-impacted, based on 2000 macroinvertebrate sampling at Springville. Clean-water mayflies, stoneflies, and caddisflies were numerous, although nonpoint source nutrient enrichment was also indicated. No prior data is known for this creek.

Spring Brook

This small tributary of Cattaraugus Creek appeared very turbid during samplings in 1994 and 2000, and has yielded a very sparse fauna near the mouth, but still is no more than slightly impacted, based on the macroinvertebrate metrics. Elevated levels of aluminum measured in crayfish collected at this site are likely caused by alum applications at the Springville (V) Wastewater Treatment Facility upstream. This site was assessed as moderately impacted in a 1976 macroinvertebrate sampling by the DEC Avon Pollution Investigations Unit. The recent samplings represent an apparent improvement in water quality since 1976, but the stream remains very turbid and the macroinvertebrate fauna remains very meager.

Tonawanda Creek

In Batavia, water quality was assessed as moderately impacted downstream of the sewage treatment plant discharge, based on 2000 macroinvertebrate sampling. This condition remains similar to that found in 1992, following the 1990 upgrade of the Batavia (C) Sewage Treatment Plant. The innovative treatment system includes a series of polishing wetlands in the final treatment process. Upstream of Batavia, water quality was assessed as slightly impacted by nutrient enrichment below Varysburg and slightly impacted by organic wastes below Attica. This impact is likely caused by the discharge of the Attica (V) Wastewater Treatment Facility. Water quality in the East Fork, in Johnsonburg was assessed as non-impacted, based on 2000 macroinvertebrate sampling. The fauna was dominated by clean-water mayflies and caddisflies.

Tonawanda Creek in Millersport was sampled in 2000 and field-assessed as non-impacted, with a good diversity of clean-water mayflies, stoneflies, and caddisflies. This may represent an improvement from the slightly impacted conditions of 1988, but needs verification, as the sample was not processed and organisms identified in the laboratory. Additionally, this sample was from a high-flow year, and may not be representative. A sample in 2001 from Rapids, 3 miles upstream, resulted in an assessment of slight impact. The Rapids site was also assessed as slightly impacted in 1993 and 1994. Based on these data, the creek at Millersport is assigned a final assessment of slight impact.

Twentymile Creek

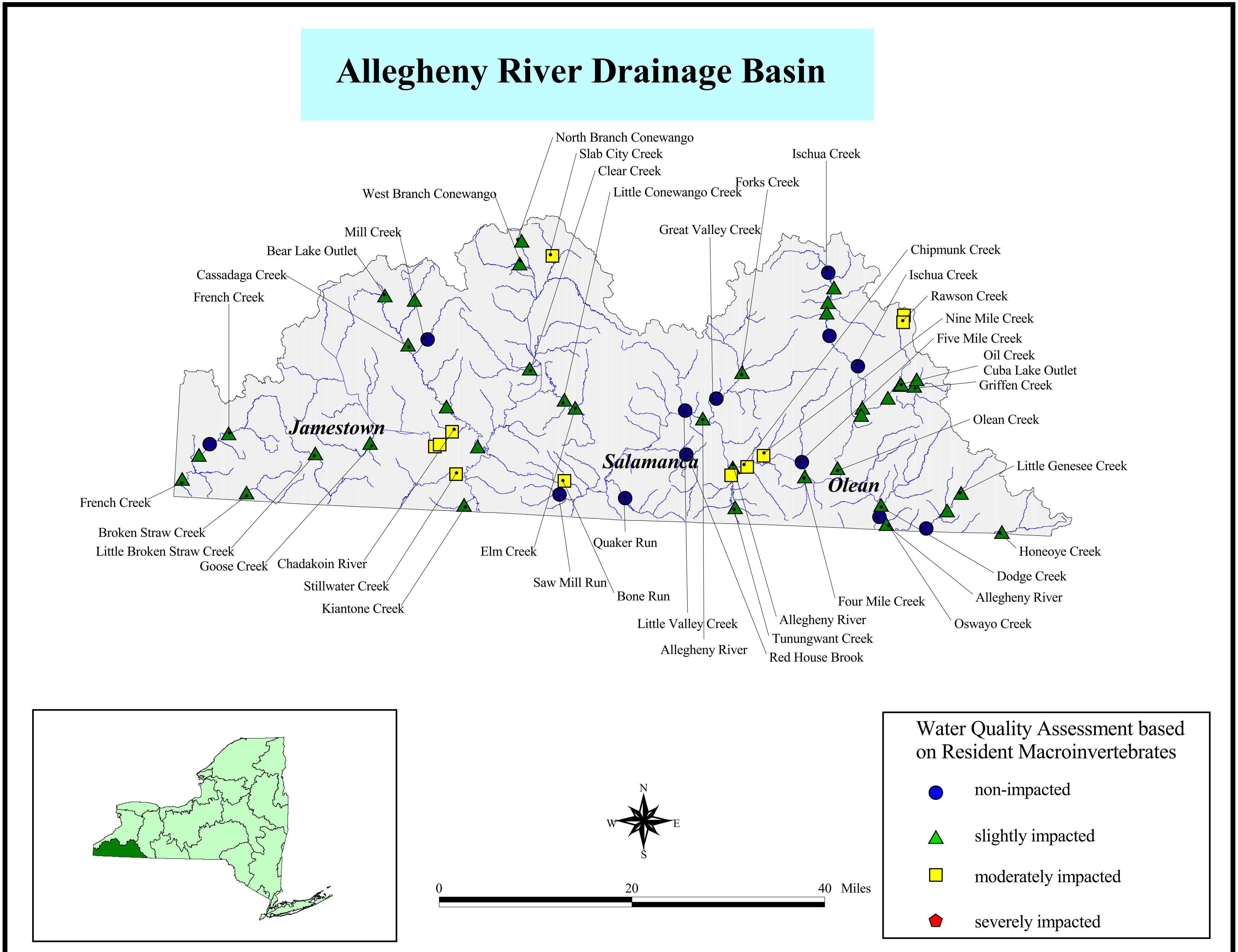
Based on a single sampling and field assessment in 2000, water quality was assessed as non-impacted. Clean-water mayflies, stoneflies, caddisflies, and beetles were present. No water quality problems were indicated.

Twomile Creek

Moderately impacted water quality was assessed for the site at Tonawanda, based on 2000 macroinvertebrate sampling. Organic wastes were the likely cause of impact. The fauna was dominated by midges and sewage-tolerant black flies, and a dissolved oxygen level of 3.8 mg/l was measured. No prior data were available for this stream.

Walnut Creek

Slightly impacted water quality was assessed for the site in the village of Silver Creek, based on 2000 macroinvertebrate sampling. Nonpoint source nutrient enrichment was the primary cause of impact. Walnut Creek had previously been assessed as slightly impacted in 1993, and non-impacted in 1994. The 1994 results were likely influenced by a high-flow year, and the sample is not considered representative of long-term conditions. No data prior to 1993 were available to determine trends.



Allegheny River Drainage Basin
North Branch Conewango
Slab City Creek
Clear Creek
Little Conewango Creek
West Branch Conewango
Mill Creek
Bear Lake Outlet
Cassadaga Creek
French Creek
Ischua Creek
Forks Creek
Great Valley Creek
Chipmunk Creek
Ischua Creek
Rawson Creek
Nine Mile Creek
Five Mile Creek
Oil Creek
Cuba Lake Outlet
Griffen Creek
Olean Creek
Little Genesee Creek
Jamestown
Salamanca
Olean
French Creek
Broken Straw Creek
Little Broken Straw Creek
Goose Creek
Chadakoin River
Stillwater Creek
Kiantone Creek
Elm Creek
Saw Mill Run
Quaker Run
Bone Run
Little Valley Creek
Allegheny River
Allegheny River
Tunungwant Creek
Red House Brook
Four Mile Creek
Oswayo Creek
Allegheny River
Dodge Creek
Honeoye Creek
N
W
E
S
0
20
40
Miles
Water Quality Assessment based on Resident Macroinvertebrates
non-impacted
slightly impacted
moderately impacted
severely impacted

ALLEGHENY RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED							
ALLEGHENY RIVER (ALGY)									
01	Mill Grove, below West River Rd. bridge	75	81	89	90	95	96	01	
02	Weston Mills, above Haskell Creek	75	81						
04	Olean, below Union St. (Rte. 16) bridge	75	81	89				01	
04A	Allegany, Allegany bridge		81						
05	Vandalia, above bridge	75	81						
06	Riverside Junction, below railroad bridge	75	81	89					
08	Salamanca, above Rte. 417 bridge	75	81	89	90				
08A	Salamanca, below Main St. bridge					95	96	01	02
09	Red House, old Route 17 bridge	75	81						
BEAR LAKE OUTLET (BRLO)									
01	Stockton, Rte. 58 bridge							01	
BONE RUN (BONE)									
01	Onoville, above Bone Run Rd. (Rte. 33)							01	
BROKEN STRAW CREEK (STRW)									
01	Clymer, above Knowltown Rd.							01	
CASSADAGA CREEK (CASS)									
00	Kabob, below Luce Rd. bridge							01	02
01	South Stockton, Rt. 56								02
03	Ross Mills, above Rte. 63 bridge					95		01	02
04	Falconer, Dolloff Rd.								02
CHADAKOIN RIVER (CHAD)									
01	Jamestown, below Main St. bridge					95			
02	Jamestown, below Windsor St. bridge					95			
03	Jamestown, above Buffalo St. bridge					95			
04	Falconer, below South Dow St. bridge			89	90	95			02
05	Falconer, below Work St. bridge					95	96	01	
CHIPMUNK CREEK (CHIP)									
01	South Vandailia, above South Nine Mile Rd. bridge							01	02
CLEAR CREEK (CLER)									
01	Clear Creek, above Rte. 67 bridge							01	
CONEWANGO CREEK (WANG)									
01	Kennedy, below Rte. 62 bridge			89	90	95		01	02
N	North Branch Conewango Ck, Wango, above Bartlett Hill Rd.							01	
W	West Branch Conewango Ck, Balcom Corners, below Rte. 87 bridge							01	

ALLEGHENY RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED				
CUBA LAKE OUTLET (CUBA)						
01	Cuba, above Rte. 446 bridge				01	
DODGE CREEK (DODG)						
01	Portville, below Rte. 417 bridge	90			01	
ELM CREEK (ELMC)						
01	Randolph, above Weeden Rd. bridge				01	
FIVE MILE CREEK (FIVE)						
01	Allegany, below Rte. 417 bridge		96			
FORKS CREEK (FORK)						
01	Above Great Valley, above Martin Rd. bridge				01	
FOUR MILE CREEK (FORA)						
01	Allegany, above West River Rd.				01	
FRENCH CREEK (FREN)						
01	Marks Corners, above Marks Rd. Bridge		96			
02	St. Matthias Church, above Rte. 4 bridge		96			
03	French Creek, below Rte. 426 bridge		96			
04	Marvin, below Gilmore Rd. bridge		96		01	
GOOSE CREEK (GOOS)						
01	Ashville, Rte. 474				01	
GREAT VALLEY CREEK (GVAL)						
00	Ellicottville, below Martha Rd. bridge				01	
01	Above Kill Buck, above Rte. 219 bridge		96			
02	Kill Buck, below Rte 417 bridge					02
GRIFFEN CREEK (GRIF)						
01	Cuba, above Bull St. bridge					02
HONEOYE CREEK (HOYE)						
01	Alma, above unnamed Rd. off Rte. 18				01	
ISCHUA CREEK (ISCH)						
A	Above Franklinville, below Reynolds Rd. bridge			98		
01	Franklinville, below West Main St. Bridge			98		
01A	Above Franklinville, Ischua Valley Golf Course			98		
02	Cadiz, above Rte. 98 bridge	90		98	01	
03	Below Cadiz, Coal Chutes Rd. bridge	90		98		
05	Ischua, below Old Dutch Hill Rd. bridge			98		
07	Maplehurst, above Mill St. bridge			98	01	
KIANTONE CREEK (KIAT)						
01	Kiantone, below Kiantone Rd.				01	

ALLEGHENY RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED						
LITTLE BROKEN STRAW (LSTR)								
01	Panama, above Rte. 33						01	
LITTLE CONEWANGO CREEK (WANG)								
L	Randolph, below Borden Rd. Ext.						01	
LITTLE GENESEE CREEK (LGEN)								
02	Bolivar, above STP	84						
03	Bolivar, below Bartlett Rd. bridge	84		90	95			
05	Below Bolivar, Coyle Rd. bridge	84						
06	Bolivar, above Obi Rd. bridge	84		90	95		01	
08	Bowler, above Rte. 417 bridge						01	
LITTLE VALLEY CREEK (LVAL)								
01	Salamanca, above Washington St. bridge					96		
MILL CREEK (MIL2)								
1	Sinclairville, below Rte. 60 bridge			90			01	
NINE MILE CREEK (NINA)								
01	Vandailia, above North Nine Mile Rd.						01	
OIL CREEK (OIL)								
01	Cuba, below Rte 305 bridge							02
02	Cuba, off Rte 446, opposite Cuba Lake Road			90				02
03	Below Cuba, off Rte 446							02
04	Hinsdale, above Rte 16 bridge						01	02
OLEAN CREEK (ALGY)								
03A	Olean, above Hastings Rd. bridge				95	96		02
03	Olean, below Rte. 16 (Main St.) bridge	81	89				01	
OSWAYO CREEK (WAYO)								
01	Mill Grove, East Carroll Rd.						01	
QUAKER RUN (QRUN)								
01	Cain Hollow, above Cain Hollow Rd. bridge						01	
RAWSON CREEK (RAWS)								
01	Rawson, above Porter Rd.						01	
02	Rawson, below Lynden Center Rd.						01	
RED HOUSE BROOK (REDH)								
01	Stoddard Hollow, Allegany State Park, above lake at covered bridge						01	02
SAW MILL RUN (SAWR)								
01	Onoville, above Saw Mill Run Rd.						01	

ALLEGHENY RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED						
SLAB CITY CREEK (SLAB)								
01	South Dayton, below Bentley Rd. bridge							01
STILL WATER CREEK (STIL)								
01	Frewsburg, below Rte. 62							01
TUNUNGWANT CREEK (TUNG)								
1	Limestone, Limestone Run Rd. bridge				90	95	96	01
3	Irvine Mills, South Carolton Rd.	75	81	89				

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE ALLEGHENY RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Allegheny River, Mill Grove	non-impacted	**IMPROVED**
Allegheny River, Olean	slightly impacted	no change
Allegheny River, Salamanca, below Main St. bridge	slightly impacted	no prior data
Bear Lake Outlet, Stockton	slightly impacted	no prior data
Bone Run, Onoville	moderately impacted	no prior data
Broken Straw Creek, Clymer	slightly impacted	no prior data
Cassadaga Creek, Kabob	slightly impacted	no change
Cassadaga Creek, South Stockton	slightly impacted	no prior data
Cassadaga Creek, Ross Mills	slightly impacted	no prior data
Cassadaga Creek, Falconer	slightly impacted	no prior data
Chadakoin River, Jamestown, Main St.	moderately impacted	no prior data
Chadakoin R., Jamestown, Windsor St.	moderately impacted	no prior data
Chadakoin R., Jamestown, Buffalo St.	moderately impacted	no prior data
Chadakoin River, Falconer, S. Dow St.	moderately impacted	no change
Chadakoin River, Falconer, Work St.	moderately impacted	no prior data
Chipmunk Creek, South Vandailia	moderately impacted	no prior data
Clear Creek, Clear Creek	slightly impacted	no prior data
Conewango Creek, Kennedy	slightly impacted	**DECLINED**
Conewango Creek, North Branch, Wango	slightly impacted	no prior data
Conewango Creek, West Branch, Balcom Corners	slightly impacted	no prior data
Cuba Lake Outlet, Cuba	slightly impacted	no prior data
Dodge Creek, Portville	slightly impacted	**DECLINED**
Elm Creek, Randolph	slightly impacted	no prior data
Five Mile Creek, Allegany	non-impacted	no prior data
Forks Creek, above Great Valley	slightly impacted	no prior data
Four Mile Creek, Allegany	slightly impacted	no prior data
French Creek, Marks Corners	slightly impacted	no prior data
French Creek, St. Matthias Church	non-impacted	no prior data
French Creek, French Creek	slightly impacted	no prior data
French Creek, Marvin	slightly impacted	no prior data
Goose Creek, Ashville	slightly impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE ALLEGHENY RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Great Valley Creek , Ellicottville	[unassessed]	no prior data
Great Valley Creek , above Kill Buck	non-impacted	no prior data
Great Valley Creek , Kill Buck	non-impacted	no prior data
Griffen Creek , Cuba	slightly impacted	no prior data
Honeoye Creek, Alma	slightly impacted	no prior data
Ischua Creek, Franklinville	slightly impacted	no prior data
Ischua Creek, Above Franklinville, below Reynolds Rd.	non-impacted	no prior data
Ischua Creek, Above Franklinville	slightly impacted	no prior data
Ischua Creek, Cadiz	slightly impacted	**DECLINED**
Ischua Creek, Below Cadiz	non-impacted	**IMPROVED**
Ischua Creek, Ischua	non-impacted	no prior data
Ischua Creek, Maplehurst	slightly impacted	no prior data
Kiantone Creek, Kiantone	slightly impacted	no prior data
Little Broken Straw Creek, Panama	slightly impacted	no prior data
Little Conewango Creek, Randolph	slightly impacted	no prior data
Little Genesee Creek, Bolivar, below Barlett Rd.	slightly impacted	**IMPROVED**
Little Genesee Creek, Bolivar, above Obi Rd.	slightly impacted	no change
Little Genesee Creek, Bowler	non-impacted	no prior data
Little Valley Creek, Salamanca	non-impacted	no prior data
Mill Creek, Sinclairville	non-impacted	**IMPROVED**
Nine Mile Creek, Vandailia	moderately impacted	no prior data
Oil Creek, Cuba, below Rte 305	moderately impacted	no prior data
Oil Creek, Cuba, off Rt. 446	slightly impacted	no prior data
Oil Creek, below Cuba	slightly impacted	**DECLINED**
Oil Creek, Hinsdale	slightly impacted	no prior data
Olean Creek, Olean, above Hastings Rd.	non-impacted	no prior data
Olean Creek, Olean, below Rte. 16	non-impacted	no change
Oswayo Creek, Mill Grove	slightly impacted	no prior data
Quaker Run, Cain Hollow	non impacted	no prior data
Rawson Creek, Rawson, above Porter Rd	moderately impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE ALLEGHENY RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Rawson Creek, Rawson, below Lyndon Center Rd	moderately impacted	no prior data
Red House Brook, Stoddard Hollow	non-impacted	no prior data
Saw Mill Run, Onoville	non-impacted	no prior data
Slab City Creek, South Dayton	slightly impacted	no prior data
Stillwater Creek, Frewsburg	moderately impacted	no prior data
Tunungwant Creek, Limestone	slightly impacted	no change

REPORTS OF MACROINVERTEBRATE SURVEYS WITHIN THE ALLEGHENY RIVER WATERSHED

STREAM	YEAR OF SURVEY	REPORT
Allegheny River	1969	DOH
Allegheny River	1975	DOH
Chadakoin River	1995	SBU,1996
French Creek	1996	SBU,1997
Ischua Creek	1975	AVON
Ischua Creek	1998	SBU,1999
Oil Creek	1975	AVON
Oil Creek	2002	SBU,2003
Olean Creek	1975	AVON
Little Genesee Creek	1984	SBU,1984
Rawson Creek	2001	SBU,2002
Watershed Streams	1989-1990	RIBS,1992
Watershed Streams	1995-1996	RIBS,1999

AVON	Avon Pollution Investigations Unit, Div. of Fish & Wildlife, NYS DEC
DOH	New York State Department of Health
RIBS	Rotating Intensive Basin System, Statewide Waters Assessment Section, NYS DEC
SBU	Stream Biomonitoring Unit, Division of Water, NYS DEC

Allegheny River

The Allegheny River at Mill Grove has been sampled for many years to monitor water quality as the river enters New York from Pennsylvania. Moderate impacts were documented in multiplate samples from 1975, 1981, and 1989. Oil was the suspected cause of impact, and caddisflies were collected downstream in 1975 with their gills impregnated with oil, although this condition was not found in later years (Bode et al., 1993). Water quality was assessed as only slightly impacted in 1990 and 1995, and again as moderately in 1996. Sampling in 2001 showed water quality to be non-impacted, with high numbers of mayflies present. Metrics from kick samples of the 1990's and 2000's cannot be compared directly to metrics from multiplate samples of the 1970's and 1980's. However, kick samples from 1981-2001 show a possible increase in species richness over the years, typifying improving water quality at the site (Figure 2-1). A series of Allegheny River kick samples in 1981, starting at this site, was the first by the Stream Biomonitoring Unit, and led to the development of the Rapid Assessment methodology in New York State two years later.

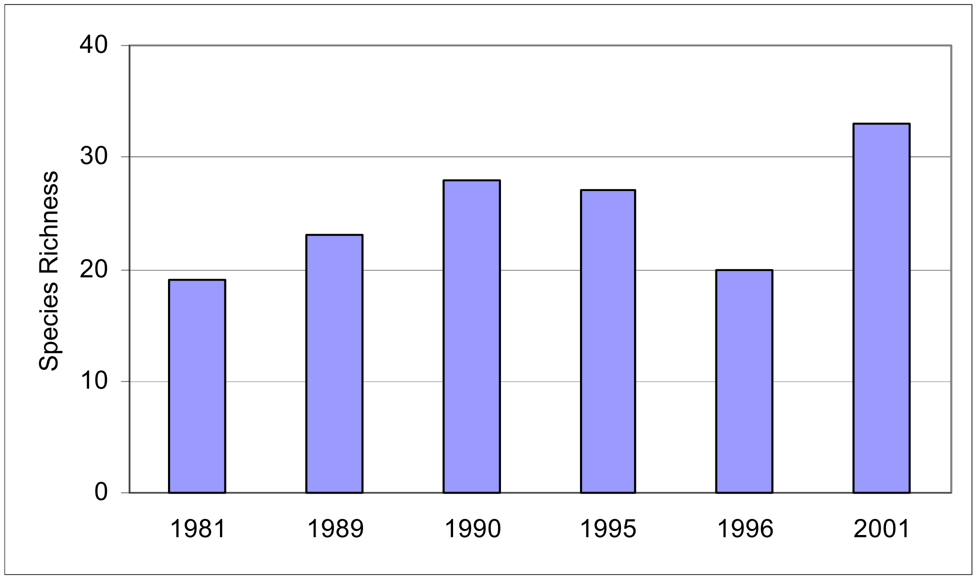


Figure 2-1. Species richness in the Allegheny River at Mill Grove, 1981-2001.

Water quality in the Allegheny River at Salamanca has remained at slightly impacted since 1975. One exception was in 1996, when sampling yielded an assessment of non-impacted. That year was one of high flows, which likely diluted any point sources responsible for impacts at this site. Macroinvertebrate faunas have mostly been dominated by filter-feeding caddisflies, midges, and black fly larvae, indicating nutrient enrichment possibly caused by organic waste inputs.

Bear Lake Outlet

The stream was sampled in 2001 at Stockton, and was assessed as slightly impacted. The fauna was dominated by scuds, and was likely influenced by impoundment effects. Most of the stream was slow-moving, and any impacts were considered to be habitat-related.

Bone Run

This small stream was assessed as moderately impacted, based on macroinvertebrate sampling in 2001. The fauna included mayflies, stoneflies, and caddisflies, but was heavily dominated by riffle beetles, and indicated nonpoint source nutrient enrichment. Siltation also appeared to be a factor at this site.

Broken Straw Creek

A site sampled for macroinvertebrates at Clymer in 2001 yielded an assessment of slight impact. The fauna was dominated by filter-feeding caddisflies, strongly indicating nonpoint source nutrient enrichment.

Cassadaga Creek

Slightly impacted water quality is assessed for Cassadaga Creek from Kabob to Falconer. Four sites were sampled for macroinvertebrates in 2002. Unspecified municipal/industrial inputs were indicated to be the primary stressor at most sites, and nonpoint source nutrient enrichment was also indicated. Previous sampling at the Ross Mills site in 1995 and 2001 also denoted slight impact. Because the substrates at the Kabob and South Stockon sites were substantially different, sandy stream criteria were used to evaluate these data.

Chadakoin River

Water quality in the Chadakoin River has been assessed as moderately impacted, for all years except the high-flow year of 1996 when it was assessed as slightly impacted. Monitoring at the downstream location in Falconer has varied between the Dow Street bridge and the Work Street bridge, although these are only 0.6 miles apart. Elevated levels of metals and PAHs have been documented in the river sediments and in invertebrate tissues. In a 1995 macroinvertebrate study of 5 sites from Jamestown to Falconer, all sites were assessed as moderately impacted except the Dow Street site, although this site was just within the limits of the slightly impacted category. Most samplings have indicated municipal/industrial inputs as the primary stressor.

Chipmunk Creek

A site on Chipmunk Creek in South Vandailia was sampled for macroinvertebrates in 2001 and 2002. The 2001 assessment denoted moderate impact, apparently from nonpoint source nutrient enrichment. The fauna was dominated by midges and riffle beetles, with few mayflies or stoneflies. No prior data were available for this stream.

Clear Creek

This stream was sampled in the town of Clear Creek in 2001. The water quality assessment was slightly impacted, although the Impact Source Determination showed high affinities to a natural community. Nonpoint source runoff from dairy farms is a likely influence on the stream.

Conewango Creek

Conewango Creek in Kennedy has been sampled several times since 1989. Most assessments were of slight impact, except for 1990, when it was assessed as non-impacted. Macroinvertebrate communities from most years are dominated by filter-feeding caddisflies and nonpoint source nutrient enrichment is the likely cause of impact. Sampling of the North Branch and West Branch of Conewango Creek in 2001 yielded assessments of slightly impacted.

Cuba Lake Outlet

This stream in the town of Cuba was sampled for macroinvertebrates in 2001. The site was one mile downstream of Cuba Lake, and impoundment effects persisted. The fauna was dominated by filter-feeding caddisflies, and water quality was assessed as slightly impacted.

Dodge Creek

Dodge Creek was sampled near its mouth in Portville in 1990 and 2001. In 1990 it was assessed as non-impacted, and in 2001 it was assessed as slightly impacted, by nonpoint source nutrient enrichment and siltation. This may represent a decline in water quality, although to date it is documented by only two samplings. Further monitoring is recommended at this site to determine if the trend is genuine.

Elm Creek

This small stream was sampled in Randolph in 2001. Water quality was assessed as slightly impacted, near the top of that category. The fauna was dominated by riffle beetles and midges, although mayflies and stoneflies were also present. Impacts were apparently from nonpoint source nutrient enrichment.

Five Mile Creek

This stream was sampled in the town of Allegany in 1995. The macroinvertebrate sample passed screening criteria, and therefore was considered to be non-impacted, and was not retained. When the stream was inspected in 2001, some sections were dry and some sections consisted of standing water, and no sample was taken.

Forks Creek

A macroinvertebrate sample taken near Great Valley in 2001 indicated slight impact, likely from nonpoint source nutrient enrichment. The fauna was dominated by riffle beetles, and also included mayflies, stoneflies, and caddisflies.

Four Mile Creek

This creek was sampled for macroinvertebrates in 2001, and water quality was assessed as slightly impacted. The fauna was dominated by riffle beetles, and apparently reflected nonpoint source nutrient enrichment.

French Creek

Four sites were sampled on French Creek in a 1996 survey. Water quality varied between non-impacted and slightly impacted, reflecting nonpoint source nutrient enrichment and siltation. The site at Marvin was sampled again in 2001, and indicated slight impact from nonpoint sources.

Goose Creek

Based on a macroinvertebrate sample from Ashville in 2001, water quality was assessed as slightly impacted. The fauna appeared to reflect toxic stress, although impoundment effect was also a factor. No prior data was available for this site.

Great Valley Creek

Non-impacted water quality is assessed for this creek, based on sampling at 2 downstream sites in 1996 and 2002 The macroinvertebrate fauna in both samples was dominated by clean-water mayflies. A sample taken upstream near Ellicottville in 2001 appeared initially to indicate moderate impact, but this assessment likely reflects intermittent flow conditions in the creek.

Griffen Creek

Slightly impacted water quality was assessed for this tributary of Oil Creek, based on macroinvertebrate sampling in Cuba in 2002. Nonpoint source runoff was the likely cause of impact, and siltation was also a factor. Conductivity was elevated at this site (1250 µmhos/cm), and the fauna was dominated by facultative midges.

Honeoye Creek

Based on a macroinvertebrate sample taken at Alma in 2001, water quality was assessed as slightly impacted. Nonpoint nutrient enrichment and siltation were the likely sources of impact.

Ischua Creek

A 1998 sampling of macroinvertebrates at seven sites on Ischua Creek documented water quality ranging from non-impacted to slightly impacted. Improvement was indicated at a site at Cadiz, which had been assessed as slightly impacted in a 1975 DEC study. The improvement was attributed to the 1987 upgrade of the Franklinville sewage treatment facility. This site was assessed as non-impacted in 1990 and 1998 samplings, but slight impact was indicated in the 2001 sampling, possibly due to very low flows. The downstream site at Maplehurst also was assessed as non-impacted in 1998, but slightly impacted in 2001. ISD denoted nutrient enrichment as the primary stressor.

Kiantone Creek

This small stream was sampled at the town of Kiantone in 2001. Water quality was assessed as slightly impacted, likely due to nonpoint source nutrient enrichment. The fauna was dominated by filter-feeding caddisflies.

Little Broken Straw Creek

Based on macroinvertebrate sampling in 2001, water quality was assessed as slightly impacted. The macroinvertebrate community was dominated by mayflies, and was most similar to natural communities and secondarily to nutrient-enriched communities. The impact is considered minor, and may be mostly due to low flows and slow current speeds.

Little Conewango Creek

Non-impacted water quality was assessed for this small stream, sampled in Randolph in 2001. Sandy stream criteria were used to evaluate the data from this site, as the stream substrate consisted primarily of sand, silt, and clay. The fauna was dominated by midges and caddisflies.

Little Genesee Creek

Water quality at Bolivar was determined in 1995 to be slightly impacted, an improvement from 1984 and 1990, when moderate impact was caused by the Bolivar (V) Sewage Treatment Plant. A new treatment plant was built in 1991, with activated sludge treatment. The improvement is illustrated by the decline in the percent contribution of sewage-tolerant worms, which declined from 70% in 1984 to 2% in 1995 (Figure 2-2). At the town of Little Genesee, water quality has been assessed as slightly impacted for all years. The impact may represent residual effects from Bolivar, in addition to nonpoint source nutrient enrichment from the golf course immediately upstream. A site at Bowler, near the mouth, was sampled in 2001, and was determined to be non-impacted.

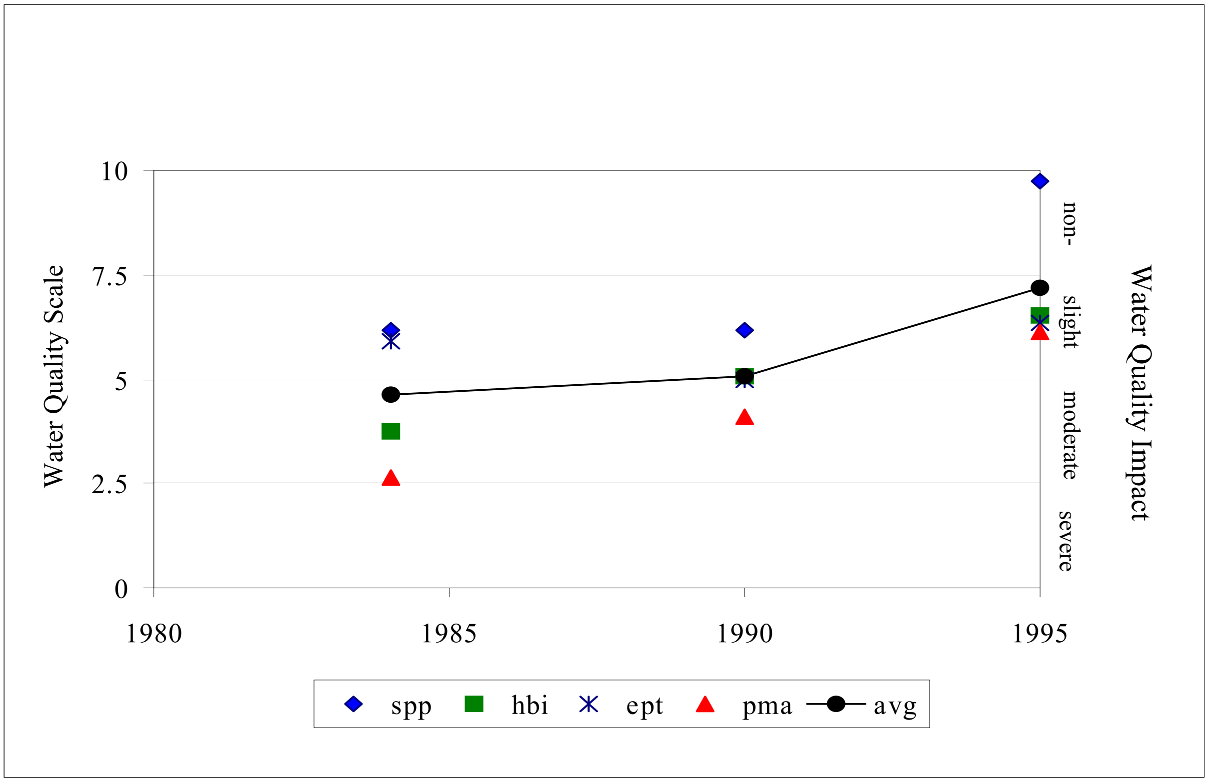


Figure 2-2. Water quality in Little Genesee Creek, 1984-1995. SPP= species richness, HBI= Hilsenhoff biotic index, EPT= richness of mayflies, stoneflies, and caddisflies, PMA- Percent Model Affinity, AVG= Biological Assessment Profile value.

<u>Little Valley Creek</u>

This creek was sampled in 1996 and was determined to be non-impacted. The macroinvertebrate fauna was dominated by midges and worms, with caddisflies and stoneflies also present.

<u>Mill Creek</u>

Mill Creek in Sinclairville was assessed as slightly impacted in 1990, and non-impacted in 2001. Impact Source Determination indicated nonpoint source nutrient enrichment. Since 2001 was a low-flow year, less runoff apparently resulted in less impacts, resulting in the non-impacted assessment. Further monitoring at this site is recommended to determine long-term water quality trends for the stream.

<u>Nine Mile Creek</u>

Based on macroinvertebrate sampling in 2001, water quality was assessed as moderately impacted. The site habitat had been modified, bulldozed upstream and downstream of the section sampled, and flow was very low. The water had a gray appearance of sewage. The macroinvertebrate fauna was heavily dominated by midges (93%), resembling no community model in Impact Source Determination, but containing many sewage-tolerant species. Based on the midge species present, effects of sewage wastes are suggested. Further sampling is recommended to monitor water quality at this site.

Oil Creek

Current water quality in Oil Creek ranges from slightly impacted to moderately impacted. In 2002, a multi-site survey of four sites from Cuba to Hinsdale found moderate conditions at Cuba and slightly impacted conditions at all downstream sites. The moderate impact appeared to indicate effects of organic wastes. Slight impact measured downstream of Cuba represents an apparent decline in water quality compared to non-impacted conditions at this site documented in 1990. A downstream site at Hinsdale sampled in 2001 was assessed as slightly impacted by nonpoint source nutrient enrichment.

Olean Creek

Olean Creek is currently assessed as non-impacted as in 1989 sampling. The creek has been monitored at two sites - Main Street in Olean, and at Hastings Road, approximately two miles upstream. Assessments of non-impacted conditions were documented at the Hastings Road bridge for 1995 and 1996. The 2001 sample from the Main Street site was analyzed using sandy stream criteria, and was also assessed as non-impacted.

Oswayo Creek

Based on macroinvertebrate sampling at Mill Grove in 2001, water quality is assessed as slightly impacted. The community was teeming with invertebrate life and diatoms. Filter-feeding caddisflies and midges dominated, indicating nonpoint source nutrient enrichment. No prior data were available for this site.

Quaker Run

Water quality was clearly non-impacted at Cain Hollow, based on macroinvertebrate sampling in 2001. The macroinvertebrate fauna was dominated by clean-water mayflies, with stoneflies and caddisflies well-represented. No prior data were available for this site.

Rawson Creek

This small stream at Rawson was sampled at two sites in 2001, upstream and downstream of a recent spill of silage leachate. Although both sites were assessed as moderately impacted, a significant biological impairment was documented downstream of the spill site. Dissolved oxygen levels in the stream declined from 7.8 mg/l upstream to 1.1 mg/l downstream. Impacts at the upstream site were likely due to impoundment effects. Re-sampling of the sites is planned to document recovery once the problem is remediated.

Red House Brook

Water quality was assessed as non-impacted for this stream located in Allegany State Park, based on macroinvertebrate sampling in 2001. The macroinvertebrate fauna was dominated by clean-water mayflies, with stoneflies and caddisflies well-represented. No prior data were available for this site.

Saw Mill Run

This stream was sampled at Onoville in 2001, and water quality was assessed as non-impacted. The fauna was dominated by mayflies and caddisflies, with stoneflies well-represented. The stream was considered somewhat enriched by nonpoint source nutrients. No prior data were available for this site.

Slab City Creek

This small stream was sampled in South Dayton in 2001. Habitat was considered poor, and sandy stream criteria were used to evaluate the fauna. Based on these, water quality was assessed as slightly impacted, with the fauna likely being controlled primarily by siltation. No prior data were available.

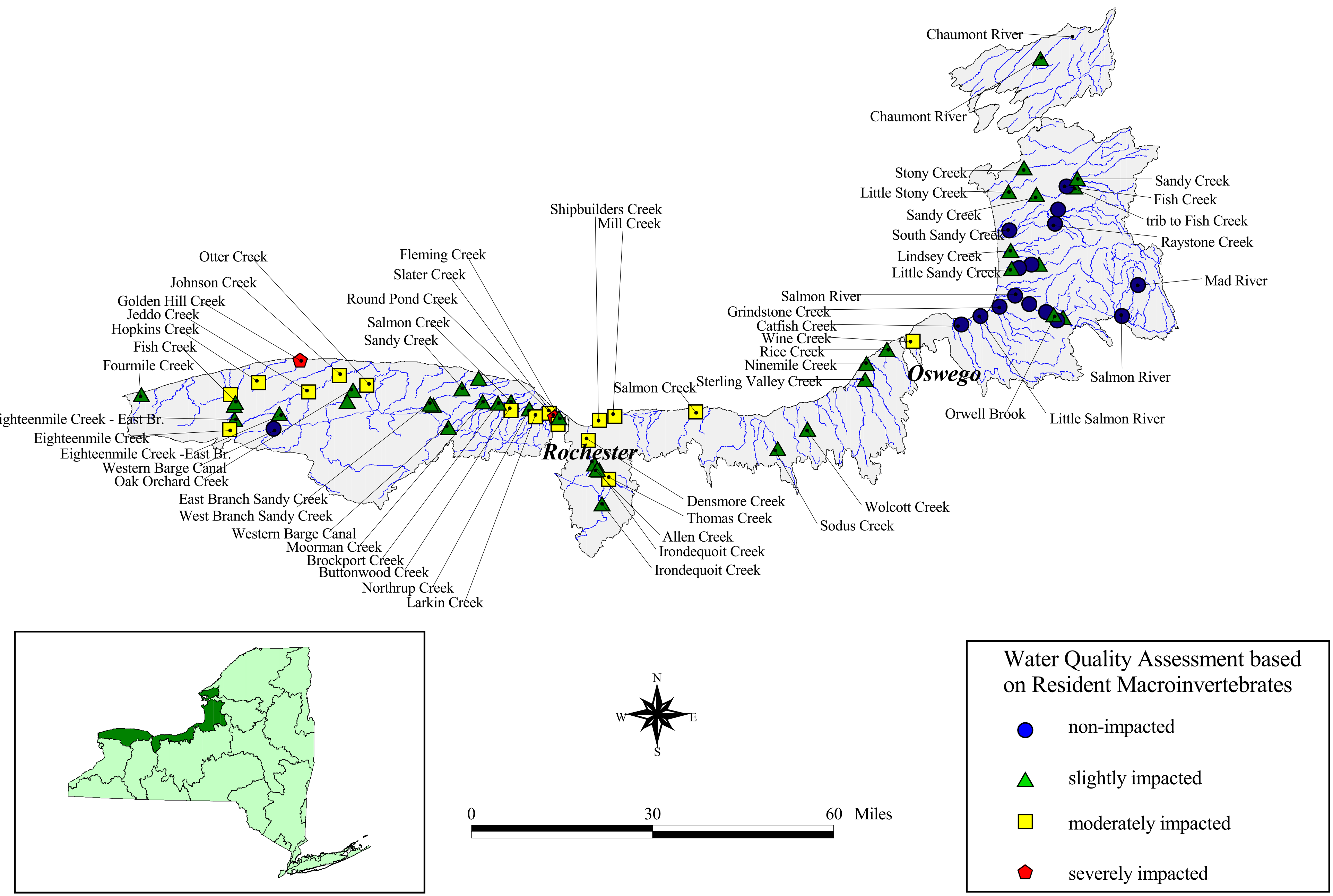
Still Water Creek

Water quality was assessed as moderately impacted, based on 2001 macroinvertebrate sampling at Frewsburg. Metric values were near the top of this category. The fauna was dominated by riffle beetles and filter-feeding midges and caddisflies, reflecting nonpoint source nutrient enrichment. No prior data were available for this site.

Tunungwant Creek

Sampling in Tunungwant Creek from 1975-1989 was conducted at Irvine Mills. Moderate impact was found, due to a combination of oil, poor habitat, and possible effects from the discharge of the Limestone (V) Wastewater Treatment Facility, located approximately 3 miles upstream. Beginning in 1990, sampling has been conducted at Limestone, an upstream location with better habitat. Water quality at this site has been assessed as slightly impacted, with the exception of 1995, a dry year, when it was assessed as moderately impacted. The fauna is heavily dominated by riffle beetles and filter-feeding caddisflies, reflecting nonpoint source nutrient enrichment.

Lake Ontario Drainage Basin



LAKE ONTARIO DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED										
ALLEN CREEK (ALEN)												
01	Penfield, below Allen Creek Development bridge								99			
BARGE CANAL, WEST (WCAN)												
02a	Lockport, west of locks		81									
03	Gasport, off Telegraph Rd.	75	81		90	95			99			
04	Below Middleport, below guard gate	75	81									
05	Below Medina, above Culvert Rd	75	81									
06	Below Knowlesville, above guard gate	75	81									
07	Hulberton, 1 km above lift bridge	75	81									
08	Below Holley, off Canal Rd.	75	81		90	95			99			
09	Below Brockport, below Gallup Rd bridge	75	81									
10	Below South Greece, below Elmgrove Rd. bridge	75	81									
BROCKPORT CREEK (BROK)												
01	West of Hilton, above Rte. 18 bridge								99			
BUTTONWOOD CREEK (BUTN)												
01	Parma Center, above Rte. 259 bridge								99			
CATFISH CREEK (CATF)												
01	Demster, above Co Rte 6 bridge										01	
CHAUMONT RIVER (CHMO)												
04	LaFargeville, above Rte. 180 bridge			89								
08	Below LaFargeville, Zang Rd. bridge			89			96					02
11	Depauville, below Rte 179 bridge			89								
DENSMORE CREEK (DENS)												
01	Newport, above Bavshore Dr. bridge								99			
EIGHTEENMILE CREEK (EMIL)												
00	Below Gasport, East Branch, below Quaker Rd. bridge									00		
01	Wrights Corners, East Branch, below Rte. 104 bridge				90					00		
01A	Below Lockport, below Stone Rd. bridge									00		
02	Corwin, below Jacques Rd.			89	90	95				00		
03	Newfane, below McKee Rd. bridge				90							
FISH CREEK (FICR)												
01	Oak Orchard on the Ridge, above E. Scott Rd. bridge								99			
FISH CREEK (FYSH)												
01	Rodman, above Rte 97 bridge							97				

LAKE ONTARIO DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED
FISH CREEK (FYSH)		
03	Rodman, above Creek Rd.	97
01A (Tributary)	Rodman, above Brown Rd. bridge	97
FLEMING CREEK (FLEM)		
01	Greece, below Britton Rd. bridge	00
02	Greece, above Latta Rd. bridge	00
FOURMILE CREEK (FOMI)		
01	Porter, Rte.18 bridge	00
GOLDEN HILL CREEK (GHIL)		
01	Somerset, Park Rd. picnic area	00
GRINDSTONE CREEK (GRND)		
01	Daysville Corner, above Rte. 3 bridge	01
HOPKINS CREEK (HOPK)		
01	Burt, above culvert	00
IRONDEQUOIT CREEK (IRON)		
04	Bushnell Basin, below Park Rd. bridge	99
07	Penfield, below Panorama Terrace bridge	95 99
08	Rochester, off Blossom Rd.	96
JEDDO CREEK (JEDO)		
01	North Ridgeway, below Mill Rd. bridge	99 00
JOHNSON CREEK (JOHN)		
01	Below Lyndonville, above Blood Rd. bridge	95 96 99
LARKIN CREEK (LARK)		
01	North Greece, above Latta Rd. bridge	99
LINDSEY CREEK (LIND)		
01	The Elms, below Weaver Rd. bridge	01
LITTLE SALMON RIVER (LSAM)		
01	Texas, above Rte. 16 bridge	95 01 02
LITTLE SANDY CREEK (LSAN)		
01	Lacona, above Rte. 22 bridge	97
02	Sandy Creek, below Rte. 11 bridge	97
03	Below Sandy Creek, below Norton Rd. bridge	97
04	Sandy Pond Corners, below Rte. 3 bridge	01
LITTLE STONY CREEK (LSTN)		
01	Scotts Corners, above Rte. 152 bridge	96

LAKE ONTARIO DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED								
MAD RIVER (MAD)										
01	Otto Mills, below Otto Mills Dr. bridge								01	
MILL CREEK (MILO)										
01	Webster, below Lake Rd. foot bridge						99			
MOORMAN CREEK (MORM)										
01	Above Walker, above Rte. 18 bridge						99			
NINEMILE CREEK (NIMI)										
01	Sterling, above Irwin Rd. Bridge			95						
NORTHRUP CREEK (NRUP)										
01	North Greece, above North Greece Rd. bridge						99			
OAK ORCHARD CREEK (ORCH)										
00	Shelby, above Martin Rd. bridge						99			
01	Ridgeway, below Town Line Rd. bridge	89	90	95						
02	Oak Orchard on-the-Ridge, above Rte 104 bridge						99			
ORWELL BROOK (ORWL)										
01	Altmar, above Rte. 52 bridge								01	
OTTER CREEK (OTER)										
01	Waterport, above Rte. 31 bridge						99			
RAYSTONE CREEK (RAYS)										
01	Giddingsville, above LeMay Rd bridge									02
RICE CREEK (RICE)										
01	Fruit Valley, above Rte 104 bridge								01	
ROUND POND CREEK (RPON)										
01	Greece, below Island Cottage Rd. bridge						99			
SALMON CREEK (SAMC)										
01	Hilton, below Rte. 259 bridge						99			
SALMON CREEK (SALC)										
01	Pultneyville, above Rte. 21 bridge								01	
SALMON RIVER (SALM)										
01	Redfield, above Waterbury Rd. bridge				96		99			
02	Above Altmar, DEC Fishing Access Rte. 22				96		99			
03	Altmar, below Rte. 52 bridge				96		99			
04	Pineville, above Rte. 48 bridge				96		99			
05	Pulaski, above Lehigh Rd. bridge	89	90		95	96	99	00	01	
06	Pulaski, off Riverview Dr.				96		99			

LAKE ONTARIO DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED
SANDY CREEK - JEFFERSON COUNTY (SAND)		
00	Rodman, above Main St. bridge	97
01	N. of Adams, below Creek Rd. bridge	97 02
02	Thomas Settlement, above Rte. 84 bridge	97
03	North Landing, above Rte. 3 bridge	96 97 02
SANDY CREEK - MONROE COUNTY (SNDY)		
01	Hamlin, below Brick Schoolhouse Rd.	95
02	North Hamlin, above Rte. 19 bridge	99
SANDY CREEK, EAST BRANCH (SNDY)		
E	Murray, below Groth Rd. bridge	99
SANDY CREEK, WEST BRANCH (SNDY)		
W	Murray, Rte. 33 bridge	99
SHIPBUILDERS CREEK (SHIP)		
01	Webster, Forest Lawn Dr.	99
SLATER CREEK (SLTR)		
01	Greece, below Dewey Ave. Bridge	99
SODUS CREEK (SDUS)		
01	Glenmark, below Glenmark Rd. bridge	01
SOUTH SANDY CREEK (SSAN)		
00	Allendale, below Rte 189 bridge	02
01	Ellisburg, above Joslyn St. bridge	96 02
STERLING CREEK (STRL)		
01	Above Grays Corners, above Sutterby Rd. bridge	01 02
STERLING VALLEY CREEK (SVAL)		
01	N. of Sterling Valley, above Rte. 122 bridge	01
STONY CREEK (STNE)		
01	Smithville, above Rte. 75 bridge	96
THOMAS CREEK (THOM)		
01	East Rochester, above Baird Rd. bridge	99 00
WINE CREEK (WINE)		
01	Oswego, Town Line Rd.	95
WOLCOTT CREEK (WOLC)		
01	Wolcott, Furnace Rd.	95 01

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE LAKE ONTARIO DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Allen Creek, Penfield	slightly impacted	no prior data
Barge Canal, Western, Gasport	non- impacted	**IMPROVED**
Barge Canal, Western, below Holley	slightly impacted	**DECLINED**
Brockport Creek, West of Hilton	slightly impacted	no prior data
Buttonwood Creek, Parma Center	moderately impacted	no prior data
Catfish Creek, Demster	non-impacted	no prior data
Chaumont River, below LaFargeville	moderately impacted	**DECLINED**
Densmore Creek, Newport	moderately impacted	no prior data
Eighteenmile Creek, East Br., Gasport	slightly impacted	no prior data
Eighteenmile Creek, East Br., Wrights Corners	slightly impacted	no change
Eighteenmile Creek, below Lockport	moderately impacted	no prior data
Eighteenmile Creek, Corwin	slightly impacted	**IMPROVED**
Fish Creek, Oak Orchard on the Ridge	slightly impacted	no prior data
Fish Creek, Rodman, above Rt. 97	slightly impacted	no prior data
Fish Creek, Trib, Rodman, above Brown Rd	slightly impacted	no prior data
Fish Creek, Rodman, at Creek Rd	non-impacted	no prior data
Fleming Creek, Greece, Britton Rd	moderately impacted	no prior data
Fleming Creek, Greece, Latta Rd	slightly impacted	no prior data
Fourmile Creek, Porter	severely impacted	no prior data
Golden Hill Creek, Somerset	severely impacted	no prior data
Grindstone Creek , Daysville Corner	non-impacted	no prior data
Hopkins Creek, Burt	moderately impacted	no prior data
Irondequoit Creek, Bushnell Basin	slightly impacted	no prior data
Irondequoit Creek, Penfield	slightly impacted	no prior data
Irondequoit Creek, Rochester	slightly impacted	no prior data
Jeddo Creek, North Ridgeway	moderately impacted	no prior data
Johnson Creek, below Lyndonville	moderately impacted	no prior data
Larkin Creek, North Greece	moderately impacted	no prior data
Lindsey Creek, The Elms	slightly impacted	no prior data
Little Salmon River, Texas	slightly impacted	no prior data
Little Sandy Creek, Lacona	non-impacted	no prior data
Little Sandy Creek, Sandy Creek	non-impacted	no prior data
Little Sandy Cr., below Sandy Creek	non-impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE LAKE ONTARIO DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Little Sandy Creek, Sandy Pond Corners	slightly impacted	no prior data
Little Stony Creek, Scotts Corners	slightly impacted	no prior data
Mad River, Otto Mills	non-impacted	no prior data
Mill Creek, Webster	moderately impacted	no prior data
Moorman Creek, above Walker	slightly impacted	no prior data
Ninemile Creek, Sterling	slightly impacted	no prior data
Northrup Creek, North Greece	slightly impacted	no prior data
Oak Orchard Creek, Shelby	slightly impacted	no prior data
Oak Orchard Creek, Ridgeway	slightly impacted	no change
Oak Orchard Creek, Oak Orchard on the Ridge	slightly impacted	no prior data
Orwell Brook, Altmar	slightly impacted	no prior data
Otter Creek, Waterport	moderately impacted	no prior data
Raystone Creek , Giddingsville	non-impacted	no prior data
Rice Creek, Fruit Valley	slightly impacted	no prior data
Round Pond Creek, Greece	moderately impacted	no prior data
Salmon Creek, Hilton	slightly impacted	no prior data
Salmon Creek, Pultneyville	moderately impacted	no prior data
Salmon River, Redfield	non-impacted	no change
Salmon River, above Altmar	slightly impacted	no prior data
Salmon River, Altmar	non-impacted	no prior data
Salmon River, Pineville	non-impacted	no prior data
Salmon River, Pulaski, above Lehigh Rd.	non-impacted	no change
Salmon River, Pulaski, off Riverview Dr.	non-impacted	no prior data
Sandy Creek, Rodman	slightly impacted	no prior data
Sandy Creek, north of Adams	slightly impacted	no prior data
Sandy Creek, Thomas Settlement	slightly impacted	no prior data
Sandy Creek, North Landing	slightly impacted	no change
Sandy Creek, Hamlin, Brick Schoolhouse Rd	slightly impacted	no prior data
Sandy Creek, Hamlin, Rte 19	slightly impacted	no prior data
Sandy Creek, East Branch, Murray	slightly impacted	no prior data
Sandy Creek, West Branch, Murray	slightly impacted	no prior data
Shipbuilders Creek , Webster	moderately impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE LAKE ONTARIO DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Slater Creek, Greece	severely impacted	no prior data
Sodus Creek, Glenmark	slightly impacted	no prior data
South Sandy Creek, Allendale	non-impacted	no prior data
South Sandy Creek, Ellisburg	non-impacted	no prior data
Sterling Creek, above Grays Corners	slightly impacted	no prior data
Sterling Valley Creek, Sterling Valley	slightly impacted	no prior data
Stony Creek, Smithville	slightly impacted	no prior data
Thomas Creek, East Rochester	moderately impacted	no prior data
Wine Creek, Oswego	moderately impacted	no prior data
Wolcott Creek, Wolcott	slightly impacted	no prior data

REPORTS OF MACROINVERTEBRATE SURVEYS WITHIN THE LAKE ONTARIO WATERSHED

STREAM	YEAR OF SURVEY	REPORT
Chaumont River	1989	SBU, 1990
Eighteenmile Creek	1990	SBU, 1990
Irondequoit Creek/Tribs.	1995	DFW
Johnson Creek	1976	AVON
Jedo Creek	1976	AVON
Little Sandy Creek	1997	SBU,1998
Rochester Embayment	2000	CAASA
Salmon River	1996	SBU,1997
Salmon River	1999	HALLOCK, 2003
Sandy Creek	1997	SBU,1998
Watershed Streams	1989-1990	RIBS,1992

AVON	Avon Pollution Investigations Unit, Div. of Fish & Wildlife, NYS DEC
CAASA	Center for Applied Aquatic Science & Aquaculture, SUNY Brockport
DFW	Division of Fish & Wildlife
DOH	New York State Department of Health
HALLOCK	John L. Hallock, SUNY ESF Master of Science thesis
RIBS	Rotating Intensive Basin Studies, Statewide Waters Assessment Section, NYS DEC
SBU	Stream Biomonitoring Unit, Division of Water, NYS DEC

Allen Creek

This stream was sampled in Penfield approximately 0.2 miles upstream of its confluence with Irondequoit Creek. The watershed is mostly residential, and also includes the Oak Hill Country Club. Based on sampling in 1999, water quality was field-assessed as slightly impacted. The stream was characterized by filamentous algae, blue-green algae, purple loosestrife, and many crayfish. The sample was laboratory-sorted to order and based on this it was determined that the field assessment was appropriate. No prior data are available for this stream.

Barge Canal

Monitoring of the Western Barge Canal has been focused on sites at Gasport and Holley. These sites have been monitored in 1975, 1981, 1990, 1995, and 1999. The Gasport site is currently assessed as non-impacted, representing an improvement compared to previous assessments. This site exhibited moderate impact in 1975 sampling, and has improved steadily since, displaying faunas of several species of mayflies and caddisflies. Diminished municipal/industrial inputs upstream is the likely cause of improvement. The Barge Canal at Holley is currently assessed as slightly impacted, representing an apparent decline from non-impacted conditions documented in 1990 and 1995 (Figure 3-1). The influx of zebra mussels, first observed on the 1990 multiplate samples, have apparently changed the ecosystem dynamics of the Barge Canal, and may be responsible for some of the changes observed at these sites.

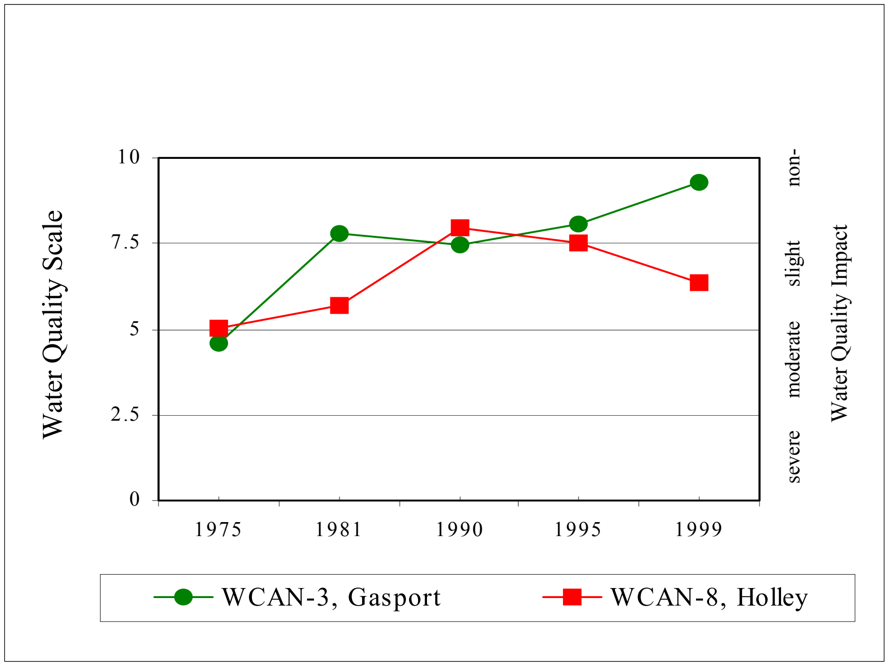


Figure 3-1. Water quality in the Western Barge Canal at Gasport and Holley, 1975-1999.

Brockport Creek

Water quality was assessed as slightly impacted, based on 1999 invertebrate sampling near Hilton. Nonpoint source nutrient enrichment was the primary factor affecting the fauna.

Buttonwood Creek

A site east of Hilton was sampled in 1999. Although the indices pointed to moderately impacted water quality, this was thought to primarily reflect poor habitat. A few clean-water species were present, although no mayflies were found. ISD denoted nutrient enrichment as a stressor.

Catfish Creek

Non-impacted water quality was assessed for this creek, based on macroinvertebrate sampling in Demster in 2001. The fauna included a diversity of clean-water mayflies, stoneflies, and caddisflies. No prior data were available for the stream.

Chaumont River

Water quality in the Chaumont River in 1989 was assessed as slightly impacted, from LaFargeville to Depauville. Sampling in 1996 and 2002 at the Depauville site yielded an assessment of moderate impact, a decline from 1989. The habitat was less than ideal, consisting of a minor riffle draining a pooled area. The invertebrate fauna was dominated by caddisflies and riffle beetles, and livestock waste was the primary stressor.

Densmore Creek

Moderate impact was assessed for the site in Newport, based on 1999 invertebrate sampling. Impact Source Determination denoted sewage wastes as the primary factor affecting the fauna.

Eighteenmile Creek

Water quality in the East Branch of Eighteenmile Creek was assessed as slightly-impacted in 2000, similar to the 1989 assessment. Nonpoint source nutrient enrichment was the likely cause of impact. Moderately impacted water quality was assessed for the site below Lockport, based on 2000 macroinvertebrate sampling. Impact Source Determination indicated that toxic inputs were the primary cause of impact. No prior data were available for this site.

Water quality at Corwin had been assessed as moderately impacted in 1989 and 1990. In 2000 macroinvertebrate sampling it was assessed as slightly-impacted by municipal/industrial inputs, representing an apparent improvement. The appearance of the pollution-sensitive riffle beetle Optioservus was an indicator of improved water quality. Further sampling is recommended to verify the trend at this site.

Figure 3-2. The pollution-sensitive riffle beetle *Optioservus,* an indicator of improved water quality, was collected in Eighteenmile Creek at Corwin in 2000.

Fish Creek (Jefferson County)

Three Fish Creek sites, including one tributary, were sampled near Rodman in 1997 (Bode et al., 1998) to determine if the nearby North Country Landfill impacted water quality. The most downstream site near the confluence with Sandy Creek was assessed as non-impacted. The upstream site and tributary site were assessed as slightly impacted, likely reflecting headwater conditions. No impacts attributable to the landfill were evident.

Fish Creek (Orleans County)

Slight impact from nonpoint source nutrient enrichment was assessed for this tributary of Oak Orchard Creek, based on 1999 invertebrate sampling. The fauna was diverse but was dominated by midges, and contained many facultative organisms.

Fleming Creek

Fleming Creek in Greece is a small tributary of Slater Creek. The stream is reported by to receive sewage overflows from houses in the area during storm events. Two sites were sampled in 2000. The Britton Road site was assessed as moderately impacted, with the fauna dominated by tolerant midges, worms, sowbugs, and black flies. The impact was attributed to organic waste inputs. The Latta Road site, approximately 1.5 miles downstream, was assessed as slightly impacted.

Fourmile Creek

Based on 2000 macroinvertebrate sampling at Fourmile Creek Park near Towers Corners, water quality was assessed as severely impacted. The fauna was dominated by flatworms and scuds, and ISD denoted municipal/industrial wastes as the primary stressor. The sampling site was at a golf course, and there are also known stormwater discharges. No prior data were available for this stream.

Golden Hill Creek

Based on 2000 macroinvertebrate sampling in Somerset, water quality was assessed as severely impacted, likely by organic wastes. Slow current speed may also be a factor. The fauna was heavily dominated by snails and sowbugs, with no mayflies, stoneflies, or caddisflies. A fish kill on March 27 in the year of sampling from a chlorine discharge may have had residual effects on the macroinvertebrate fauna.

Grindstone Creek

This stream was sampled at Daysville Center in 2001 and was assessed as non-impacted. Clean-water mayflies, stoneflies, and caddisflies were well-represented. No prior data were available for this site.

Hopkins Creek

Moderately impacted water quality was assessed for the Burt site, based on 2000 macroinvertebrate sampling. Impact Source Determination indicated that municipal/industrial inputs were the primary cause of impact.

Irondequoit Creek

Slight impact was assessed for the Bushnell Basin to Penfield reach, based on 1999 invertebrate sampling at two sites. Impact Source Determination indicated influences of nonpoint nutrient enrichment and possible municipal and/or industrial inputs. Sampling in 1995 at Penfield and in 1996 at a downstream Rochester site showed similar assessments.

Jeddo Creek

Moderately impacted water quality was indicated by the 1999 sample from North Ridgeway. Municipal and/or industrial inputs were the likely sources of impact. The fauna was dominated by filtering caddisflies, and species richness was very low. Sampling in 2000, a high-flow year, yielded an assessment of slight impact, likely due to greater dilution of any point source inputs.

Johnson Creek

Sampling in 1995 yielded an assessment of slightly impacted for the site below Lyndonville. Moderate impact was assessed in 1996 and 1999 invertebrate sampling. Nonpoint source nutrient enrichment was indicated to be the primary cause of impact. Crayfish collected in 1995 showed elevated levels of DDE (4,4') in their tissues.

Larkin Creek

Moderately impacted water quality was indicated by the 1999 sample taken near North Greece. Nonpoint source nutrient enrichment was the primary factor affecting the invertebrate fauna. The fauna was dominated by riffle beetles.

Lindsey Creek

This stream was sampled at The Elms in 2001 and was assessed as slightly impacted. The macroinvertebrate fauna was dominated by riffle beetles and filter-feeding caddisflies, indicative of nonpoint source nutrient enrichment. No prior data were available for this site.

Little Salmon River

Although excellent water quality was documented for this stream in 1995, sampling in 2001, a low-flow summer, resulted in an assessment of slightly impacted. Minor nonpoint source nutrient enrichment is indicated by the fauna.

Little Sandy Creek

Three sites were sampled on Little Sandy Creek in 1997: in Lacona, in Sandy Creek, and below Sandy Creek. All sites were assessed as non-impacted, based on fish and invertebrate sampling. Stoneflies were numerous in the stream. The biota indicated possible nutrient and organic additions in the villages of Lacona and Sandy Creek, but the effect on the fauna was considered minor. Sampling downstream at Sandy Pond Corners in 2001 yielded an assessment of slightly impacted by nonpoint source nutrient enrichment.

Figure 3-3. ***Acroneuria abnormis*****, a pollution-sensitive stonefly found in Little Sandy Creek.**

Little Stony Creek

The 1996 sampling site was County Road 152 at Scotts Corners. The habitat was considered adequate, but the invertebrate fauna contained many tolerant species. Indices were in the range of slightly impacted conditions. Impact Source Determination showed that nonpoint sources of nutrients and/or pesticides were likely responsible for the impact.

Mad River

Water quality was assessed as non-impacted for the Mad River at Otto Mills, based on macroinvertebrate sampling in 2001. The fauna included many clean-water mayflies, stoneflies, and caddisflies, and the habitat was considered excellent.

Mill Creek

Moderately impacted water quality was assessed for this site in Webster, based on 1999 invertebrate sampling. Sandy stream criteria were used to evaluate the data. Impact Source Determination denoted municipal and/or industrial sources as affecting the fauna. Poor habitat is also a factor at this site.

Moorman Creek

Water quality was assessed as slightly impacted, based on 1999 invertebrate sampling above Walker. Nonpoint source nutrient enrichment and siltation were strongly indicated.

Ninemile Creek

Macroinvertebrate sampling at Sterling in 1995 yielded an assessment of slightly impacted. Impact Source Determination denoted municipal/industrial sources as the probable stressor.

Northrup Creek

Water quality was assessed as slightly impacted, based on 1999 invertebrate sampling above Long Pond. Nonpoint source nutrient enrichment was strongly indicated to be the primary factor affecting the invertebrate fauna.

Oak Orchard Creek

Macroinvertebrate sampling at Ridgeway in 1989 and 1990 yielded assessments of non-impacted to slightly impacted. Sampling in May, 1989, yielded an assessment of moderate impact that is now considered spurious, as it resulted from a spring bloom of worm populations known to be unrelated to poor water quality. In 1995 the site was assessed as slightly impacted. The assessment of moderate impact for the site in Shelby in 1999 is uncertain, and is probably caused by the moss substrate. This assessment was adjusted to slightly impacted. Additional sampling at another nearby site should be conducted. Slight impact is assessed for the site in Oak Orchard, based on 1999 sampling, although the impairment is very minor. Impact Source Determination showed the highest similarity to natural communities, although nonpoint source nutrient enrichment was also noted.

Orwell Creek

Based on macroinvertebrate sampling at Altmar in 2001, water quality was assessed as slightly impacted. The fauna was dominated by caddisflies and mayflies. Impact Source Determination denoted nonpoint source nutrient enrichment as the primary stress. No prior data were available for this site.

Otter Creek
Moderate impact was assessed for the site in Waterport, based on 1999 invertebrate sampling. Nonpoint source nutrient enrichment is the primary cause of impact. The fauna was heavily dominated by algal-feeding beetles.

Raystone Creek
Non-impacted water quality is assessed for Raystone Creek, based on macroinvertebrate sampling at Giddingsville in 2002. The fauna included many species of clean-water mayflies, stoneflies, and caddisflies.

Rice Creek
Rice Creek was assessed as slightly impacted in 2001, based on sampling at Fruit Valley. ISD denoted nonpoint source nutrient enrichment as the likely stressor, although the bedrock substrate and ponded area upstream also likely contribute effects. No prior data were available for the stream.

Round Pond Creek
Moderately impacted water quality was indicated by the 1999 sample taken at Island Cottage Road, Greece. The fauna most closely resembled those affected by toxic contaminants.

Salmon Creek (Monroe County)
Slightly impacted water quality was assessed for the site at Hilton, based on 1999 invertebrate sampling. Nonpoint source nutrient enrichment was the likely cause of impact. The fauna was heavily dominated by algal-feeding beetles.

Salmon Creek (Wayne County)
Macroinvertebrate sampling at Pultneyville in 2001 yielded a water quality assessment of moderately impacted, possibly by toxic stressors. Low summer flows likely affected the sample. The watershed at this site is heavily agricultural.

Salmon River
The Salmon River continues to exhibit excellent water quality and diverse macroinvertebrate communities. A multi-site survey in 1996 documented non-impacted conditions from Redfield to Pulaski, with the exception of some impoundment effects above Altmar. Beginning in 1997, summer releases were increased from the Salmon River Reservoir. A 1999 re-survey of the 6 sites sampled in 1996 found very similar conditions (Figure 3-4). The long-term monitoring site at the Lehigh Road upstream of Pulaski was assessed as slightly impacted in 1989, but has been assessed as non-impacted for all years from 1990 to 2001.

Sandy Creek (Jefferson County)
Sandy Creek was sampled from Rodman to North Landing in a 1997 macroinvertebrate survey, with all sites being assessed as slightly impacted, mostly by nutrient enrichment, organic loadings, and siltation. The North Landing site had previously been assessed as slightly impacted in 1996.

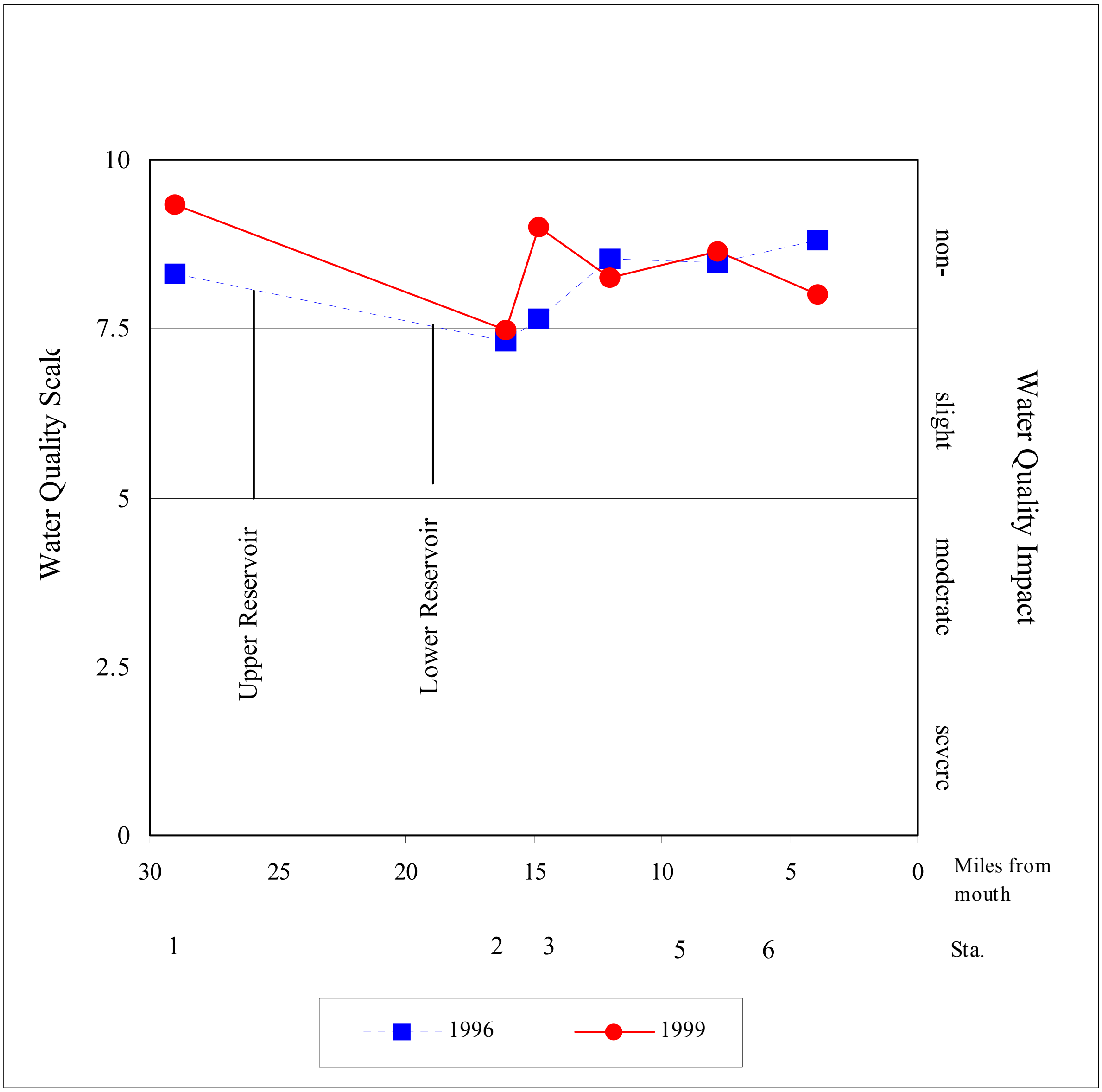


Figure 3-4. Salmon River water quality, 1996 and 1999.

<u>Sandy Creek (Monroe County)</u>

Sandy Creek was sampled in Hamlin in 1995, and was determined to be slightly impacted by nonpoint source nutrient enrichment. The site near North Hamlin was field-assessed as non-impacted in 1999. The sample was laboratory-sorted to order and based on this it was determined that the field assessment was appropriate. The East Branch and West Branch of Sandy Creek were sampled in Murray in 1999, and were both field-assessed as slightly impacted. The samples were laboratory-sorted to order and based on this it was determined that the field assessments were appropriate.

Shipbuilders Creek

Slightly impacted water quality was assessed for the site in Webster, based on 1999 invertebrate sampling. Sandy stream criteria were used to evaluate the data. Impact Source Determination indicated municipal and/or industrial inputs may be involved, but poor habitat is also a likely factor.

Slater Creek

Severely impacted water quality was assessed for the site in Greece, based on 1999 invertebrate sampling. Sewage effluent was strongly indicated as the primary cause of impact, and a strong sewage smell was present at the site. The invertebrate fauna was dominated by sewage-tolerant worms, midges, snails, and sowbugs. No mayflies, stoneflies, or caddisflies were found at this site.

Sodus Creek

Based on macroinvertebrate sampling at Glenmark in 2001, water quality was assessed as slightly impacted. Impact Source Determination denoted nonpoint source nutrient enrichment at the primary stressor. Poor habitat is also a factor at this site.

South Sandy Creek

Water quality in South Sandy Creek is currently assessed as non-impacted. Sites in Allendale and Ellisburg were assessed as non-impacted in 2002 sampling. The macroinvertebrate faunas were dominated by clean-water mayflies. For the Ellisburg sample, the species richness metric was set aside as being non-representative, likely caused by the predominantly bedrock substrate. The Ellisburg site was previous assessed as non-impacted in 1996 macroinvertebrate sampling as a field-assessed screening sample. The fauna was diverse, with mayflies, stoneflies, caddisflies, beetles, and hellgrammites.

Sterling Creek

Water quality was assessed as slightly impacted by nonpoint source nutrient enrichment and siltation, based on macroinvertebrate sampling above Grays Corners in 2001. The substrate was heavily coated with growths of diatoms.

Sterling Valley Creek

Based on macroinvertebrate sampling north of Sterling Valley in 2001, water quality was assessed as slightly impacted by nonpoint source nutrient enrichment. The fauna was dominated by mayflies and caddisflies.

Stony Creek

The sampling site in 1999 was at County Road 75 at Smithville. Most of the stream had a sandy bottom, but a short riffle was found and sampled. The invertebrate fauna consisted mostly of caddisflies and midges, and the indices were in the range of slight impact, from nonpoint nutrient additions. Habitat is likely a partial factor in this assessment.

Thomas Creek

Moderate impact was assessed for the site in East Rochester, based on invertebrate sampling in both 1999 and 2000. Impact Source Determination strongly indicated toxicity as the primary factor affecting the fauna. Crayfish collected at this site in 2000 exhibited elevated levels of PAHs in their tissues.

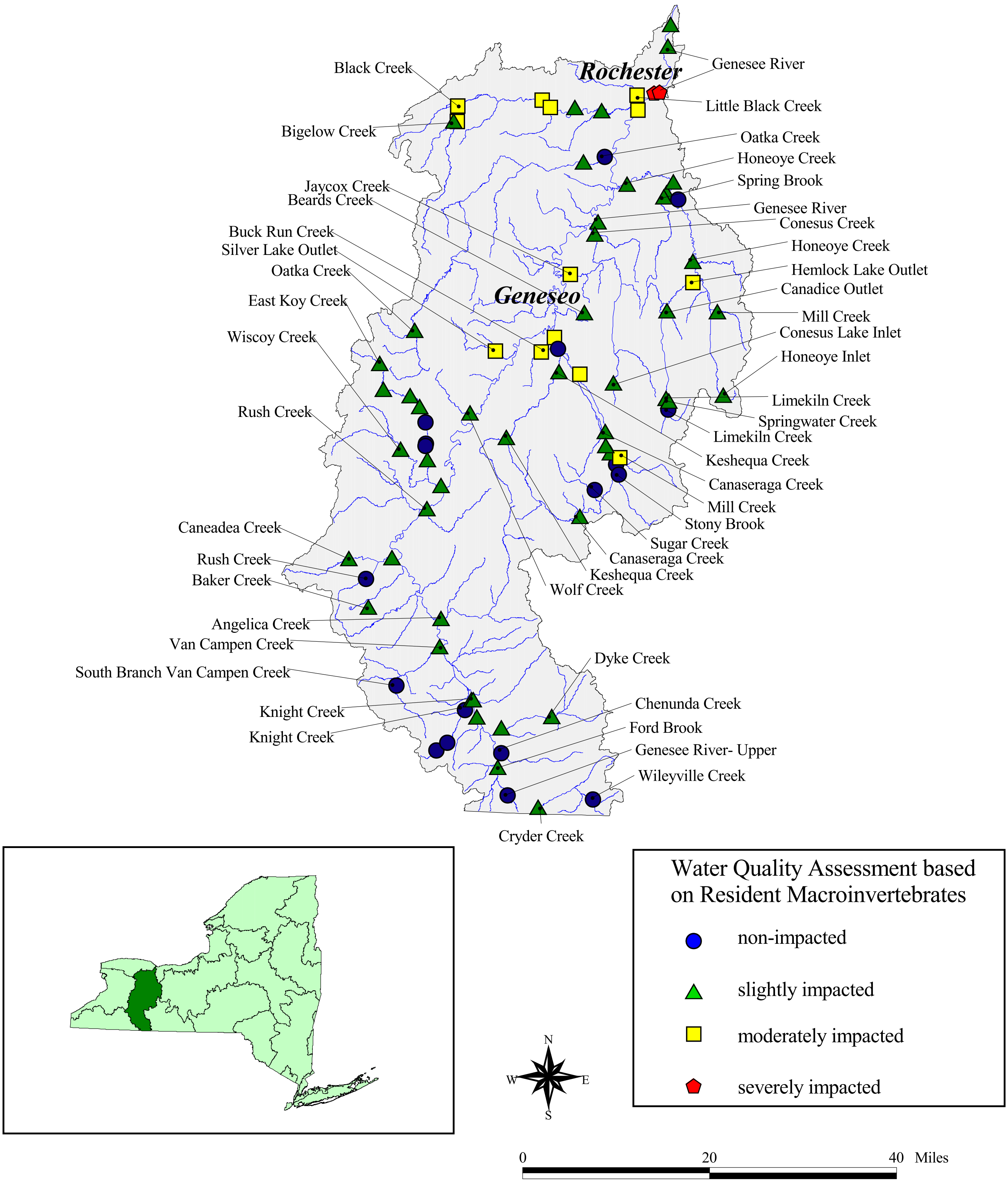
Wine Creek

This creek was assessed as moderately impacted in 1995 macroinvertebrate sampling near the mouth at Oswego. Sandy stream criteria were used to evaluate the data. The stream is very small, with low current speeds and a bedrock substrate, limiting the fauna. Tolerant midges dominated the fauna.

Wolcott Creek

Water quality was assessed as slightly impacted in 1995 macroinvertebrate sampling at Wolcott. The stream is small, with low current speeds, likely limiting the fauna. Sampling at this site in 2001 also yielded an assessment of slightly impacted. Impact Source Determination denoted nonpoint and toxic stressors.

Genesee River Drainage Basin



GENESEE RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED								
ANGELICA CREEK (ANGL)										
01	Angelica, Camp Rd. (Co Rte 43) bridge							96	99	
BAKER CREEK (BAKE)										
01	Angelica, above Rte 16 bridge								99	
BARGE CANAL, CENTRAL (CCAN)										
01	Rochester, east of Genesee River junction	74	75	80						
BARGE CANAL, WEST (WCAN)										
11	Rochester, west of Genesee River junction		75	81						
BEARDS CREEK (BERD)										
01	Cuylerville, below Rte 20A bridge							96		
BIGELOW CREEK (BLOW)										
01	South Byron, above Caswell Rd. bridge								99	
BLACK CREEK (BLAK)										
01	Above Byron, above Cockram Rd. bridge							96		
02	Byron, above Rte 237 bridge							96	99	00
03	Churchville, below Rte 36 bridge						95	96		
04	Churchville, below Burnt Mill Rd.					90		96	99	
05	West Chili, below Rte 33A bridge							96		
06	Chili Center, below Rte 386 bridge							96		
BUCK RUN CREEK (BUCK)										
01	Mt. Morris, above Rte 36 bridge								99	00
CANADICE LAKE OUTLET (DICE)										
02	Hemlock, at Rte 15A bridge								99	
CANASERAGA CREEK (RAGA)										
01	Canaseraga, above Rte 70 bridge							96		
02	Below Dansville, below Poag Hole Rd. bridge							96		
03	Dansville, above Rte 436 bridge							96		
04A	Cumminsville, below Rte 36 bridge								99	
04	Below Dansville, above White Bridge Rd. bridge							96		
05	Below Groveland, @Pioneer Rd. bridge							96		
06A	Hampton Corners, East of I-390 bridge								99	
06	Mt. Morris, Rte 408 bridge				89	90		96		
CANEADEA CREEK (CNEA)										
01	Rushford, below Hardy Corners Rd. bridge							96		
02	Caneadea, Mill St.; downstream of lake								99	

GENESEE RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED										
CHENUNDA CREEK (NUND)												
01	Stannards, above Rte 19 bridge										99	
CONESUS CREEK (CONE)												
01	Ashantee, below 5 arch Rte 39 bridge										99	00
CONESUS LAKE INLET (CONI)												
01	Scottsburg, above E. Swamp Rd. bridge										99	
CRYDER CREEK (CRYD)												
01	Paynesville, below Paynesville Rd. bridge										99	
DYKE CREEK (DYKE)												
01	Andover, above Rte 417 bridge										99	
02	Wellsville, below Rte 417 bridge										99	
EAST KOY CREEK (EKOY)												
01	Wethersfield Springs, above Hermitage Rd. bridge							93				
02	Hermitage, above Hardys Rd. bridge							93				
03	Above Gainesville, below Shearing Rd.							93				
04	Below Gainesville, below Jordan Rd.							93				
05	Above Lamont, above Murphy Rd.							93				
06	Griffith Corners, above Griffith Rd.							93				
06A	Below Griffith Corners, below Trib 4							93				
07	East Koy, below East Koy Rd							93		96	99	
FORD BROOK (FORD)												
01	South of Stannards, River Rd. bridge										99	
GENESEE RIVER, UPPER (UGNS)												
01	Shongo, below Graves Rd. bridge										99	
02	Wellsville, Weidrick Rd. bridge			84								
03	Wellsville, State St.										99	
04	Below Wellsville, off Rte 19										99	
05	Scio, above Knight Creek Rd. bridge				89	90						00
08	Caneadea, Co. Rte 46										99	
12	Cuylerville, Rte 20A				89	90					99	
GENESEE RIVER, LOWER (GENS)												
01	Avon, Rtes 5 & 20 bridge	74	80		89	90					99	
02	Below Avon, below Rte 5 & 20 bridge	74	80									
03	Scottsville, Brown's Bridge, Rte 253	74	80									
03A	Genesee Junction, Ballantyne Bridge, Rte 252						92	93				
04	Rochester, above Barge Canal	74	80		89	90	92		95		99	

GENESEE RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED										
GENESEE RIVER (GENS), cont'd												
05	Rochester, below Elmwood Ave. bridge	74	80				92	93			99	
05A	Rochester, below upper falls										99	
06	Rochester, 0.1 miles below Rte 104 bridge	74	80	89	90		92	93			99	
06A	Rochester, at Kodak Park				90		92					
06B	Rochester, below Kodak STP discharge				90		92					
06C	Rochester, below Merrill St storm sewer						92	93				
07	Rochester, opposite Genesee Docks at Boxart St	74	80	89	90		92		95		99	00
08	Rochester, above Stutson St bridge	74										
HEMLOCK LAKE OUTLET (HEML)												
01A	Frost Hollow, Co. Rte 15 bridge											99
HONEOYE CREEK (HONY)												
01	Honeoye, Rte 20A		78									
02	Below Honeoye, Cty Rd. 15		78									
03	Idaho, below ford @Gray Rd.		78							96		
08	Honeoye Falls, Rte 65										99	
09	Mendon, Sibley Rd. bridge			89	90				95			
10	Mendon, Plains Rd. bridge			89	90							
12	West Rush, Creek side Rd.										99	00
HONEOYE INLET (HONI)												
01	Hunt Hollow, South of Old West Lake Rd. junction								95		99	
JAYCOX CREEK (JCOX)												
01	Geneseo, above Nations Rd. bridge										99	
KESHEQUA CREEK (KESH)												
01	Nunda, @Creek Rd. bridge										99	
04	Sonyea, below Rte 36 bridge										99	00
KNIGHT CREEK (KNIT)												
01	Below Allentown, Allen Rd. bridge					91						00
02	Below Allentown, Rte 417 bridge					91						00
03	Above Scio, Knight Ck Rd. bridge					91						00
04	Scio, Back River Rd. bridge					91					99	00
LIMEKILN CREEK (LIMK)												
01	Above Springwater, above Marvin Hill Rd. bridge								95			
02	Below Springwater, above Marvin Hill Rd. bridge											99

GENESEE RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED					
LITTLE BLACK CREEK (LBLA)							
01	Chili, above Beahan Rd.bridge					99	
MILL CREEK (MILD)							
01	Dansville, Red Jacket/Know Road bridge					99	
MILL CREEK (MILH)							
01	Honeoye, below Co. Rte 33 bridge					99	
OATKA CREEK (OATK)							
00	Warwaw, Rte 20A bridge					99	
01	Garbutt, Union St bridge	89	90	95			
02	Scottsville, below Rte 251 bridge					99	00
RUSH CREEK (RSHC)							
01	McGrawville, above Barber Hill Rd. bridge					99	
RUSH CREEK (RUSH)							
01	East of Fillmore, below Co.Rte 4 bridge					99	
SILVER LAKE OUTLET (SILO)							
01	Perry, above Twin Bridge Rd. culvert			95		99	
SPRING BROOK (SPRG)							
01	Moran Corners, under Monroe Rd. bridge					99	
SPRINGWATER CREEK (SPRN)							
01	Springwater, above Kellogg Rd. bridge					99	
STONY BROOK (STNB)							
01	Stony Brook State Park, Rte 36 bridge					99	
SUGAR CREEK (SUGA)							
01	Near Ossian, above Co.Rte 17 bridge					99	
VAN CAMPEN CREEK (VCAM)							
01	Belvidere, above Rte 19 bridge	89			96	99	
VAN CAMPEN CREEK, SOUTH BRANCH (VCAM)							
02	Friendship, Rte 275 bridge					99	
WILEYVILLE CREEK (WILY)							
01	East of Whitesville, above Co Rte 124 bridge					99	
WISCOY CREEK (WCOY)							
04	Pike, above Rte 19 bridge					99	00
07	Rossburg, above Rte 19A bridge					99	
WOLF CREEK (WOLF)							
01	Castile, below Park Rd. in Letchworth State Park					99	

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE GENESEE RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Angelica Creek, Angelica	slightly impacted	no prior data
Baker Creek, Angelica	slightly impacted	no prior data
Beards Creek, Cuylerville	slightly impacted	no prior data
Bigelow Creek , near South Byron	slightly impacted	no prior data
Black Creek, above Byron	slightly impacted	no prior data
Black Creek, Byron	moderately impacted	no prior data
Black Creek, Churchville	moderately impacted	no change
Black Creek, below Churchville	moderately impacted	no prior data
Black Creek, West Chili	slightly impacted	no prior data
Black Creek, Chili Center	slightly impacted	no prior data
Buck Run Creek, Mount Morris	moderately impacted	no prior data
Canadice Outlet, Hemlock	slightly impacted	no prior data
Canaseraga Creek, Canaseraga	slightly impacted	no prior data
Canaseraga Creek, above Dansville	non-impacted	no prior data
Canaseraga Creek, Dansville	slightly impacted	no prior data
Canaseraga Creek, below Dansville	slightly impacted	no prior data
Canaseraga Creek, Cumminsville	slightly impacted	no prior data
Canaseraga Creek, below Groveland	moderately impacted	no prior data
Canaseraga Creek, Mt. Morris	moderately impacted	**DECLINED**
Canaseraga Creek, below Hampton Corners	non-impacted	no prior data
Caneadea Creek, Rushford	slightly impacted	no prior data
Caneadea Creek, Caneadea	slightly impacted	no prior data
Chenunda Creek , Stannards	slightly impacted	no prior data
Conesus Creek, Ashantee	slightly impacted	no prior data
Conesus Lake Inlet, Scottsburg	slightly impacted	no prior data
Cryder Creek, Paynesville	slightly impacted	no prior data
Dyke Creek, Andover	slightly impacted	no prior data
Dyke Creek, Wellsville	slightly impacted	no prior data
East Koy Creek, Wethersfield Springs	slightly impacted	no prior data
East Koy Creek, Hermitage	slightly impacted	no prior data
East Koy Creek, Gainesville	slightly impacted	no prior data
East Koy Creek, below Gainesville	slightly impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE GENESEE RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
East Koy Creek, above Lamont	non-impacted	no prior data
East Koy Creek, Griffith Corners	non-impacted	no prior data
East Koy Creek, below Griffith Corners	non-impacted	no prior data
East Koy Creek, East Koy	slightly impacted	no prior data
Ford Brook, South of Stannards	slightly impacted	no prior data
Genesee River, Upper, Shongo	non-impacted	no prior data
Genesee River, Upper, Wellsville	slightly impacted	no prior data
Genesee River, Upper, below Wellsville	slightly impacted	no prior data
Genesee River, Upper, Scio	slightly impacted	**DECLINED**
Genesee River, Upper, Caneadea	non-impacted	no prior data
Genesee River, Upper, Cuylerville	non-impacted	no change
Genesee River, Avon	slightly impacted	no change
Genesee River, Rochester - Genesee Valley Park	severely impacted	**DECLINED**
Genesee River, Rochester, below Barge Canal	severely impacted	**DECLINED**
Genesee River, Rochester, below Upper Falls	moderately impacted	no prior data
Genesee River, Rochester, below Rt. 104 bridge	slightly impacted	**IMPROVED**
Genesee River, Rochester, Genesee Docks at Boxart St.	slightly impacted	**IMPROVED**
Hemlock Lake Outlet, Frost Hollow	moderately impacted	no prior data
Honeoye Creek, Idaho	slightly impacted	no change
Honeoye Creek, Honeoye Falls	non-impacted	no prior data
Honeoye Creek, Mendon	slightly impacted	no change
Honeoye Creek, West Rush	slightly impacted	no prior data
Honeoye Inlet, below Hunt Hollow	slightly impacted	no prior data
Jaycox Creek, Geneseo	moderately impacted	no prior data
Keshequa Creek, Nunda	slightly impacted	no prior data
Keshequa Creek, Sonyea	slightly impacted	no prior data
Knight Creek, below Allentown	non-impacted	no change
Knight Creek, below Allentown	non-impacted	no change
Knight Creek, above Scio	non-impacted	no change

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE GENESEE RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Knight Creek, Scio	slightly impacted	**DECLINED**
Limekiln Creek, above Springwater	non- impacted	no prior data
Limekiln Creek, below Springwater	slightly impacted	no prior data
Little Black Creek, Chili	moderately impacted	no prior data
Mill Creek, Dansville	moderately impacted	no prior data
Mill Creek, Honeoye	slightly impacted	no prior data
Oatka Creek, Warsaw	slightly impacted	no prior data
Oatka Creek, Garbutt	slightly impacted	no change
Oatka Creek, Scottsville	non-impacted	no prior data
Rush Creek, McGrawville	non-impacted	no prior data
Rush Creek, East of Fillmore	slightly impacted	no prior data
Silver Lake Outlet, below Perry	moderately impacted	no prior data
Spring Brook, Moran Corners	slightly impacted	no prior data
Springwater Creek, Springwater	slightly impacted	no prior data
Stony Brook, Stony Brook State Park	non-impacted	no prior data
Sugar Creek, near Ossian	non-impacted	no prior data
Van Campen Creek, Belvidere	slightly impacted	no change
Van Campen Creek, South Branch, Friendship	non-impacted	no prior data
Wileyville Creek, east of Whitesville	non-impacted	no prior data
Wiscoy Creek, Pike	slightly impacted	no prior data
Wiscoy Creek, Rossburg	slightly impacted	no prior data
Wolf Creek, Castile	slightly impacted	no prior data

REPORTS OF MACROINVERTEBRATE SURVEYS WITHIN THE GENESEE RIVER WATERSHED

STREAM	YEAR OF SURVEY	REPORT
Black Creek	1996	SBU,1997
Canaseraga Creek	1973	AVON
Canaseraga Creek	1996	SBU,1997
East Koy Creek	1993	SBU,1993
Genesee River	1974	DOH
Genesee River	1980	SBU
Genesee River	1984	SBU,1984
Knight Creek	1927	NYCD
Knight Creek	1991	SBU,1991
Knight Creek	2000	SBU,2001
Oatka Creek	1973	AVON
Oatka Creek	2002	DFW
Spring Creek	2002	DFW
Upper Genesee River	1973	EPA
Watershed Streams	1989-1990	RIBS, 1992

AVON	Avon Pollution Investigations Unit, Div. of Fish & Wildlife, NYS DEC
DFW	Division of Fish & Wildlife, NYS DEC
DOH	New York State Department of Health
RIBS	Rotating Intensive Basin System, Statewide Waters Assessment Section, NYS DEC
SBU	Stream Biomonitoring Unit, Division of Water, NYS DEC

Angelica Creek

A site on Angelica Creek below Angelica was assessed as slightly impacted in 1996 and 1999 macroinvertebrate sampling. Nonpoint source nutrient enrichment was the likely stressor, but the impact was considered to be minor.

Baker Creek

Baker Creek near Angelica was sampled in 1999 and was field-assessed as slightly impacted. The sample was laboratory-sorted to order and based on this it was determined that the field assessment was appropriate.

Beards Creek

This stream was sampled in Cuylerville in 1996, and water quality was assessed as slightly impacted. The macroinvertebrate fauna was dominated by clean-water mayflies, and water quality problems were considered to be minor.

Bigelow Creek

Moderately impacted water quality was indicated by the 1999 sample taken in South Byron. The stream was in a highly agricultural area, and Impact Source Determination denoted both nutrient enrichment and toxic stressors. The macroinvertebrate fauna was dominated by algal-feeding riffle beetles and filter-feeding caddisflies.

Black Creek

In a 1996 macroinvertebrate study sampling 6 Black Creek sites from above Byron to Chili Center, water quality assessments ranged from slightly to moderately impacted. Moderate impacts were observed downstream of the discharges of the South Byron (V) Sewage Treatment Plant and the Churchville (V) Sewage Treatment Plant. The South Byron site was also assessed as moderately impacted in

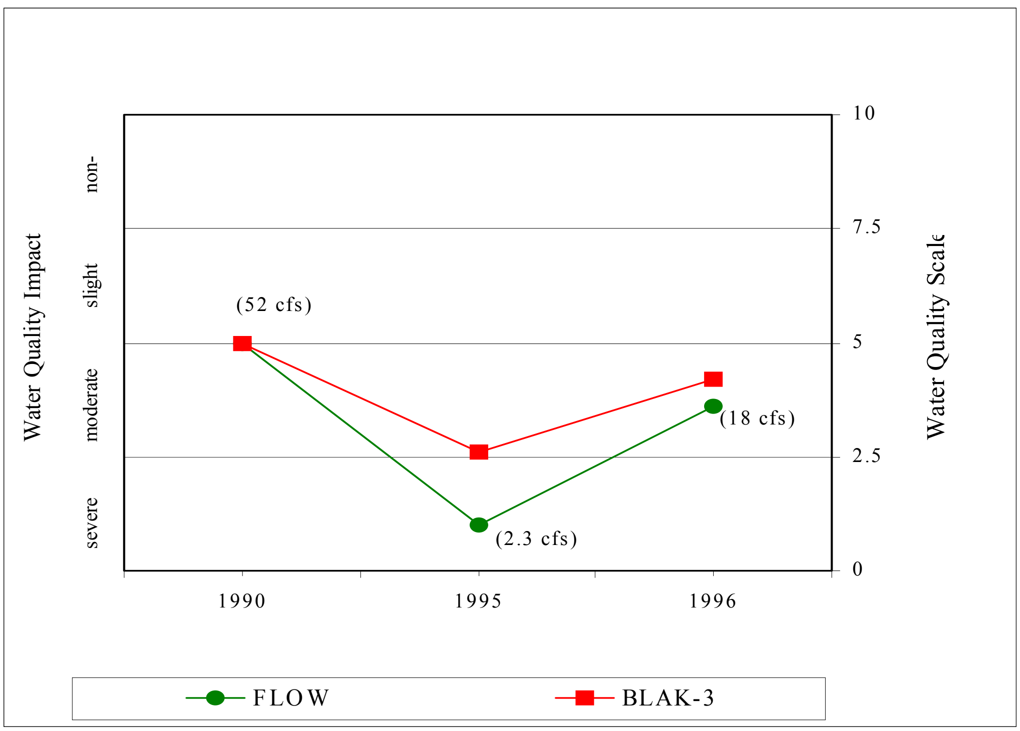


Figure 4-1. Biological Assessment Profile of index values, Black Creek at Churchville, 1990-1996, and flow at Churchville during these years. Flow values are of average 7-day low flow period during the 2-month period prior to invertebrate sampling, derived from values from the USGS gage at Churchville.

1999 and 2000. Sampling downstream of the Churchville (V) STP discharge yielded assessments of slightly impacted (borderline moderately impacted) in 1990, and moderately impacted in 1995, 1996, and 1999. Water quality was demonstrated to be closely correlated with stream flow and volume of dilution water.

Buck Run

Moderate impact was assessed for this small sluggish stream, based on 1999 invertebrate sampling in Mount Morris. The primary cause of impact was apparently toxic, and a small grey-water discharge was noted upstream. Habitat was also a likely factor at this site.

Canadice Lake Outlet in Hemlock

Slight impact was assessed for this site, based on 1999 macroinvertebrate sampling. The primary cause of impact was impoundment effect, since the site was less than one mile below the outlet of Canadice Lake. The fauna was dominated by caddisflies and midges.

Canaseraga Creek

A macroinvertebrate survey of Canaseraga Creek from Canaseraga to Mount Morris in 1996 documented water quality ranging from non-impacted in Dansville to moderately impacted in Mount Morris. Slight impact was documented downstream of the Dansville (V) Sewage Treatment Plant. A site below Dansville was field-assessed as non-impacted in 1999, but this sample was not processed in the laboratory, and the assessment is unverified. The most frequently monitored site has been downstream at Mount Morris, despite the generally poor habitat. Moderate impact was found in 1989, slight impact in 1990, and moderate impact in 1996. The site was relocated one mile upstream to Hampton Corners in 1999 at more suitable habitat, and water quality was determined to be slightly impacted.

Caneadea Creek

Based on sampling at two sites on Caneadea Creek, water quality is assessed as slightly impacted. A site in Caneadea was field-assessed as slightly impacted in 1999, but the sample was not laboratory-sorted. A site in Rushford was sampled in 1996, and was assessed as slightly impacted by nonpoint source nutrient enrichment.

Chenunda Creek

A site in Stannards was field-assessed as slightly impacted in 1999. The sample was laboratory-sorted to order and based on this it was determined that the field assessment was appropriate. Diatoms were very abundant at this site, and filter-feeding caddisflies dominated the sample indicating nutrient enrichment. The area was typified by dairy farms.

Conesus Creek

Sampling in 2000 at Ashantee yielded a sample that was initially assessed as non-impacted, based on the metrics. This assessment was adjusted to slight impact, based on ISD and best professional judgement. Nonpoint source nutrient enrichment is strongly indicated at this site. Moderate impact was assessed for a site at this site in 1999, although this assessment is somewhat uncertain due to upstream streambank work.

Conesus Inlet

Slight impact was assessed for a site at Scottsburg, based on 1999 sampling. The cause of impact could not be determined. Mayflies, stoneflies, caddisflies, and hellgrammites were present at this site.

Cryder Creek

Water quality was assessed as slightly impacted, based on 1999 invertebrate sampling in Paynesville. Although mayflies, stoneflies, and caddisflies were present, the fauna indicated organic enrichment.

Dyke Creek

Based on 1999 invertebrate sampling at Andover and Wellsville, water quality was assessed as slightly impacted. Organic inputs were denoted as the cause of impact, possibly livestock.

East Koy Creek

East Koy Creek was sampled from Weathersfield Springs to East Koy in 1993. Slight impact was found at most sites, with the exception of a non-impacted reach from Lamont to Griffith Corners. A tributary entering the creek below Griffith Corners carried wastes from a large dairy farm, and impacted the stream for a short distance. The continuing monitoring site in East Koy was assessed as slightly impacted in 1993, field-assessed as non-impacted in 1996, and assessed as slightly impacted in 1999. Impacts were likely due to nonpoint nutrient enrichment and additions of organic wastes.

Ford Brook

This small stream was sampled in 1999 south of Stannards, where it ran through a dairy farm. Heavy growths of diatoms in the stream indicated nutrient enrichment. The site was field-assessed as slightly impacted, the sample was laboratory-sorted to order, and based on this it was determined that the field assessment was appropriate.

Genesee River

Non-impacted water quality was assessed for a site in Shongo , based on 1999 invertebrate sampling. The fauna was diverse and well-balanced, with many mayflies, stoneflies, and caddisflies. Slightly impacted water quality was assessed for the State Street site in Wellsville (UGNS-3), based on 1999 invertebrate sampling. Nonpoint source nutrient enrichment was the primary cause of impact. A site approximately one mile downstream of Wellsville (UGNS-4) was field-assessed as slightly impacted. The sample was partially processed, and determined to be no more than slightly impacted. A site in Scio was assessed as slightly impacted in 1989, non-impacted in 1990, and slightly impacted in 2000. A site in Caneadea was field-assessed as non- to slightly impacted 1999. The Cuylerville site was assessed as non-impacted in 1989 and 1990, and was field-assessed as non-impacted in 1999. In summary, the upper Genesee River appears to be non-impacted upstream of Wellsville, slightly impacted from Wellsville to Scio, and non-impacted from Caneadea to Cuylerville. In the lower Genesee River, the site in Avon was assessed as slightly impacted in all years sampled: 1974, 1980, 1989, 1990, and 1999.

The Genesee River entering Rochester upstream of the canal junction exhibited a substantial decline in water quality from 1989 to 1999. During the 1980's this site showed greatly improved water quality following the 1977 upgrade of the Gates-Chili-Ogden Sewage Treatment Plant. The number of EPT (mayflies, stoneflies, and caddisflies) illustrated this change, but these numbers returned to 1974 levels (Figure 4-2) in 1999, and water quality is assessed as severely impacted. This situation is likely to be reversed, as all Monroe County wastewater treatment facilities discharge into Lake Ontario, as of late 1999. Resampling of this reach is planned for 2004. The Genesee River near the mouth currently exhibits good water quality, being assessed as slightly impacted in 1995 and 1999. The 1992 assessment of slight impact was considered somewhat inflated by high flows, but improvement now is verified at this site.

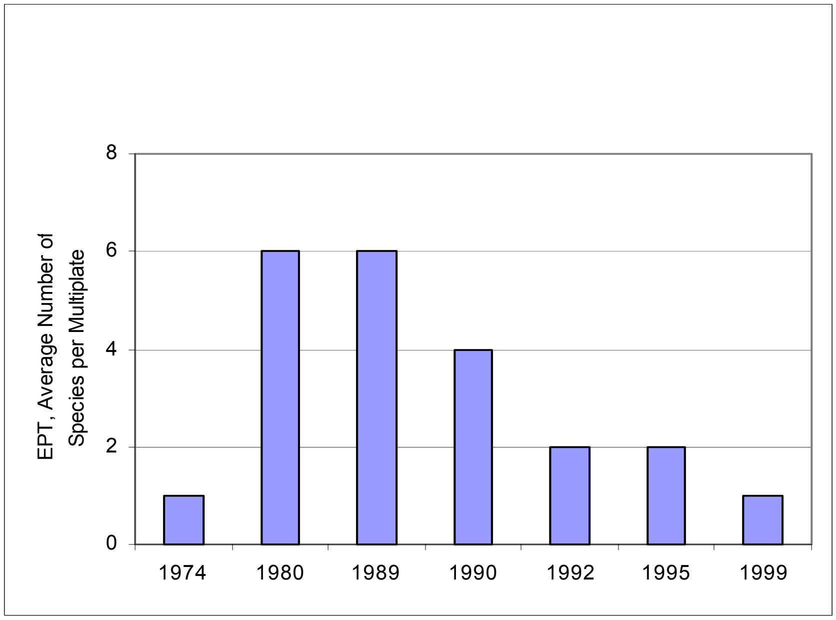


Figure 4-2. Genesee River at Rochester, upstream of Barge Canal. EPT data (species of sensitive mayflies, stoneflies, and caddisflies), 1974-1999.

Hemlock Lake Outlet

Moderate impact was indicated for a site at Frost Hollow, although at the high end of this category, bordering on slight impact. The fauna was heavily dominated by riffle beetles, indicating nutrient enrichment.

Honeoye Creek

Water quality assessments of Honeoye Creek have ranged from non-impacted to slightly impacted by nonpoint source nutrient enrichment. Of the four sites from Idaho to West Rush sampled since 1992, only the Honeoye Falls site is assessed as non-impacted. Much of the drainage area in agricultural. A statement in “20 year trends in water quality of rivers and streams in New York State” (Bode et al., 1993) referring to non-impacted conditions at Mendon was in error.

Honeoye Inlet

Based on 1999 invertebrate sampling at Hunt Hollow, water quality was assessed as slightly impacted, though bordering on non-impacted. Impact Source Determination showed slight nutrient enrichment, but the fauna contained many mayflies, stoneflies, and caddisflies.

Jaycox Creek

Moderate impact was assessed for a site north of Geneseo, based on 1999 invertebrate sampling. The fauna was dominated by sewage-tolerant worms and midges. This was a small, muddy, pasture stream with livestock waste along the banks. Poor habitat is also a factor at this site.

Keshequa Creek

Slightly impacted water quality was indicated by the 1999 invertebrate sampling in Nunda and below Sonyea. Nonpoint nutrient enrichment was the most likely cause of impact. Sampling at the Sonyea site in 2000 also indicated slight impact, but ISD denoted a toxic stressor.

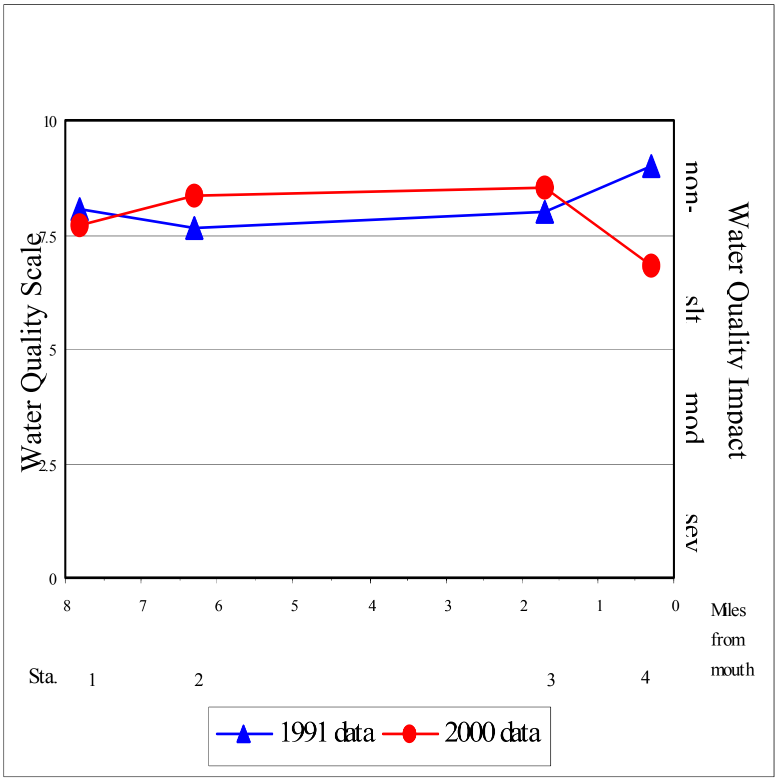


Figure 4-3. Water quality in Knight Creek, 1991 and 2000.

Knight Creek

Knight Creek was sampled from Allentown to Scio in 1991 and 2000. The 1991 survey documented non-impacted conditions at all four sites. The 2000 survey showed the upper three sites to be non-impacted, but the Scio site showed slight impact, from nonpoint source nutrient additions (Figure 4-3). Similar conditions at this site were also documented in 1999 sampling .

Limekiln Creek

Slightly impacted water quality was indicated by the invertebrate sample taken downstream of Springwater in 1999, a dry summer. Nonpoint nutrient enrichment was indicated, although Impact Source Determination showed the community to be most similar to natural communities. A site above Springwater had been assessed as non-impacted in 1995 macroinvertebrate sampling.

Little Black Creek

Moderately impacted water quality was indicated by the 1999 invertebrate sample taken in Chili. Impact Source Determination denoted possible toxicity affecting the fauna. Although the habitat was satisfactory at this site, mayflies were not found.

Mill Creek (Livingston County)

Moderate impact was assessed for the Dansville site, based on 1999 invertebrate sampling. It was not clear what factors were affecting the fauna most, although siltation appeared to be a factor. Stoneflies were present at this site, but mayflies were not found.

Mill Creek (Ontario County)

Slightly impacted water quality was indicated by the 1999 invertebrate sample taken in Honeoye. The impact was considered very minor, as the community was similar to natural communities, although siltation was denoted as a stressor.

Oatka Creek

Oatka Creek has been assessed as slightly impacted in nearly all samplings by the Stream Biomonitoring Unit. One exception was a non-impacted assessment based on sampling at Scottsville in 2000, a high-flow year. Nonpoint source nutrient enrichment and siltation are indicated to be the primary factors affecting the invertebrate fauna. Independent monitoring of Oatka Creek (Oatka Trail to Scottsville) and the tributary Spring Creek has been conducted by Dr. William Sutton in 1992, 1993, 1997, and 2002, and these results are summarized in his 2002 report. Water quality assessments in nearly all of these samplings have been non-impacted or slightly impacted. No significant trends were identified over this time period.

Rush Creek

This small creek enters the Genesee River just east of Fillmore, Allegany County. The site near Fillmore above the confluence was field-assessed as slightly impacted in 1999. Abundant diatoms indicated nutrient enrichment at the site. The sample was laboratory-sorted to order and based on this it was determined that the field assessment was appropriate.

Rush Creek

This creek flows north into Rushford Lake, in Allegany County. A site in McGrawville was field-assessed as non-impacted in 1999. The sample was laboratory-sorted to order and based on this it was determined that the field assessment was appropriate.

Silver Lake Outlet

Based on macroinvertebrate sampling downstream of Perry in 1999, water quality was assessed as moderately impacted. The sample was dominated by filtering caddisfly larvae. The impact was likely a combination of impoundment effect and enrichment from the Perry sewage treatment facility. The stream was previously sampled in 1995, and was also determined to be slightly impacted.

Spring Brook

Based on sampling in Moran Corner in 1999, water quality was field-assessed as slightly impacted. The sample was laboratory-sorted to order and based on this it was determined that the field assessment was appropriate. The cause of impact was undetermined.

Springwater Creek

Slightly impacted water quality was assessed for this site, based on 1999 invertebrate sampling in Springwater. Mayflies, stoneflies, and caddisflies were well-represented. Worms composed a large portion of the fauna, but they were not pollution-tolerant worms. The impact is considered to be minor, and the cause was undetermined.

Stony Brook

Non-impacted water quality was assessed for a site in Stony Brook State Park, Steuben County, based on 1999 invertebrate sampling. The fauna was diverse and well-balanced, with many mayflies, stoneflies, and caddisflies.

Sugar Creek

Non-impacted water quality was assessed for a site below Ossian Center, based on 1999 invertebrate sampling. The fauna was diverse and well-balanced, with many mayflies, stoneflies, and caddisflies. Community indices were very high.

Van Campen Creek

Slightly impacted water quality was assessed for the site in Belvidere, based on macroinvertebrate sampling 1989 and 1999. Nonpoint source nutrient enrichment was strongly indicated to be the primary factor, with filtering caddisflies dominated the fauna. A screening sample taken in 1996, a high-flow year, was field assessed as non-impacted, and the sample was not retained. This assessment is not considered typical of normal water quality in this stream. A site sampled on the South Branch, in Friendship in 1999 was assessed as non-impacted. The fauna was diverse and well-balanced, with many mayflies, stoneflies, and caddisflies.

Wileyville Creek

Non-impacted water quality was assessed for a site in Whitesville, based on 1999 invertebrate sampling. The fauna was diverse and well-balanced, with many mayflies, stoneflies, and caddisflies. Community indices were very high.

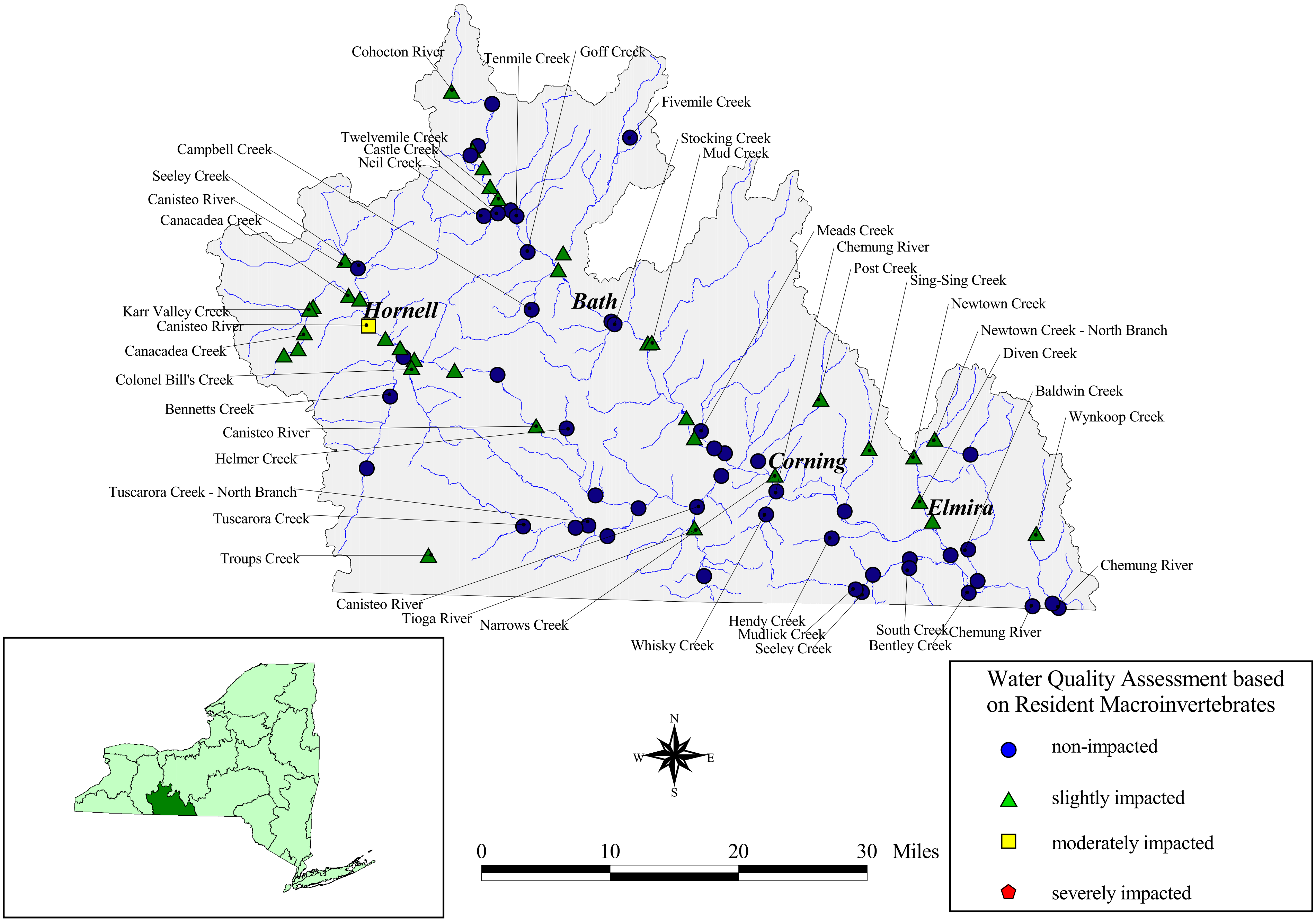
Wiscoy Creek

The site in Pike was assessed as non-impacted in 1999 and slightly impacted in 2000. The 2000 impact was attributed to nonpoint source nutrient enrichment and siltation. Since 1999 flows were low and 2000 flows were high, the 2000 impact is likely derived from greater runoff. At the downstream site at Rossburg, approximately 0.5 miles upstream of the confluence with the Genesee River, water quality was assessed as slightly impacted in 1999. Nonpoint source nutrient enrichment was strongly indicated to be the primary factor, with filter-feeding caddisflies dominating the fauna.

Wolf Creek

Water quality was determined to be slightly impacted, based on 1999 invertebrate sampling in Letchworth State Park east of Castile, 0.2 miles above the confluence with the Genesee River. Although clean-water stoneflies were numerous, mayflies were scarce, and tolerant scuds were numerous. Municipal and/or industrial inputs were indicated by Impact Source Determination, likely originating in Castile. The specific conductance at this site was very high (1013 µmhos/cm). Habitat was very good at this site, and should have supported a very good invertebrate fauna.

Chemung River Drainage Basin



CHEMUNG RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED									
BALDWIN CREEK (BWIN)											
01	East Elmira, above Lowman Rd (Co Rt 2) bridge										02
02	Lowman, above Co Rt 60 bridge										02
BENNETTS CREEK (BENN)											
00	Greenwood, above Rt 248 bridge										02
01	Bennetts, Rt. 248								97		
02	Canisteo, above Rte 36 bridge										02
BENTLEY CREEK (BENT)											
01	Wellsburg, above Rt 427 bridge										02
CAMP CREEK (CAMP)											
01	Osceola, PA, off NY Co Rt 127, above dirt rd bridge										02
CAMPBELL CREEK (CAMB)											
01	Knight Settlement, above Turnpike Rd bridge										02
02	Knight Settlement, below Turnpike Rd bridge, near airport										02
CANACADEA CREEK (CDEA)											
A	Alfred, above STP discharge									98	
01	Alfred station, above Rte 21 bridge									98	
02	Below Alfred, below Satterlee Hill Rd bridge									98	
03	Almond, above Depot St. bridge									98	02
04	Hornell, above Rt. 21 bridge						91	92	97	98	02
05	Hornell, above Main St bridge					89				98	
CANISTEO RIVER (STEO)											
01	Above Hornell, below Co Rte 65 bridge				88						02
02	Hornell, Ashbaugh Hill Rd				88						
03	Canisteo, Magee Rd, Rte 415				88						
03A	Canisteo, @Depot St bridge										02
04	Below Canisteo, below Carson bridge				88					98	02
05	Adrian, above Catatunk Rd bridge				88						
06	Brown's Crossing, at bridge				88						
07	Cameron, @Co Rt 22 bridge										02
08	Derby Switch, Newcomb Rd bridge						91	92	97	98	02
09	Erwins, @Co Rt 73 (Hills Rd) bridge										02
CHEMUNG RIVER (CHEM)											
03	Corning, below jct of Cohocton & Tioga R.	73	79								
04	South Corning, off Rte 17	73	79	84				92	97	98	02
05	Big Flats, South Corning Rd	73									
06	Golden Glow Heights, above Fitch Bridge	73	79	84							

CHEMUNG RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED									
CHEMUNG RIVER (CHEM), cont'd.											
07	Below Elmira, above Big Island	73	79		84			92			02
08	Wellsburg, Rte 367 bridge	73	79								
09	Above Chemung, below Rt. 17W bridge	73			84		91			98	02
10A	Below Chemung, above Rt.17 bridge								97		
10	Waverly, above Penn. border	73	79								
COHOCTON RIVER (COHO)											
00	Bowles Corners, below Rt 21 bridge										02
01	Atlanta, Church St			80		88					
01A	Cohocton, Rte 371					88					
02	Cohocton, Rte 415			80		88					02
03	Cohocton, Larrowe Mills Rd			80		88		92		98	
03A	Cohocton, Jones Rd					88					
04	Wallace, Wentworth Rd			80		88					
05	Wallace, Rte 15					88					
06	Kanona, below Rt 415 bridge										02
07	Above Bath, Rte 415 DEC site		79								
07A	Below Bath, Co Rte 11							92		98	
08A	Savona, above Co Rt 12 bridge										02
08	Above Campbell, Campbell bridge		79								
09	Curtis, County Rte 4 bridge						91	92	97	98	
10A	Coopers Plains, above Smith Hill Rd bridge										02
10	Painted Post, Canada Rd., Kinsella Pk	73	79		84			92		98	
COLONEL BILL'S CREEK (BILL)											
01	below Canisteo, @ Rte 36 bridge										02
DIVEN CREEK (DIVN)											
01	Elmira								97		
FIVEMILE CREEK (FIVM)											
00	Prattsburg, below Co Rt 75 bridge										02
01	Kanona, below Hemlock Rd. bridge								97		02
GOFF CREEK (GOFF)											
01	Avoca, above Co. Rt. 70A bridge									98	02
HELMER CREEK (HELM)											
01	Cameron Mills, @ Co. Rt 24 bridge										02
HENDY CREEK (HEND)											
01	Dutch Hill, above Clark Hollow Rd bridge										02

CHEMUNG RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED			
KARR VALLEY CREEK (KARR)					
01	Almond, below Rte 21 bridge				02
MEADS CREEK (MEAD)					
01	East Campbell, above Meads Creek Rd. bridge		97	98	
02	Coopers Plains, @Rte 416 bridge				02
MUD CREEK (MDCR)					
01	Savona, @Rte 415 bridge				02
MUDLICK CREEK (SEEL)					
02	Seeley Creek, below Kinner Hill Rd. bridge			98	02
NARROWS CREEK (NARO)					
01	Gibson, @Narrows Creek Rd bridge				02
NEILS CREEK (NEIL)					
01	Above Bloomerville, above Co. Rte 6 bridge				02
02	Bloomerville, below Rte 415 bridge				02
NEWTOWN CREEK (NEWT)					
01	Breesport, below Church Rd bridge				02
03	Horseheads, above East Franklin St bridge				02
04	Elmira, above Rt. 352 bridge	91	97	98	02
NEWTOWN CREEK, NORTH BRANCH (NEWT)					
02	Below Sullivanville, Path at Park 'n Ride off Rt 13				02
POST CREEK (POSC)					
01	Post Creek, above Rt 414 bridge				02
02	Corning, above RR bridge and Rt.414 bridge			98	02
SEELEY CREEK (SEEL)					
01	Seeley Creek, below Rt. 328 bridge			98	02
03	Webb Mills, below Pennsylvania Ave. bridge			98	
04	Southport, below Rt 14 bridge		97	98	02
SEELEY CREEK (SELY)					
01	North Hornell, below Seneca St bridge				02
SING SING CREEK (SING)					
01	Near Fisherville, below Singsing Rd bridge				02
02	Near Harris Hill Manor, above Rt 352 bridge				02
SOUTH CREEK (SOUT)					
01	Above Southport, above Co Rt 26 bridge				02
STOCKING CREEK (STOK)					
01	Bath, @Eagle Valley Rd bridge				02

CHEMUNG RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED							
		73	79	84	91	92	97	98	02
TENMILE CREEK (TNCR)									
01	Near Avoca, just below Rt 7 bridge								02
TIOGA RIVER (TOGA)									
01	Lindley,below Morgan Creek Rd. bridge			84					
01A	Presho, below Presho-Lindley Rd bridge				91	92	97	98	02
02	Gang Mills, below RR bridge at Lumber St.	73	79	84		92			02
TROUPS CREEK (TRPS)									
01	Troupsburg, above Hopper Hill Rd bridge								02
TUSCARORA CREEK (TUSC)									
01	Woodhull, below Main St bridge								02
02	East Woodhull, above Rt 417 bridge								02
04	South Addison, above Co.Rt. 85 bridge						97		
05	Addison, @South St bridge								02
TUSCARORA CREEK, NORTH BRANCH (TUSC)									
03	Above S. Addison, above closed bridge on Holden Rd								02
TWELVEMILE CREEK (TMLV)									
01	Wallace, above Rt 415 bridge								02
WHISKY CREEK (WHIS)									
01	French Mill, just below Whisky Creek Rd								02
WYNKOOP CREEK (KOOP)									
01	Below Beantown, above Wynkoop Ck Rd bridge								02
02	Chemung, below old Rt 17 bridge								02

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE CHEMUNG RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Baldwin Creek, East Elmira	non-impacted	no prior data
Baldwin Creek, Lowman	non-impacted	no prior data
Bennetts Creek, Greenwood	non-impacted	no prior data
Bennetts Creek, Bennetts	non-impacted	no prior data
Bennetts Creek, Canisteo	non-impacted	no prior data
Bentley Creek, Wellsburg	non-impacted	no prior data
Camp Creek, Osceola, PA	non-impacted	no prior data
Campbell Creek, Knight Settlement, above Turnpike Rd bridge	non-impacted	no prior data
Campbell Creek, Knight Settlement, below Turnpike Rd bridge	slightly impacted	no prior data
Canacadea Creek, Alfred, above STP	slightly impacted	no prior data
Canacadea Creek, Alfred Station	slightly impacted	no prior data
Canacadea Creek, below Alfred	slightly impacted	no prior data
Canacadea Creek, Almond	slightly impacted	no prior data
Canacadea Creek, Hornell, above Rt. 21	slightly impacted	**IMPROVED**
Canacadea Creek, Hornell, above Main St.	slightly impacted	no change
Canisteo River, above Hornell	slightly impacted	no change
Canisteo River, Canisteo	moderately impacted	no change
Canisteo River, below Canisteo	slightly impacted	no change
Canisteo River, Cameron	slightly impacted	no prior data
Canisteo River, Derby Switch	non-impacted	no change
Canisteo River, Erwins	non-impacted	no prior data
Chemung River, South Corning	non-impacted	no change
Chemung River, below Elmira	non-impacted	no change
Chemung River, Chemung, below Rt. 17 W	non-impacted	**IMPROVED**
Chemung River, Chemung, above Rt.17	non-impacted	no prior data
Cohocton River, Bowles Corners	slightly impacted	no prior data
Cohocton River, Cohocton, above Rte 415	slightly impacted	**DECLINED**
Cohocton River, Cohocton, above Larrowe Mills Rd	non-impacted	no change
Cohocton River, Kanona	slightly impacted	no prior data
Cohocton River, below Bath	non-impacted	no change
Cohocton River, Savona	slightly impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE CHEMUNG RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Cohocton River, Curtis	slightly impacted	no change
Cohocton River, Cooper Plains	slightly impacted	no prior data
Cohocton River, Painted Post	non-impacted	no change
Colonel Bill's Creek, below Canisteo	slightly impacted	no prior data
Diven Creek, Elmira	slightly impacted	no prior data
Fivemile Creek, Prattsburg	non-impacted	no prior data
Fivemile Creek, Kanona	slightly impacted	no prior data
Goff Creek, Avoca	non-impacted	no prior data
Helmer Creek, Cameron Mills	non-impacted	no prior data
Hendy Creek, Dutch Hill	non-impacted	no prior data
Karr Valley Creek, Almond	slightly impacted	no prior data
Meads Creek, East Campbell	non-impacted	no prior data
Meads Creek, Cooper Plains	non-impacted	no prior data
Mud Creek, Savona	slightly impacted	no prior data
Mudlick Creek, Seeley Creek	non-impacted	no prior data
Narrows Creek, Gibson	slightly impacted	no prior data
Neils Creek, above Bloomerville	non-impacted	no prior data
Neils Creek, Bloomerville	non-impacted	no prior data
Newtown Creek, Breesport	non-impacted	no prior data
Newtown Creek, Horseheads	slightly impacted	no prior data
Newtown Creek, Elmira	slightly impacted	no change
Newtown Creek, North Branch, below Sullivanville	slightly impacted	no prior data
Post Creek, Post Creek	slightly impacted	no prior data
Post Creek, Corning	non-impacted	no prior data
Seeley Creek, Seeley Creek	non-impacted	no prior data
Seeley Creek, Webb Mills	non-impacted	no prior data
Seeley Creek, Southport	non-impacted	no prior data
Seeley Creek, North Hornell	non-impacted	no prior data
Sing-Sing Creek, near Fisherville	slightly impacted	no prior data
Sing-Sing Creek, near Harris Hill Manor	non-impacted	no prior data
South Creek, above Southport	non-impacted	no prior data
Stocking Creek, Bath	non-impacted	no prior data
Tenmile Creek, near Avoca	non-impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE CHEMUNG RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Tioga River, Presho	slightly impacted	**DECLINED**
Tioga River, Gang Mills	non-impacted	no change
Troups Creek, Troupsburg	non-impacted	no prior data
Tuscarora Creek, Woodhull	non-impacted	no prior data
Tuscarora Creek, East Woodhull	non-impacted	no prior data
Tuscarora Creek, above South Addison	non-impacted	no prior data
Tuscarora Creek, Addison	non-impacted	no prior data
Tuscarora Creek, North Branch, above South Addison	non-impacted	no prior data
Twelvemile Creek, Wallace	slightly impacted	no prior data
Whisky Creek, French Mill	non-impacted	no prior data
Wynkoop Creek, below Beantown	slightly impacted	no prior data
Wynkoop Creek, Chemung	non-impacted	no prior data

REPORTS OF MACROINVERTEBRATE SURVEYS WITHIN THE CHEMUNG RIVER WATERSHED

STREAM	YEAR OF SURVEY	REPORT
Canacadea Creek	1998	SBU,1999
Canisteo River	1973	AVON
Canisteo River	1988	SBU,1988
Chemung River	1984	DOH,1985
Cohocton River	1973	AVON
Cohocton River	1988	SBU,1988
Cohocton River	1994	DFW
Cold Brook	1996	DFW
Seeley Creek	1998	SBU,1999
Watershed Streams	1991-1992	RIBS,1994

AVON	Avon Pollution Investigations Unit, Div. of Fish & Wildlife, NYS DEC
DFW	Division of Fish & Wildlife, NYS DEC
DOH	New York State Department of Health
RIBS	Rotating Intensive Basin System, Statewide Waters Assessment Section, NYS DEC
SBU	Stream Biomonitoring Unit, Division of Water, NYS DEC

Baldwin Creek

Non-impacted water quality is assessed for this Chemung River tributary, based on macroinvertebrate sampling at two sites in 2002. The sample taken near Lowman was field-assessed and was not processed; the sample from East Elmira was laboratory-processed. Both showed diverse communities dominated by mayflies and caddisflies.

Bennetts Creek

Based on macroinvertebrate sampling in 1997 at Bennetts, water quality is assessed as non-impacted. The field screening criteria were met, and the sample was not retained. Some agricultural effects were noted, including diatoms, filamentous algae, and supersaturated dissolved oxygen levels. Sites at Greenwood and Canisteo were also field-assessed as non-impacted in 2002 sampling, and the samples have not yet been processed.

Bentley Creek

This small tributary of the Chemung River is assessed as non-impacted, based on sampling of macroinvertebrates in Wellsburg in 2002. The fauna reflected influences of nutrient enrichment and siltation, but most metrics were within the range of non-impacted water quality. No prior data were available for the stream.

Camp Creek

A site near Osceola, Pennsylvania, was sampled for macroinvertebrates in 2002, and was field-assessed as non-impacted, but the sample has not yet been processed. No prior data were available for the stream.

Campbell Creek

This tributary of the Cohocton River was assessed as non-impacted at a site upstream of Kanona in 2002 sampling. A diverse fauna dominated by mayflies was present. A second site downstream of bridge construction documented slight impact from siltation, but this impact is judged to be temporary.

Canacadea Creek

Improved water quality is indicated for Canacadea Creek at Hornell. Water quality was assessed as moderately impacted in 1991 and 1992. Species richness was low (Figure 5-1) and the impact on the fauna was thought to be toxic in nature. Crayfish collected in 1991 contained elevated levels of mercury and

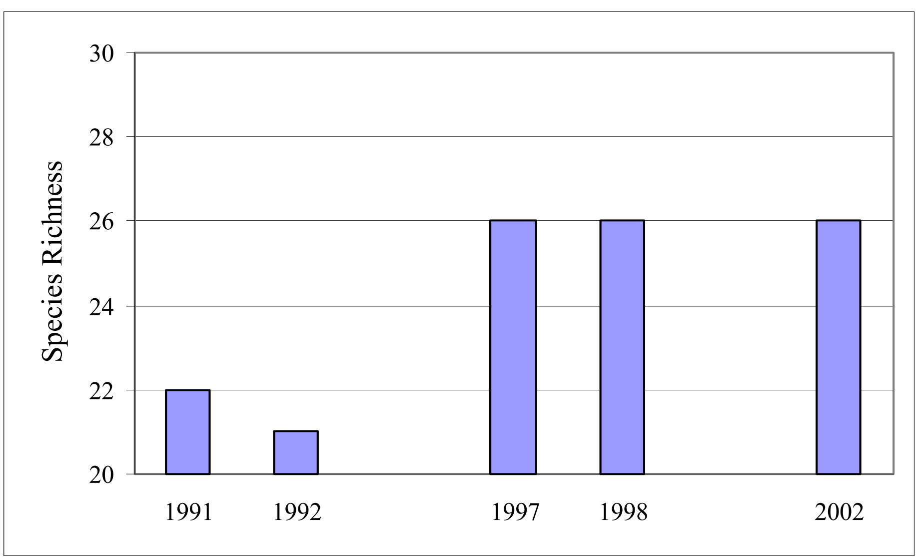


Figure 5-1. Species richness trends in Canacadea Creek at Hornell, 1991-2002.

aluminum. Sampling in 1997, 1998, and 2002 at this site documented slightly impacted conditions, with increased species richness. The previous impact source and the cause of improvement remain unknown. In a multiple-site survey conducted in 1998, water quality at 6 locations from Alfred to Hornell was assessed as slightly impacted. Siltation was the major factor influencing the fauna. A 5-mile reach downstream of the Alfred Wastewater Treatment Facility displayed some toxic effects. The site in Hornell was also sampled in 1997, and was similarly assessed as slightly impacted. Crayfish collected during this sampling were analyzed for metals; nickel was found at a concentration exceeding the level of concern. Two PAHs, chrysene and benzo (a) anthracene, were found in amounts exceeding levels of concern.

<u>Canisteo River</u>

Water quality in the Canisteo River currently ranges from non-impacted to moderately impacted. A small segment of moderate impact still exists downstream of the Hornell (C) Water Pollution Control Facility discharge, similar to the results of 1988 survey. Water quality from downstream of Canisteo to Cameron is assessed as slightly impacted, primarily by nutrient enrichment and siltation.

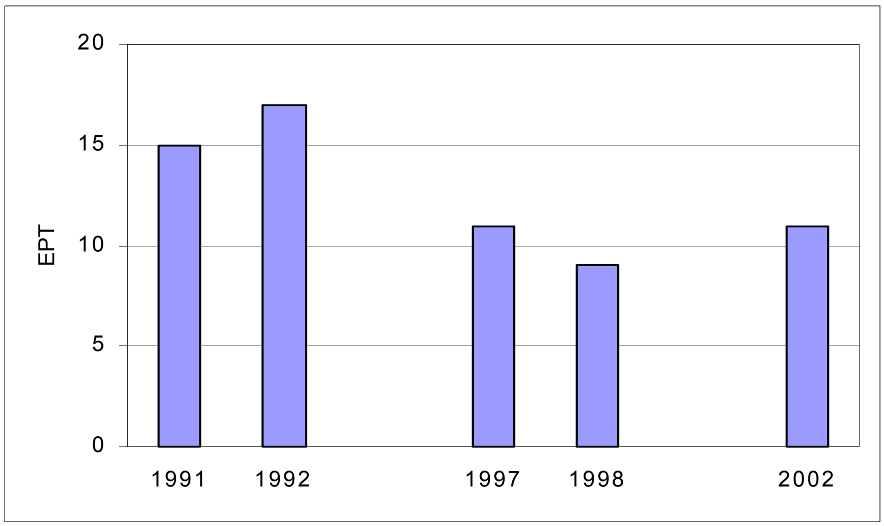


Figure 5-2. EPT trends (species of sensitive mayflies, stoneflies, and caddisflies) in Canisteo River at Derby Switch, 1991-2002.

Most long-term sampling in the Canisteo River has been conducted at Derby Switch (Figure 5-2). This site was assessed as non-impacted in 1991 and 1992, slightly impacted in 1997 and 1998, and non-impacted in 2002. Non-impacted water quality was also field-assessed for Erwins in 2002. Two PAHs, chrysene and benzo (a) anthracene, were found at levels exceeding current levels of concern in hellgrammites collected at this site in 1997. PCB Aroclor 1254 was found at low levels. Continued monitoring is recommended for the Derby Switch site.

<u>Chemung River</u>

Water quality at all Chemung River sites is currently assessed as non-impacted. At South Corning, water quality had been assessed as slightly impacted in 1997 and 1998, but was previously assessed as non-impacted in 1979, 1984, and 1992. This site was sampled in 2002 and water quality was determined to be non-impacted.

The site below Elmira was also assessed as non-impacted in 2002, similar to the assessment of 1992. Water quality at Chemung, assessed as slightly impacted in 1984, 1991, and 1998, was assessed as non-impacted in 2002 sampling. The fauna showed some indications of being enriched by nonpoint agricultural sources, but contained many mayflies, stoneflies, and caddisflies. Further monitoring of this site is recommended to confirm this apparent improvement. The site below

Chemung was sampled for macroinvertebrates in 1997, and was assessed as non-impacted. The fauna was diverse and well-balanced, and dominated by mayflies and caddisflies, with stoneflies also present.

Cohocton River

Water quality in nearly all of the Cohocton River is currently assessed as slightly impacted by nonpoint source nutrient enrichment, based on 2002 macroinvertebrate sampling. Most of the river was considered non-impacted in 1992, although nutrient enrichment has always been an issue. In 1998 sampling, three of four sites were assessed as non-impacted, but in 2002 sampling, slightly impacts to water quality were found at all five sites sampled. Since most of the 2002 locations did not coincide with the 1998 sites, the three assessments of non-impact remain. It seems likely that varying flow levels are responsible for some of the fluctuation in assessments, and continued monitoring at established sites should be maintained to gain an accurate picture of long term water quality in the river. Diatom monitoring would also be useful as a measure of nutrient enrichment.

Macroinvertebrate communities at most sites are dominated by filter-feeding caddisflies and algal-scraping riffle beetles. Clean-water mayflies and stoneflies are present throughout the length of the river, but in reduced numbers. At Cohocton, water quality was clearly assessed as slightly impacted in 2002, with all metrics within the range of slight impact. The fauna was heavily dominated by riffle beetles and caddisflies. This site was previously assessed as non-impacted in 1988, when the fauna was dominated by mayflies. All metrics declined at this site from 1988 to 2002, representing an apparent decline in water quality but needing further sampling for verification.

Water quality at Curtis continues to be assessed as slightly impacted, likely by nonpoint source nutrient enrichment. Water quality metrics were within the range of non-impacted water quality in 1997, but returned to slight impact in 1998, similar to conditions found in 1991 and 1992. Filamentous algae and macrophytes continue to be abundant at this site. In 1997 tissue sampling, three PAHs, chrysene, pyrene, and benzo (a) anthracene, were found at levels exceeding current levels of concern for hellgrammites.

Near the mouth, water quality at Painted Post was assessed as non-impacted in 1998, similar to the 1992 assessment for this site. More recently, water quality was assessed as slightly impacted in 2002, three miles upstream at Coopers Plains. Further sampling will be continued at Painted Post to monitor this possible decline.

Colonel Bill's Creek

Slightly impacted water quality is assessed for this tributary of the Canisteo River. A site near the mouth was sampled for macroinvertebrates in 2002. The fauna was dominated by facultative midges that indicated nonpoint source nutrient enrichment and possible toxicity. No prior data were available.

Diven Creek

This small tributary of Newtown Creek in Elmira Heights was assessed as slightly impacted in 1997, although the assessment was near the range of moderate impact. Impact Source Determination showed toxicity to be the primary factor affecting water quality. Crayfish were collected at this site in 1997 and analyzed for metals. Lead was found at 5 mcg/g, which is the current level of concern. Four PAHs were found at levels exceeding current levels of concern: fluoranthene, chrysene, pyrene, and benzo (a) anthracene. No previous data were available.

Five Mile Creek

Macroinvertebrates were sampled at the Kanona site in 1997 and 2002, and water quality was assessed as slightly impacted. The stream was in an agricultural area. The stream bottom had diatoms, macrophytes, and filamentous algae, and the midday dissolved oxygen level was highly supersaturated. Impact Source Determination indicated nonpoint source nutrient and/or pesticide runoff as a likely source of impact. Sewage effluent or animal wastes were also possible sources of impact. An upstream site near Prattsburg was field-assessed as non-impacted in 2002, although this sample has not yet been laboratory-processed. Clean-water mayflies, stoneflies, and caddisflies were present.

Goff Creek

Non-impacted water quality was assessed for a site at Avoca, based on macroinvertebrate sampling in 1998 and 2002. A diverse and well-balanced fauna was found, with the fauna dominated by mayflies and midges.

Helmer Creek

Non-impacted water quality is assessed for this small tributary of the Canisteo River, based on macroinvertebrate sampling in 2002. The sample was field-assessed as non-impacted, and has not yet been processed.

Hendy Creek

This small tributary of the Chemung River was assessed as non-impacted, based on macroinvertebrate sampling in 2002. The sample was field-assessed as non-impacted, and has not yet been processed.

Karr Valley Creek

This small tributary of Canacadea Creek is assessed as slightly impacted by nonpoint source nutrient enrichment, based on macroinvertebrate sampling near Almond in 2002. The stream had abundant algae, and the fauna was dominated by facultative mayflies and midges.

Meads Creek

Based on macroinvertebrate sampling at East Campbell, water quality was assessed as slightly impacted in 1997 and non-impacted in 1998. Indices were very similar for these 2 years, and mayflies, stoneflies, and caddisflies were present in both years. Impact Source Determination indicated highest similarities to natural communities for both years, and actual water quality for this site is considered to be non-impacted. A site near Coopers Plains was field-assessed as non-impacted in 2002, and the sample has not yet been processed.

Mud Creek

Slightly impacted water quality was assessed for this Cohocton River tributary. A site in Savona was sampled for macroinvertebrates in 2002. The fauna was dominated by filter-feeding midges and caddisflies, indicating nonpoint source nutrient enrichment. No prior data were available for the stream.

Mudlick Creek

Non-impacted water quality was assessed for this tributary of Seeley Creek. The site in the hamlet of Seeley Creek was previously sampled for macroinvertebrates in 1998, and was assessed as slightly impacted.

Narrows Creek

This small tributary of the Chemung River is assessed as slightly impacted, based on macroinvertebrate sampling at Gibson, across the river from Corning. The fauna was dominated by facultative midges, and ISD denoted nonpoint source nutrient enrichment as the primary stressor.

Neils Creek

Non-impacted water quality is assessed for this tributary of the Cohocton River, based on macroinvertebrate sampling in 1998 and 2002. The 2002 samples were field-assessed as non-impacted, and have not yet been processed.

Newtown Creek

Current water quality ranges from non-impacted to slightly impacted. The upstream site in Breesport was assessed as non-impacted in 2002 sampling, and all sites downstream of this were assessed as slightly impacted. The most downstream site in Elmira was sampled for macroinvertebrates in 1991, 1997, 1998, and 2002. Water quality was assessed as slightly impacted for all years. Impact Source Determination showed toxicity to be the primary factor affecting water quality, and siltation is also a stressor. Caddisflies collected at this site in 1997 were analyzed for PAHs, and one- benzo (a) anthracene - was found at a level exceeding the current level of concern. Slight impact was also assessed for the North Branch of Newtown Creek.

Post Creek

Non-impacted water quality was assessed for the site in Corning, based on macroinvertebrate sampling in 1998 and 2002. A diverse and well-balanced fauna was found, including clean-water mayflies, stoneflies, caddisflies, riffle beetles, and hellgrammites. An upstream site sampled in the village of Post Creek in 2002 assessed water quality as slightly impacted by siltation and nutrient enrichment.

Seeley Creek (Chemung County)

Non-impacted water quality is currently assessed for this stream, based on sampling at 3 locations.. The most downstream site, in Southport, was sampled in 1997, 1998, and 2002, and found to have non-impacted water quality all three years. In 1998, two additional sites at Webb Mills and upstream at Seeley Creek were sampled; Webb Mills was assessed as non-impacted and Seeley Creek was assessed as slightly impacted. Causes of the upstream impact are not known. The stream originates in Pennsylvania and most of the watershed lies in that state. Based on 2002 sampling and a field-assessment, water quality in the stream at the village of Seeley Creek is currently considered to be non-impacted.

Seeley Creek (Steuben County)

This small tributary of the Canisteo River was assessed as non-impacted, based on macroinvertebrate sampling in 2002. The sample was field-assessed as non-impacted, and has not yet been processed.

Sing Sing Creek

Water quality ranges from non-impacted to slightly impacted in this creek, based on 2002 macroinvertebrate sampling. The upstream site near Fisherville was assessed as slightly impacted by nonpoint source nutrient enrichment, with a fauna dominated by filter-feeding caddisflies. The downstream site near Harris Hill Manor was field-assessed as non-impacted. Clean-water stoneflies were present at this site, and filter-feeding caddisflies appeared less abundant.

South Creek

Non-impacted water quality is assessed for this tributary of Seeley Creek, based on macroinvertebrate sampling in 2002. The sample was field-assessed as non-impacted, and has not yet been processed.

Stocking Creek

Water quality is assessed as non-impacted for this small Cohocton River tributary, based on 2002 macroinvertebrate sampling near Bath. The sample was field-assessed, and has not yet been processed. No prior data were available for the stream.

Tenmile Creek

This small tributary of the Cohocton River was assessed as non-impacted, based on macroinvertebrate sampling in 2002. The sample was field-assessed as non-impacted, and has not yet been processed.

Tioga River

The site at the Presho-Lindley bridge has shown an apparent decline in water quality from 1991 to 2002. The site was sampled in 1991, 1992, 1997, 1998, and 2002, and the number of species of EPT has steadily declined over those years (Figure 5-3). Water quality was assessed as non-impacted in 1991 and 1992, and slightly impacted in 1997, 1998, and 2002. Hellgrammites continue to be numerous at this site. Hellgrammites collected in 1992 had high body burdens of cobalt, manganese, and nickel. ISD denotes siltation as the primary stressor, although this needs verification. The river originates in Pennsylvania.

Water quality downstream at Gang Mills was mostly assessed as non-impacted from 1973 to 1992, and was also assessed as non-impacted in 2002 sampling, indicating no net long-term changes in water quality. The macroinvertebrate fauna was dominated by mayflies, and also included many clean-water stoneflies, caddisflies, and hellgrammites. All metrics were within the range of non-impacted water quality.

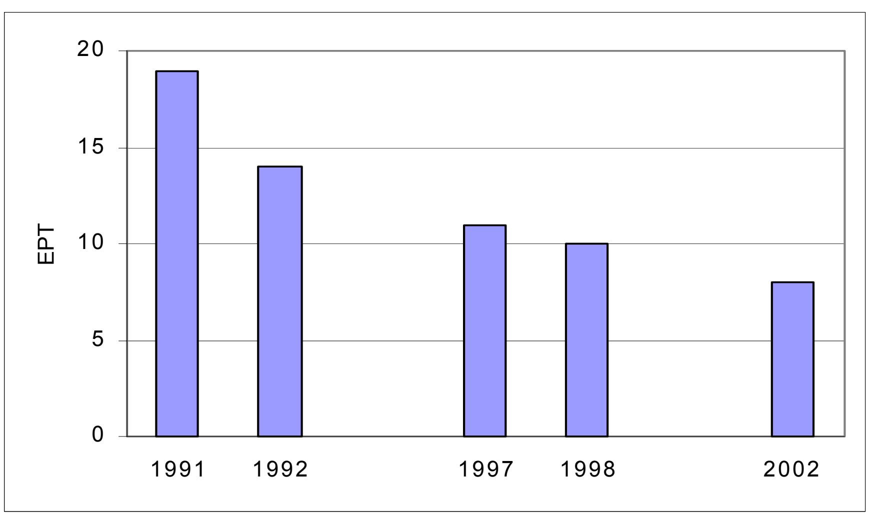


Figure 5-3. EPT trends (species of sensitive mayflies, stoneflies, and caddisflies) in Tioga River at Presho, 1991-2002.

Troups Creek

Non-impacted water quality is assessed for stream, based on macroinvertebrate sampling in 2002. The sample was field-assessed as non-impacted, and has not yet been processed.

Tuscarora Creek

Water quality in Tuscarora Creek from Woodhull to Addison has been assessed as non-impacted, based on sampling in 1997 and 2002. While this is in an agricultural area, and the stream had much filamentous algae and supersaturated dissolved oxygen levels in daytime measurements, the fauna was diverse, and was dominated by sensitive mayflies. The 2002 samples were field-assessed as non-impacted, and have not yet been processed.

Twelvemile Creek

Slightly impacted water quality is assessed for this tributary of the Cohocton River, based on macroinvertebrate sampling near Wallace in 2002. The fauna was dominated by filter-feeding caddisflies and algal-feeding riffle beetles, and ISD denoted nonpoint source nutrient enrichment as the primary stressor. No prior data were available for the stream.

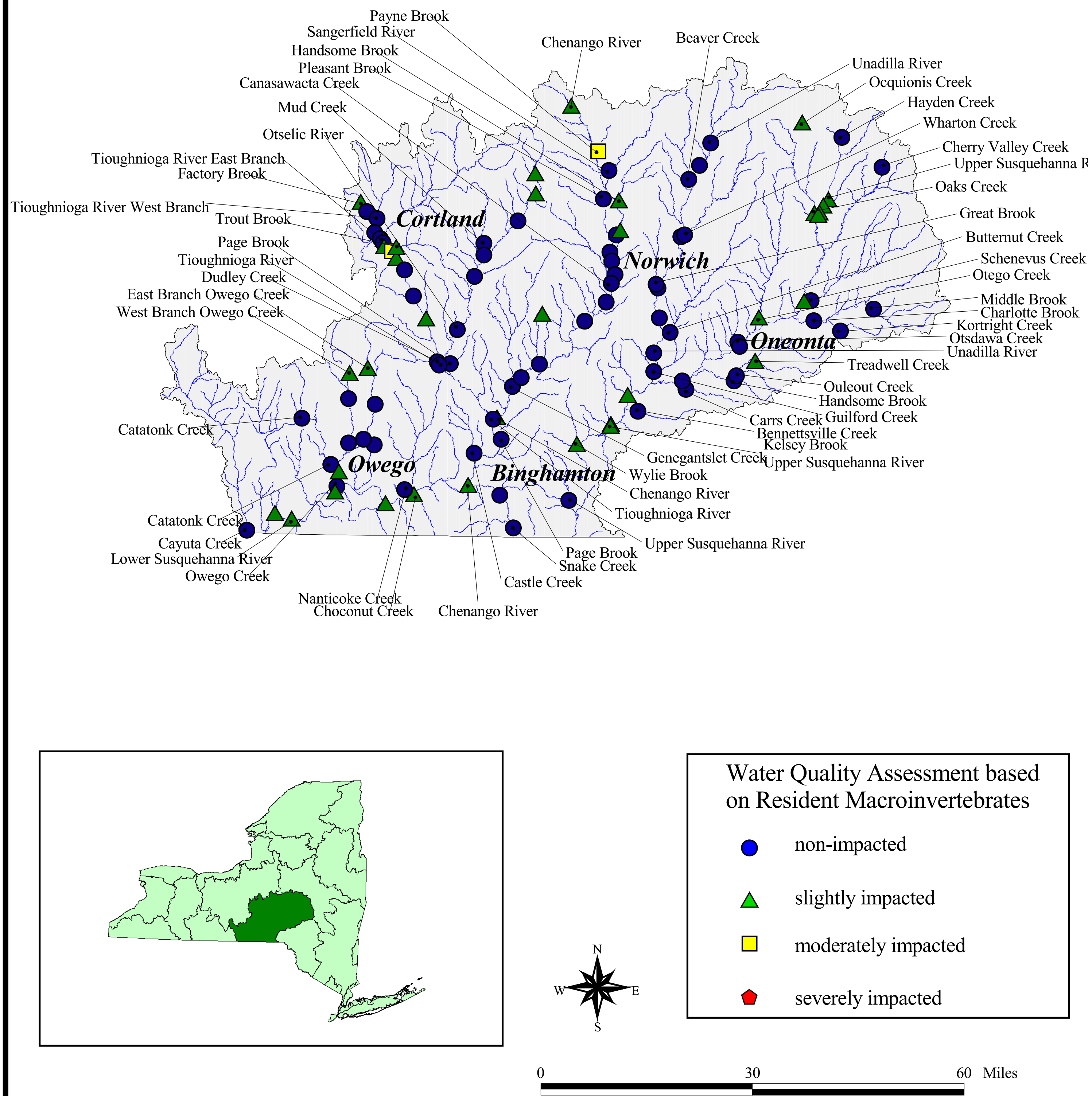
Whisky Creek

This small tributary of the Chemung River was assessed as non-impacted, based on macroinvertebrate sampling in 2002 near South Corning. The sample was field-assessed as non-impacted, and has not yet been processed.

Wynkoop Creek

Water quality of this Chemung River tributary ranges from non-impacted to slightly impacted, based on macroinvertebrate sampling in 2002. The upstream site near Beantown indicated slight impact from nonpoint source nutrient enrichment. The headwater nature of the stream likely contributed to some low metric values. Diatoms were abundant on the stream substrate at this site. The downstream site near the mouth showed signs of siltation, but all metric values were within the range of non-impacted water quality. No prior data were available for the stream.

Susquehanna River Drainage Basin



SUSQUEHANNA RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED
APALACHIN CREEK (APAL)		
01	Apalachin, above Rte 434 bridge	91
02	Apalachin, below below Rt. 17 bridge	91 92
BEAVER CREEK (BEVR)		
01	South Brookfield, where South Brookfield Rd comes close to stream	97
BENNETTSVILLE CREEK (BVIL)		
01	Bennettsville, below Rt. 206 bridge	97
BUTTERNUT CREEK (BTNT)		
01	Mount Upton, below Flatiron Road bridge	97
CANASAWACTA CREEK (NANG)		
T	Norwich, above Rte 12 bridge	89 97
CARRS CREEK (CARR)		
01	Youngs, below Poplar Hill Rd bridge	97
CASTLE CREEK (CSTL)		
01	Hinmans Corners, under Rt. 11 bridge	97
CATATONK CREEK (CATA)		
01	Above Candor, above Griddleyville Cross Rd. bridge	98
02	Below Hubbardtown, off Rt. 96	98
03	Below Catatonk, below Glen Mary Dr bridge	97 98
CAYUTA CREEK (CAYU)		
01	Waverly, Broad St Ext	84 92
02	Waverly, below Rte 17W bridge, below STP	84 92
03	Milltown, (Penn.), above N. Thomas Ave bridge	84 92 97
CHARLOTTE BROOK (CHAR)		
01	Davenport, above Hollow Rd. bridge	97
CHENANGO RIVER (NANG)		
00	(West Branch) Morrisville, above Hart Rd. bridge	92 97
A	below Sherburne, where Tracy Rd is closer to river	97
01	North Norwich, Rtes 12 and 23A	89
03	Above Norwich, Plasterville bridge site (east)	89
03A	Above Norwich, Plasterville bridge site (west)	89
04	Above Norwich, opposite Mead Pond	79 89 98

SUSQUEHANNA RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002, cont'd.

STATION	LOCATION	YEAR SAMPLED							
CHENANGO RIVER (NANG), cont'd.									
06	Norwich, below Rte 23 bridge				89				
13	Below Norwich, Railroad bridge				89			97	98
14	Oxford, under Oxford bridge				89				
15	Above Greene, below Hogsback Rd bridge site		79		89				
15A	Greene, above gaging station							97	
16	Chenango Forks, below Rt 79 bridge							97	
17	Binghamton, Lockwood St	73	79	84		91	92	97	98
CHERRY VALLEY CREEK (CHER)									
01	Cherry Valley, dirt rd. off Rt. 166							97	
CHOCONUT CREEK (CHOC)									
01	Vestal, above Front St. bridge							97	
DRY CREEK (TOGH)									
03A	Dry Creek, Cortland, North Main St						92		
DUDLEY CREEK (DDLY)									
01	Lisle, below Whiting Hill Rd bridge							97	
FACTORY BROOK (FACT)									
01	Above Homer, above Rt. 41 bridge near Rt. 100 intersection							97	98
02	Above Homer, above Rt. 41 bridge							97	98
GENEGANTSLET CREEK (GENE)									
01	Below Greene, at Slater Rd behind EZ mart							97	
GREAT BROOK (GREA)									
01	Holmesville, @Rte 8 bridge							97	
GUILFORD CREEK (GUIL)									
01	East Guilford, below Rte 8 bridge							97	
HANDSOME BROOK (HAND)									
01	Bartlett Hollow, @ Rte 357 bridge							97	
HANDSOME BROOK (HANS)									
01	Sherburne, below Rt. 12B bridge							97	
HAYDEN CREEK (HAYD)									
01	Springfield Center, below Co. Rt. 53 bridge culvert							97	

SUSQUEHANNA RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002, cont'd.

STATION	LOCATION	YEAR SAMPLED		
KELSEY BROOK (KELS)				
01	Afton, above Rt. 7 bridge		97	
KORTRIGHT CREEK (KORT)				
01	East Meredith, above Co. Rt. 10 bridge		97	
MIDDLE BROOK (MDDL)				
01	East of Butts Corner, above Rte 23 bridge		97	
MUD CREEK (OTSL)				
03A	Above Pitcher, above closed bridge in Hydesville		97	
NANTICOKE CREEK (NANT)				
01	Endicott, below Rte 17C bridge		97	
OAKS CREEK (OAKS)				
01	Index, Rte 28 @gage above bridge		97	
OCQUIONIS CREEK (OCQN)				
01	Richfield Springs, above Bronner St. bridge		97	
OTEGO CREEK (OTGO)				
01	West of Oneonta, @gaging station off Co Rte 9		97	
OTSDAWA CREEK (OTSD)				
01	Otego, below Main St bridge		97	
OTSELIC RIVER (OTSL)				
A	Above Georgetown, below Lebanon Rd. bridge			98
01	Above Otselic, above Mill Rd. bridge		97	
02	Otselic Center, above Co Rt 16 bridge		97	
03	South Otselic, below Co. Rt. 13 bridge		97	
04	Pitcher, above Rt. 26 bridge		97	
05	Lower Cincinnatus, below Rte 23 bridge		97	
06	Landers Corners, below Landers Corners Rd bridge		97	98
OTTER CREEK (TOGH)				
03B	Otter Creek, Cortland, North Main St	92		
OULEOUT CREEK (OULE)				
01	Franklin, dirt rd opp. inters. of Rt 357 & Co. Rt. 21		97	
OWEGO CREEK (OWGO)				
09	Above Owego, above Rt. 96 bridge			98
10	Owego, below Rt. 17C bridge		97	98

SUSQUEHANNA RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002, cont'd.

STATION	LOCATION	YEAR SAMPLED
OWEGO CREEK, EAST BRANCH (OWGO)		
05	Below Richford, below Rt. 38 bridge	98
06	Berkshire, above south crossing Brown Rd. bridge	98
07	Newark Valley, above Dr. Knapp Rd	97 98
OWEGO CREEK, WEST BRANCH (OWGO)		
01	Above Speedsville, above Blackman Hill Rd. bridge	98
02	Jenksville, below West Creek Rd. bridge	98
04	Weltonville, below West Creek Rd bridge	97 98
PAGE BROOK (PAGE)		
01	North of Chenango Bridge, below Rogers Rd. bridge	97
PAGE BROOK (PGBR)		
01	Triangle, below Rte 26 bridge	97
PAYNE BROOK (PAYN)		
02	Hamilton, above STP	84 92
03	Hamilton, 300 m below STP	84
04	Hamilton,at farm road bridge, off Rt. 12B	84 92
05	Middleport, below Middleport Rd. bridge	84 92 97 98
PLEASANT BROOK (PLES)		
01	Sherburne, above Co.Rt. 80 bridge	97
SANGERFIELD RIVER (SANG)		
01	Earlville, below Earlville Rd bridge	97
SCHENEVUS CREEK (NVUS)		
03	Colliersville, below bridge on road off I-88 Exit 17	92 97
SNAKE CREEK (SNAK)		
01	Corbettsville, above Rt 7A bridge & RR bridge	97
SUSQUEHANNA RIVER, UPPER (USSQ)		
03	Cooperstown, below falls at Atwell St	85 91
04	Cooperstown, Susquehanna Ave	85 91
07	Below Cooperstown, below WWTF discharge	85 91
10	Phoenix Mills, Cross Rd bridge	85 91
11	Hyde Park, above Oak Ck confluence	85 91 98
14	Colliersville, above bridge off Rte 7	91 92 97
15A	Otego, above River St. old bridge abutment	97

SUSQUEHANNA RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002, cont'd.

STATION	LOCATION	YEAR SAMPLED						
SUSQUEHANNA RIVER, UPPER (USSQ)								
15	Unadilla, @DEC fishing access						97	98
16A	Bainbridge, below Rt. 206 bridge						97	
16	Afton, above Rte 41 bridge			84	91			
18	Windsor, above Rt. 17 bridge							98
SUSQUEHANNA RIVER, LOWER (SUSQ)								
02	Above Binghamton, Conklin Ave	73	79	84				
02A	Near Conklin Center, above Co.Rt.177 bridge						97	
03	Binghamton, Laurel Ave	73	79					
04	Endwell, above Rte 17 bridge	73	79	84				
05	Apalachin, off Rte 17	73	79	84	91	92	97	98
06	Above Owego, above Hiawatha Island	73	79					
07	Below Owego, Rte 17 rest area	73		84	91	92	97	
08	Lounsberry, East River Dr	73	79					
09	Smithboro, below Rt. 282 bridge	73			91		97	98
10	Below Barton, Barton Rd	73	79	84		92		
TIOUGHNIOGA RIVER (TOGH)								
08A	Cortland, Port Watson Ave				91	92		
09	Below Cortland, railroad bridge					92	97	
11	Below Cortland, Loop Rd					92		
12	Blodgett Mills, above Blodgett Mills Rd bridge				91	92	97	
14	Hoxie Gorge, Rte 11 pulloff					92		
15	Messengerville, opposite Gridley Ck					92		
16	Marathon, above Rt. 221bridge					92		98
17	Lisle, below Rte 79 bridge					92	97	
19	Chenango Forks, above Rte 12 bridge						97	
TIOUGHNIOGA RIVER, EAST BRANCH (TOGH)								
08	Cortland, at Rt. 12 and Rt. 81 overpasses					92	97	
TIOUGHNIOGA RIVER, WEST BRANCH (TOGH)								
01	Above Homer, below Rte 11 bridge					92		
02	Below Homer, below Miller St. bridge					92		
04	Cortland, below Rte 13 bridge					92	97	
TREADWELL CREEK (TRED)								
01	Near Franklin, above Rte 357 bridge						97	
TROUT BROOK (TOGH)								
13	Pokeville, Ridge Rd, under Rt. 81 overpass						97	

SUSQUEHANNA RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002, cont'd.

STATION	LOCATION	YEAR SAMPLED			
UNADILLA RIVER (DILA)					
01	Leonardsville, Co. Rt. 13 bridge				98
02	West Edmeston, Welsh Rd. bridge				98
03	New Berlin, below Co. Rte 13 bridge			97	98
04	Holmesville, below Ditch Road bridge			97	98
05	Rockwells Mills, opposite Crandall Rd.				98
06	Rockdale, above Rt. 40 bridge	91	92	97	98
WHARTON CREEK (WHAR)					
01	New Berlin, below Co.Rt. 18 bridge			97	
WYLIE BROOK (WYLI)					
01	Harpursville, below Rte 7 bridge			97	

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE SUSQUEHANNA RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Beaver Creek, South Brookfield	non-impacted	no prior data
Bennettsville Creek, Bennettsville	non-impacted	no prior data
Butternut Creek, Mount Upton	non-impacted	no prior data
Canasawacta Creek, Norwich	non-impacted	no change
Carrs Creek, Youngs	non-impacted	no prior data
Castle Creek, Hinmans Corners	non-impacted	no prior data
Catatonk Creek, above Candor	non-impacted	no prior data
Catatonk Creek, below Hubbardtown	non-impacted	no prior data
Catatonk Creek, below Catatonk	non-impacted	no prior data
Cayuta Creek, Milltown, PA	slightly impacted	**DECLINED**
Charlotte Brook, Davenport	non-impacted	no prior data
Chenango River, West Br., Morrisville	slightly impacted	no change
Chenango River, below Sherburne	non-impacted	no prior data
Chenango River, above Norwich	non-impacted	no change
Chenango River, below Norwich	non-impacted	**IMPROVED**
Chenango River, Greene	non-impacted	no prior data
Chenango River, Chenango Forks	slightly impacted	no prior data
Chenango River, Binghamton	slightly impacted	no change
Cherry Valley Creek, Cherry Valley	non-impacted	no prior data
Choconut Creek, Vestal	slightly impacted	no prior data
Dudley Creek, Lisle	non-impacted	no prior data
Factory Brook, above Homer, near Rt.100	slightly impacted	no prior data
Factory Brook, Homer, above Rt. 41	non-impacted	no prior data
Genegantslet Creek, below Greene	non-impacted	no prior data
Great Brook, Holmesville	non-impacted	no prior data
Guilford Creek, East Guilford	non-impacted	no prior data
Handsome Brook, Bartlett Hollow	non-impacted	no prior data
Handsome Brook, Sherburne	slightly impacted	no prior data
Hayden Creek, Springfield Center	slightly impacted	no prior data
Kelsey Brook, Afton	slightly impacted	no prior data
Kortright Creek, East Meredith	non-impacted	no prior data
Middle Brook, east of Butts Corner	non-impacted	no prior data
Mud Creek, above Pitcher	non-impacted	no prior data
Nanticoke Creek, Endicott	non-impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE SUSQUEHANNA RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Oaks Creek, Index	slightly impacted	no prior data
Ocquionis Creek, Richfield Springs	slightly impacted	no prior data
Otego Creek, west of Oneonta	slightly impacted	no prior data
Otsdawa Creek, Otego	non-impacted	no prior data
Otselic River, above Georgetown	slightly impacted	no prior data
Otselic River, above Otselic	slightly impacted	no prior data
Otselic River, Otselic Center	slightly impacted	no prior data
Otselic River, South Otselic	non-impacted	no prior data
Otselic River, Pitcher	non-impacted	no prior data
Otselic River, Lower Cincinnatus	non-impacted	no prior data
Otselic River, Landers Corners	non-impacted	no prior data
Ouleout Creek, Franklin	non-impacted	no prior data
Owego Creek, East Branch, below Richford	slightly impacted	no prior data
Owego Creek, above Owego	slightly impacted	no prior data
Owego Creek, Owego	non-impacted	no prior data
Owego Creek, East Branch, Berkshire	non-impacted	no prior data
Owego Creek, East Branch, Newark Valley	non-impacted	no prior data
Owego Creek, West Branch, above Speedsville	slightly impacted	no prior data
Owego Creek, West Branch, Jenksville	non-impacted	no prior data
Owego Creek, West Branch, Weltonville	non-impacted	no prior data
Page Brook, north of Chenango Bridge	non-impacted	no prior data
Page Brook, Triangle	non-impacted	no prior data
Payne Brook, Middleport	moderately impacted	**DECLINED**
Pleasant Brook, Sherburne	non-impacted	no prior data
Sangerfield River, Earlville	non-impacted	no prior data
Schenevus Creek, Colliersville	non-impacted	no change
Snake Creek, Corbettsville	non-impacted	no prior data
Susquehanna River, Upper, Hyde Park	slightly impacted	no change
Susquehanna River, Upper, Colliersville	slightly impacted	no change
Susquehanna River, Upper, Otego	non-impacted	no prior data
Susquehanna River, Upper, Unadilla	non-impacted	no prior data
Susquehanna River, Upper, Bainbridge	slightly impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE SUSQUEHANNA RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Susquehanna River, Upper, Windsor	non-impacted	no prior data
Susquehanna River, Lower, near Conklin Center	non-impacted	no prior data
Susquehanna River, Lower, Apalachin	slightly impacted	**IMPROVED**
Susquehanna River, Lower, Owego	slightly impacted	**DECLINED**
Susquehanna River, Lower, Smithboro	slightly impacted	no change
Tioughnioga River, below Cortland	slightly impacted	**IMPROVED**
Tioughnioga River, Blodgett Mills	slightly impacted	no change
Tioughnioga River, Marathon	slightly impacted	**DECLINED**
Tioughnioga River, Lisle	non-impacted	no change
Tioughnioga River, Chenango Forks	non-impacted	no prior data
Tioughnioga River, East Branch, Cortland	slightly impacted	**DECLINED**
Tioughnioga River, West Branch, Cortland	non-impacted	**IMPROVED**
Treadwell Creek, Near Franklin	slightly impacted	no prior data
Trout Brook, Pokeville	slightly impacted	no prior data
Unadilla River, Leonardsville	non-impacted	no prior data
Unadilla River, West Edmeston	non-impacted	no prior data
Unadilla River, New Berlin	non-impacted	no prior data
Unadilla River, Holmesville	non-impacted	no prior data
Unadilla River, Rockwells Mills	non-impacted	no prior data
Unadilla River, Rockdale	non-impacted	no prior data
Wharton Creek, New Berlin	non-impacted	no prior data
Wylie Brook, Harpursville	slightly impacted	no prior data

REPORTS OF MACROINVERTEBRATE SURVEYS WITHIN THE SUSQUEHANNA RIVER WATERSHED

STREAM	YEAR OF SURVEY	REPORT
Cayuta Creek	1984	DOH,1985
Cayuta Creek	1992	SBU,1993
Chenango River	1972	AVON
Chenango River	1989	SBU,1990
Owego Creek	1998	SBU,1999
Payne Brook	1984	DOH,1984
Payne Brook	1992	SBU,1993
Susquehanna River/Tribs.	1965	FWPCA,1967
Susquehanna River	1972	AVON
Susquehanna River	1984	DOH,1985
Susquehanna River	1984	SRBC,1985
Susquehanna River, lower	1985	DOH,1986
Susquehanna River, upper	1985	DOH,1986
Susquehanna River, upper	1991	SBU,1991
Tioughnioga River	1972	AVON
Tioughnioga River	1992	SBU,1992
Unadilla River	1998	SBU,1999
Watershed Streams	1991-1992	RIBS,1994

AVON	Avon Pollution Investigations Unit, Div. of Fish & Wildlife, NYS DEC
DOH	New York State Department of Health
FWPCA	Federal Water Pollution Control Administration
RIBS	Rotating Intensive Basin System, Statewide Waters Assessment Section, NYS DEC
SBU	Stream Biomonitoring Unit, Division of Water, NYS DEC
SRBC	Susquehanna River Basin Commission

Beaver Creek

Water quality of Beaver Creek at South Brookfield was assessed as non-impacted, based on 1997 macroinvertebrate sampling. The fauna was dominated by riffle beetles, and also contained mayflies, stoneflies, and caddisflies. Livestock were seen in the stream above the sampling site, but apparently did not impact the fauna substantially.

Bennettsville Creek

Macroinvertebrate sampling was conducted at Bennettsville in 1997, and water quality was assessed as non-impacted. The field screening criteria were met, and the sample was not retained.

Butternut Creek

Based on 1997 macroinvertebrate sampling at Mt. Upton, water quality was assessed as non-impacted. The field screening criteria were met, and the sample was not retained.

Canasawacta Creek

Water quality was assessed as non-impacted, based on 1997 macroinvertebrate sampling at Norwich. The sample passed field screening criteria, and was not retained. Extensive bulldozing in the stream was noted at the Route 12 bridge site, the 1989 sampling site. The kick sample was taken near the Route 23 bridge, approximately 2 miles upstream. Water quality at the Route 12 bridge site was previously assessed as non-impacted in 1989.

Carrs Creek

Based on 1997 macroinvertebrate sampling at Youngs, water quality was assessed as non-impacted. The field screening criteria were met, and the sample was not retained. No prior data were available for this stream.

Castle Creek

Based on 1997 macroinvertebrate sampling at Hinmans Corners, water quality was assessed as non-impacted. The sample passed field screening criteria, and was not retained. No prior data were available for this stream.

Catatonk Creek

Catatonk Creek is a tributary of Owego Creek. Three sites were sampled on the creek in 1998 for macroinvertebrates: above Candor, Hubbardtown, and below Catatonk. All three sites were assessed as non-impacted. The site below Catatonk was also assessed as non-impacted in 1997. This site had large growths of macrophytes on the stream bottom, and nutrient enrichment was indicated at all sites by Impact Source Determination.

Cayuta Creek

Water quality was assessed as slightly impacted, based on 1997 macroinvertebrate sampling at Milltown (Pennsylvania). Filter-feeding caddisflies dominated the sample, and diatoms and filamentous algae were noted at the site. ISD denoted nutrient enrichment as the primary stressor. This site was previously assessed as non-impacted in 1984 and 1992, and the 1997 assessment represents an apparent decline in water quality. Since 1997 was a low-flow summer year, it is not determined if this is a trend or a flow-related event. Upstream sites on Cayuta Creek previously had a documented improvement following the 1986 upgrading of the Waverly (V) Wastewater Treatment Plant.

Charlotte Brook

Macroinvertebrate sampling was conducted at Davenport in 1997, and water quality was assessed as non-impacted. The field screening criteria were met, and the sample was not retained.

Chenango River

Current water quality in the Chenango River is considered non-impacted from Sherburne to Greene, and slightly impacted downstream to Binghamton. Recent sampling at Sherburne, Norwich, and Greene confirms these assessments. Sampling downstream of Norwich in 1997 and 1998 showed apparent improvement from slightly impacted conditions documented in 1989. This site is downstream of the Norwich (C) Waste Disposal Plant discharge. The plant was upgraded in 1989, and the 1989 sampling may not have reflected upgraded conditions. The Chenango River at Binghamton has been sampled regularly since 1973. Water quality assessments continue to vary between non-impacted and slightly impacted. Current water quality appears unchanged since 1992, and is assessed as slightly impacted, likely due to nonpoint source nutrient enrichment.

Water quality in the West Branch Chenango River below Morrisville was assessed as slightly impacted, based on 1997 macroinvertebrate sampling. This assessment is similar to that assigned in 1992 for this site. Filter-feeding caddisflies and midges dominated the sample, and mayflies were scarce. The daytime dissolved oxygen level was high super-saturated. Impact Source Determination showed organic wastes to be the primary factor affecting water quality, likely reflecting effects of the effluent from the State Agricultural and Technical College.

Cherry Valley Creek

This stream was sampled in the town of Cherry Valley in 1997, and was assessed as non-impacted. The sample was not retained. No prior data were available for this stream.

Choconut Creek

Slightly impacted water quality was assessed at the Vestal site, based on 1997 macroinvertebrate sampling. Impact Source Determination indicated that nonpoint source nutrient enrichment was the primary source of impact.

Dudley Creek

Water quality was assessed as non-impacted, based on 1997 macroinvertebrate sampling at Lisle. The sample passed field screening criteria, and was not retained. Sedimentation appeared high at this site, and diatoms were numerous on rocks.

Factory Brook

The upstream site on Factory Brook above Homer was located immediately downstream of several farming operations, and was sampled to document possible nonpoint agricultural effects. Both the 1997 and 1998 kick samples showed slightly impacted conditions, although all 4 indices improved from 1997 to 1998, possibly reflecting improved management practices. The second site on Factory Brook was located downstream, and was sampled as a recovery site from nonpoint effects. Water quality was assessed as non-impacted in both 1997 and 1998, with these years showing little change in the fauna or the indices derived from it.

Genegantslet Creek

Water quality was assessed as non-impacted, based on 1997 macroinvertebrate sampling at Greene. The sample passed field screening criteria, and was not retained.

Great Brook

Based on 1997 macroinvertebrate sampling at Holmesville, water quality was assessed as non-impacted. The fauna appeared diverse and well-balanced, dominated by midges. No prior data were available for this stream.

Guilford Creek

Water quality was assessed as non-impacted, based on 1997 macroinvertebrate sampling at East Guilford. The sample passed field screening criteria, and was not retained. Rocks at this site were slippery with diatoms.

Handsome Brook (Delaware County)

Macroinvertebrate sampling was conducted at Bartlett Hollow in 1997, and water quality was assessed as non-impacted. The field screening criteria were met, and the sample was not retained.

Handsome Brook (Chenango County)

Macroinvertebrate sampling was conducted in 1997 at Sherburne. Although this stream contained many mayflies, stoneflies, and caddisflies, it was overly productive, and water quality was assessed as slightly impacted. The fauna was heavily dominated by filter-feeding caddisflies. Impact Source Determination indicated nonpoint source nutrient enrichment to be the primary source of impact.

Hayden Creek

This small tributary of Otsego Lake was sampled for macroinvertebrates in 1997 near Springfield Center. The fauna was dominated by caddisflies, and algae was abundant in the stream, indicating nutrient enrichment. The sample was field-assessed as slightly impacted, and was not processed. No prior data were available for the stream.

Kelsey Brook

Macroinvertebrate sampling in 1997 indicated slight impact at Afton. Rocks were covered with filamentous algae and diatoms, and afternoon dissolved oxygen was only 6.2 ppm (65%). Impact Source Determination however pointed to siltation as the primary factor affecting the fauna. Nonpoint source runoff is an apparent issue in this stream.

Kortright Creek

Macroinvertebrate sampling was conducted at East Meredith in 1997, and water quality was assessed as non-impacted. The field screening criteria were met, and the sample was not retained.

Middle Brook

Macroinvertebrate sampling was conducted at Butts Corner in 1997, and water quality was assessed as non-impacted. The field screening criteria were met, and the sample was not retained.

Mud Creek

This tributary of the Otselic River was sampled for macroinvertebrates in 1997 near Pitcher. The macroinvertebrate fauna appeared diverse, with many mayflies, stoneflies, caddisflies, and dobsonflies. Water quality was assessed as non-impacted although ISD indicated influences of nonpoint source nutrient enrichment.

Nanticoke Creek

This stream was sampled for macroinvertebrates in 1997 downstream of the Route 17C bridge near Endicott. The riffle-area rocks were covered with growths of filamentous algae, and these also dominated the kick sample. Nevertheless, indices placed water quality as non-impacted, due largely to high numbers of midge species. These results may not be representative, as this site has an obvious nutrient enrichment problem.

Oaks Creek

Macroinvertebrate sampling in 1997 at Index indicated slightly impacted water quality. The site was a short distance downstream of a dammed pool, and this may have influenced the fauna. Impact Source Determination indicated nonpoint source nutrient and/or pesticide runoff as a likely source of impact.

Ocquionis Creek

Based on 1997 macroinvertebrate sampling at Richfield Springs, water quality was assessed as slightly impacted. There was much urban debris in the stream at this site. Impact Source Determination indicated that nonpoint nutrients and/or pesticides were the primary source of impact.

Otego Creek

Based on macroinvertebrate sampling conducted in 1997 west of Oneonta, water quality was assessed as slightly impacted. This site was located in an agricultural area with livestock upstream. Impact Source Determination indicated nonpoint source agricultural runoff as a possible source of impact, but similarity to natural communities was also indicated.

Otsdawa Creek

Macroinvertebrate sampling in 1997 at Otego indicated non-impacted water quality. The fauna was dominated by midges, although mayflies, stoneflies, and caddisflies were well-represented. All index values were excellent.

Otselic River

Six sites from Georgetown to Landers Corners were sampled for macroinvertebrates on Otselic River in 1997. The upstream portion was found to be slightly impacted by agricultural nonpoint sources. Livestock in the stream at Otselic were responsible for organic loads, erosion, and siltation. From South Otselic to Landers Corners, water quality was assessed as non-impacted. An upstream site above Georgetown was sampled in 1998, and was found to be slightly impacted.

Impact Source Determination indicated that this site was equally similar to natural communities as to those impacted by agriculture.

Ouleout Creek

Macroinvertebrate sampling conducted in 1997 at Franklin indicated non-impacted water quality. The site was field-assessed as non-impacted, and the sample was not retained.

Owego Creek

Current water quality in Owego Creek is assessed as non-impacted to slightly impacted. Two main stem sites were sampled for macroinvertebrates in 1998: upstream of Owego, and in Owego. The upstream site was assessed as slightly impacted; the macroinvertebrate community showed effects of siltation, probably from a large area of bank erosion present about the site. This is an effect of short duration, since less than 3 miles downstream in Owego, water quality was assessed as non-impacted. The site in Owego was assessed as slightly impacted in 1997, and appeared nutrient-enriched by nonpoint sources.

The upstream reaches of both branches of Owego Creek originate in agricultural areas, and water quality is slightly impacted by nonpoint source runoff. Three sites were sampled for macroinvertebrates on the West Branch in 1998: Speedsville, Jenksville, and Weltonville. Water quality was assessed as slightly impacted above Speedsville, and non-impacted at the other sites. The Weltonville site was also assessed as non-impacted in 1997. Three sites were sampled for macroinvertebrates on the East Branch in 1998: Richford, Berkshire, and Newark Valley. Water quality was assessed as slightly impacted below Richford, and non-impacted at the other sites. The Newark Valley site was also assessed as non-impacted in 1997.

Page Brook (Broome County)

Based on 1997 macroinvertebrate sampling at Chenango Bridge, water quality was assessed as non-impacted for this tributary of the Chenango River. The sample passed field screening, and was not retained.

Page Brook (Broome County)

This tributary of the Whitney Point Reservoir was assessed as non-impacted, based on 1997 macroinvertebrate sampling at Triangle. The field screening criteria were met, and the sample was not retained. The stream was mostly bedrock; pockets of rubble were sampled.

Payne Brook

This stream has been sampled since 1984 to measure effects of the Hamilton (V) Wastewater Treatment Plant discharge. Based on macroinvertebrate sampling at Middleport, water quality was assessed as slightly impacted in 1997, and moderately impacted in 1998. ISD indicated the primary stressor to be nutrient enrichment. Water quality at this site was moderately impacted in 1984, and slightly impacted in 1992. Since present water quality is moderately impacted, this represents a decline, but continued monitoring is recommended to verify this trend.

Pleasant Brook

Water quality was assessed as slightly impacted, based on 1997 macroinvertebrate sampling at Sherburne. The field screening criteria were met, and the sample was not retained.

Sangerfield River

Based on 1997 macroinvertebrate sampling at Earlville, water quality was assessed as non-impacted. The fauna included clean-water mayflies, stoneflies, caddisflies, riffle beetles, and hellgrammites, and most indices were within the range of non-impacted conditions.

Schenevus Creek

Macroinvertebrate sampling at Colliersville in 1997 indicated non-impacted water quality, similar to the 1992 assessment. The fauna was diverse and well-balanced, with many mayflies, stoneflies, caddisflies, and riffle beetles.

Snake Creek

Water quality at Corbettsville was assessed as non-impacted based on 1997 macroinvertebrate sampling. Filter-feeding caddisflies were numerous, indicating some enrichment, but the fauna remained diverse.

Susquehanna River

Overall, water quality in the Susquehanna River is currently considered slightly impacted from Cooperstown to Colliersville, mostly non-impacted from Otego to Binghamton, and slightly impacted from Binghamton to Barton. A small section of moderately impacted conditions was found downstream of the Cooperstown (V) Sewage Treatment Plant discharge in 1991, but this site has not been sampled recently.

Hyde Park, located 2.4 river miles downstream of the Cooperstown (V) Sewage Treatment Plant discharge, is considered a representative site for monitoring water quality in the upper river. This site was assessed as slightly impacted

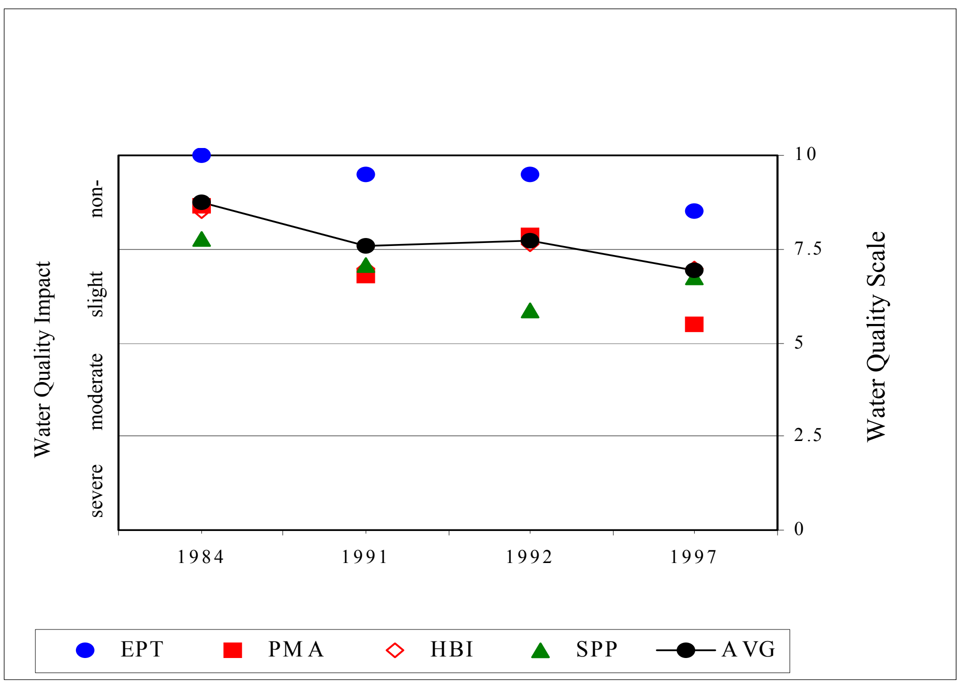


Figure 6-1. Susquehanna River below Owego, 1984-1997, showing declining water quality. SPP= species richness, HBI= Hilsenhoff biotic index, EPT= richness of mayflies, stoneflies, and caddisflies, PMA- Percent Model Affinity, AVG= Biological Assessment Profile value.

by nutrient enrichment in 1985, 1991, and 1998. Based on macroinvertebrate sampling in 1997 and 1998 at Unadilla, water quality was clearly assessed as non-impacted. The fauna was very diverse and well-balanced. Water quality at Bainbridge was assessed as slightly impacted in 1997, indicating an enriched reach. Filamentous algae and diatoms were numerous at this site. Impact Source Determination indicated siltation as a primary factor affecting the macroinvertebrate fauna. A downstream site at Windsor was assessed as non-impacted.

Water quality at Apalachin, downstream of Binghamton and the Binghamton/Johnson City Wastewater Treatment Facility, has apparently improved, with recent samplings in 1997 and 1998 reflecting only slightly impacted conditions, compared to previous assessments of moderate impact. This site historically has exhibited delayed effects of sewage effluent discharges from the Binghamton-Johnson City metropolitan area. The site at Owego had been assessed as non-impacted from 1984-1992. Sampling in 1997 showed slight impact, representing an apparent decline (Figure 6-1). The fauna was dominated by filter-feeding caddisflies, and appeared very enriched. Continued monitoring of this site is recommended to determine if the decline is genuine. Water quality at Smithboro, the most downstream site, continues to be assessed as slightly impacted.

Tioughnioga River

Present water quality in the Tioughnioga River is considered slightly impacted from Cortland to Marathon, and non-impacted from Lisle to Chenango Forks. The West Branch Tioughnioga River in Cortland was assessed as non-impacted in1997, a possible improvement over 1992 conditions. Further sampling is recommended to verify this trend. Water quality in the East Branch Tioughnioga River was assessed in 1997 as slightly impacted by

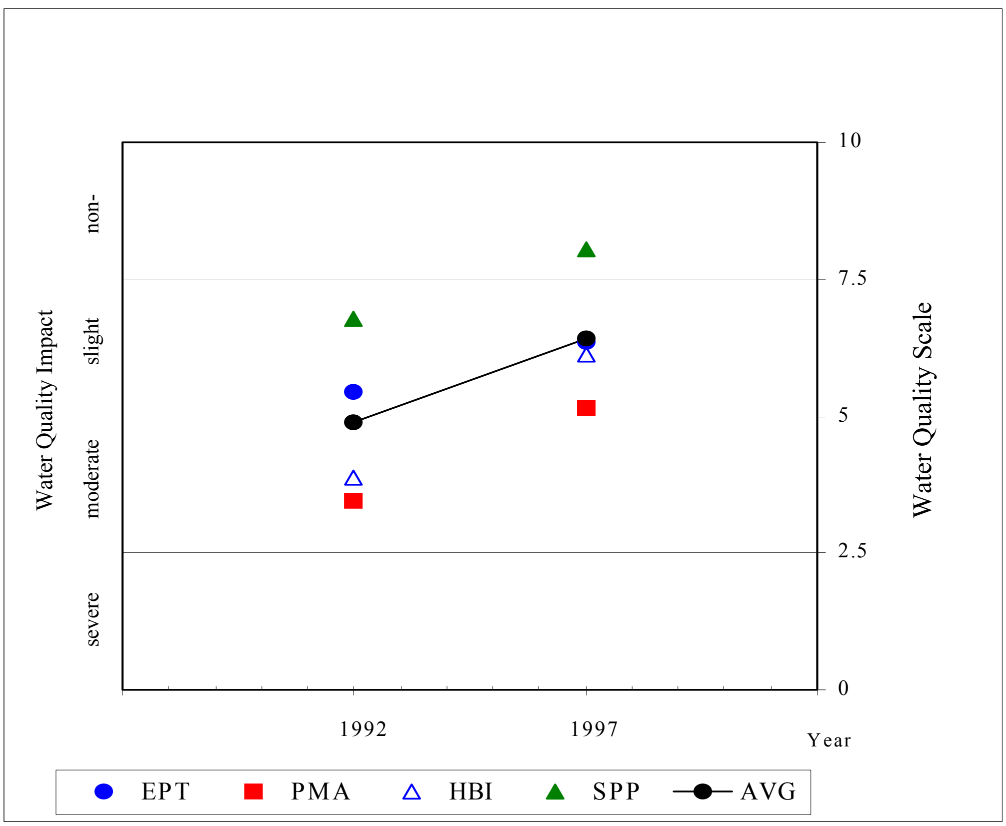


Figure 6-2. Tioughnioga River below Cortland (C) Wastewater Treatment Facility, 1992 and 1997. SPP= species richness, HBI= Hilsenhoff biotic index, EPT= richness of mayflies, stoneflies, and caddisflies, PMA- Percent Model Affinity, AVG= Biological Assessment Profile value.

nonpoint source nutrient enrichment. This may represent a decline from 1992 conditions, although only based on two samplings.

Water quality downstream of the Cortland (C) Wastewater Treatment Plant discharge was assessed as slightly impacted, based on 1997 macroinvertebrate sampling. Mayflies, stoneflies, and caddisflies were found, a substantial improvement over 1992 samples, which reflected moderate impact from the wastewater treatment plant discharge (Figure 6-2). The plant upgrade was completed in 1995, resulting in improved water quality downstream.

Water quality was assessed as slightly impacted at Blodgett Mills, based on sampling in 1991, 1992, and 1997. The stream contained many macrophytes and duckweed, and the invertebrate fauna was dominated by filter-feeding midges and riffle beetles.

Treadwell Creek

Based on 1997 macroinvertebrate sampling at Franklin, water quality was assessed as slightly impacted. The community was dominated by clean-water filter-feeding midges, but Impact Source Determination indicated that organic wastes may be affecting the fauna.

Trout Brook

Water quality was assessed as slightly impacted, based on macroinvertebrate sampling at Pokeville in 1997. This site appeared very productive, with much filamentous algae and an invertebrate fauna dominated by midges.

Unadilla River

Six sites were sampled for macroinvertebrates on the Unadilla River in 1998, from Leonardsville to Rockdale. Water quality was considered non-impacted for the entire length of the stream, although most assessments were close to the slightly impacted range. The Rockdale site was previously assessed as non-impacted in 1991, 1992, and 1997. The sites at New Berlin and Holmesville were sampled in 1997, a low-flow year, and were assessed as slightly impacted. The 1998 assessments are considered more typical of overall water quality for these sites.

Wharton Creek

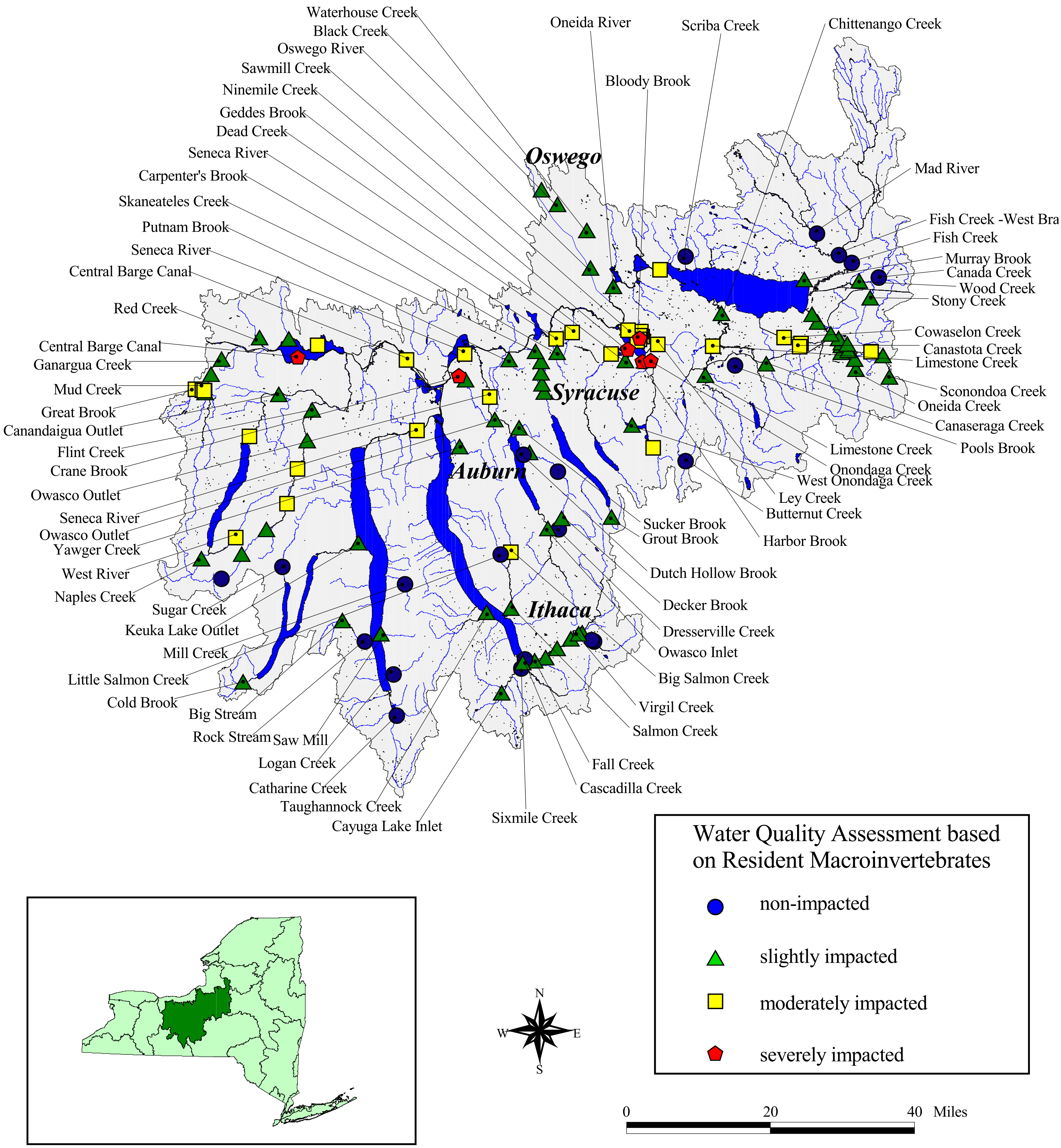
Based on the macroinvertebrate kick sample from New Berlin in 1997, screening criteria were met, and water quality was assessed as non-impacted. The stream bottom at this site appeared to be rubble and gravel overlaying sand and silt. Streambanks were exposed, and large amounts of silt were kicked up by sampling.

Wylie Brook

Macroinvertebrate sampling in 1997 at Harpursville indicated slightly impacted water quality at this site. Impact Source Determination indicated that nonpoint source nutrient enrichment was the probable source of impact. No prior data were available for this stream.

Figure 6-3. Sampling the Susquehanna River at Owego.

Seneca - Oneida - Oswego Rivers Drainage Basin



SENECA-OSWEGO-ONEIDA RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED													
BARGE CANAL, CENTRAL (CCAN)															
04	Port Gibson, above Wide Waters, Light 748	74	80												
05	Newark, below Wide Waters, Light 719	74	80				89			95				01	
08	Above Lyons, Light 679	74	80												
09	Below Lyons, Light 646	74	80												
10	Above Clyde, Light 627	74	80												
11	Below Clyde, Light 586	74	80					90		95				01	
18	Port Byron, Light 503 Howland Island Area	74	80				89							01	
19	Weedsport, Light 462	74	80												
BIG SALMON CREEK (BIGS)															
01	Genoa, above Rte. 90 bridge										96	98	00		
BIG STREAM (BGST)															
01	Above Dundee, above Pre-Emption Rd													01	
BLACK CREEK (BLKO)															
01	Bundy Crossing, below Co Rte 57 bridge													01	
BLOODY BROOK (BLDY)															
01	Liverpool, Limestone Drive								94						
02	Liverpool, below Martin Marietta pond - Middle Branch								94						
03	Liverpool, below Vine St. culvert - West Branch								94						
04	Liverpool, below Thruway bridge - West Branch								94						
05	Liverpool, below Sunflower Dr. culvert - Middle Branch								94						
06	Liverpool, below Onondaga Lake Parkway (Rt. 370) bridge						89		94	95				01	
BUTTERNUT CREEK (BNUT)															
01	Jamesville, above Apulla Rd bridge										96			01	
CANADA CREEK (CNCR)															
01	Seifert Corners, above Tannery Rd bridge													01	
CANANDAIGUA OUTLET (CANA)															
01	Canandaigua, at lake outlet			84	85	86									
02	Canandaigua, Phelps Rd, below WWTF			84	85	86		90						01	
03	Above Chapin, County Rd 4			84	85	86									
05	Littleville, Route 19			84	85	86									
06	Manchester, Rte 96			84	85	86									
08	Manchester Center, Cty Rd 7			84	85	86		90		95					
12	Alloway, above Alloway Rd. bridge									95				01	02

SENECA-OSWEGO-ONEIDA RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED				
CANASERAGA CREEK (SRAG)						
00	Sullivan, above Rte 5 bridge			96		
CANASTOTA CREEK (TOTA)						
01	Canastota, above N. Main St. Rd. bridge	90	95		01	
CARPENTER'S BROOK (CARP)						
01	Peru, above Peru Rd bridge				01	
CASCADILLA CREEK (CASC)						
01	Itahca, above Lake Ave & Madison St				01	
CATHARINE CREEK (CATH)						
01	Montour Falls, above Rte 14			96	01	
CAYUGA LAKE INLET (CAYG)						
01	Near Newfield Station, above Rte 34 bridge				01	
CHITTENANGO CREEK (CHIT)						
01	Chittenango, Route 5	90				
02	Bridgeport, below Rt. 31 bridge		95	96	01	
COLD BROOK (COBR)						
01	Hammondsport, below South Valley Rd				01	
COLDSPRING BROOK (COSP)						
01	Weedsport, Oakland St (Co Rt 13B) @bridge				01	02
COWASELON CREEK (COWA)						
01	Canastota, at Rt. 13 bridge			96		
02	Canastota, Ditch Bank Road	90				
CRANE BROOK (CRAN)						
01	Montezuma, above Mentz Church Rd. bridge					02
02	Montezuma, above East Loop Rd. bridge					02
DEAD CREEK (DEAD)						
01	Near Baldwinsville, @bridge Hoag Rd				01	
DECKER BROOK (DECK)						
01	Moravia, Jugg Rd @fishing access bridge				01	
DRESSERVILLE CREEK (DRES)						
01	Moravia, below Rte 38A bridge				01	

SENECA-OSWEGO-ONEIDA RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED												
DUTCH HOLLOW BROOK (DUCH)														
02	Niles, Old State Rd bridge					93	94			98	99	00		
03	Owasco, below Rte 38A bridge												01	
04	Below Owasco, Honeysuckle Rd bridge					93								
FALL CREEK (FALL)														
01	Red Mills, Red Mills Road bridge			87										
02	Below Freeville, Route 366 bridge			87										
03	Below Etna, Pinckney Road bridge			87										
04	Varna, Freese Road bridge			87										
05	Forest Home,opp filtration plant			87										
06	Ithaca, below Ithaca Falls			87				95	96				01	
FISH CREEK (FSHO)														
01	West Branch, in Blossvale, below McConnellsville Rd. bridge							95					01	
03	Vienna, above "new" Oswego Rd. bridge							95					01	
05	Fish Creek Landing, CR 50A, under bridge													02
FLINT CREEK (FLNT)														
01	Italy, below Basset Rd bridge													02
02	Italy, below Warren Rd bridge													02
03	Potter, below Rt 364 bridge													02
04	Cole Corners, below Rt 4 bridge													02
05	Stanley, below Mott Rd bridge													02
06	Seneca Castle, @Ferguson Rd bridge													02
07	Phelps, above Griffith Rd. bridge							95	96				01	02
GANARGUA CREEK (GNAR)														
01	East Victor, above golf course, off Plaster Mill Rd								96					
02	Brownsville, below Gillis Rd bridge								96					
03	Farmington, above Hook Rd bridge								96					
04	Macedon, above Erie St.	74	80					95	96				01	02
04A	Yellow Mills, off Rte 31	74	80											
05	East Palmyra, below Port Gibbons Rd bridge	74	80						96					
06	Mud Mills, below Mud Mills Rd bridge	74	80						96					
GEDDES BROOK (GEDD)														
01	Camillus, Horan Rd				89								01	
GREAT BROOK (GRBR)														
01	Victor, below Maple Ave. bridge								96				01	
02	Victor, Plaster Mill Rd								96					

SENECA-OSWEGO-ONEIDA RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED						
GROUT BROOK (GROU)								
01	Grout Mill, Co Rte 101 @Sweeney Hill Rd bridge						01	
HARBOR BROOK (HARB)								
01	Split Rock, Rte 173		89					
02	Syracuse, Hiawatha Blvd		89		95		01	
KEUKA LAKE OUTLET (KEUK)								
01	Dresden, Kings Landing Rd		89	90	95		01	
LEY CREEK (LEY)								
A	South branch, Syracuse, James St			90				
00	South branch, Syracuse, Court St			90				
01	Mattydale, Le Moyne Ave		89	90	95		01	
02	Galeville, Route 370, USGS Gaging Station		89	90				
LIMESTONE CREEK (LIME)								
01	Fayetteville, Rte 5			90		96		
02	Minoa, above Kirkville Rd						01	
LITTLE BAY CREEK (LBAY)								
01	Above Central Square, Rte 11	84						
02	Central Square, Rte 49, above WWTF	84						
03	Below Central Square, Rte 81	84						
04	Below Central Square, Rte 37	84						
LITTLE SALMON CREEK (LILS)								
01	Little Hollow, below Creek Rd bridge					96		
LOGAN CREEK (HECT)								
01	Burdett, below Rte. 5						01	
MAD RIVER (MADR)								
01	Camden, River Rd (Co Rte 68) bridge						01	02
MILL CREEK (MLOD)								
01	Lodi, below Neal Rd						01	
MUD CREEK (MUDG)								
01	East Victor, above Rt. 96 bridge					96	01	
02	East Victor, above railroad bridge					96		
MURRAY BROOK (MURY)								
01	North Bay, East Lake Rd						01	

SENECA-OSWEGO-ONEIDA RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED								
NAPLES CREEK (NAPL)										
01	Naples, above Parish Road							96	01	
NETTLE VALLEY CREEK (FLNT)										
A	Potter, below Route 364									02
NINEMILE CREEK (NINE)										
01	Amboy, Warners Road				89					
02	Lakeland, above State Fair Blvd				89	90	95		01	
ONEIDA CREEK (ONEI)										
01	Above Sherrill, Peterboro Rd bridge			86						
02	Sherrill, Kenwood Ave			86						
03	Oneida Castle, Rte 5 bridge			86						
04	Oneida, Lenox Ave bridge			86						
05	Oneida, Sconondoa St bridge			86						
06	Oneida, Bennett Rd bridge			86						
07	Durhamville, Foster St bridge			86				96	01	
08	Above Oneida Valley, Swallows Rd bridge			86						
09	Oneida Valley, Rte 316			86						
ONEIDA RIVER (SEOS)										
04B	Oneida River, Brewerton, Rte 11				89	90				
04A	Oneida River, above Three Rivers, Buoy 209		78				95		01	
ONONDAGA CREEK (ONON)										
01	Tully Farms, Tully Farms Rd		81							
02	Tully Valley, Otisco Rd bridge, above trib.		81							
02A	Tributary stream, Tully Valley, Otisco Rd		81							
02B	Cardiff, Webster Rd				89	90	95		01	
03	Below Cardiff, Indian Rd bridge		81							
05	Syracuse, Spencer St				89	90	95		01	
ONONDAGA LAKE OUTLET (SEOS)										
02A	Salina, Rte 90 bridge		78		89	90				
OSWEGO RIVER (SEOS)										
05	Oswego River, below Three Rivers, Buoy 7	72	78							
06	Oswego River, below Phoenix, Buoy 30	72	78		89	90				
07	Oswego River, below Hinmansville, Buoy 73	72	78							

SENECA-OSWEGO-ONEIDA RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED							
OSWEGO RIVER (SEOS) cont'd.									
08	Oswego River, below Fulton, Buoy 102A	72	78						
09	Oswego River, above Minetto, Buoy 122A	72		89	90	95		01	
10	Oswego River, below Minetto, Buoy 138	72	78						
11	Oswego River, in Oswego, Buoy 4	72	78						
OWASCO INLET (OWAS)									
I	Owasco Inlet, Moravia, Rte 30 bridge							01	
OWASCO LAKE OUTLET (OWAS)									
02	Auburn, Caroga St				90				02
03	Auburn, below Auburn WWTF				90				02
05	Throopsville, Sherman Rd				90				02
06	Below Throopsville, off Robinson Rd				90				
08	Above Port Byron, Hayden Rd				90				02
09	Port Byron, Rochester St				90	95			02
10	North Port Byron, New York Central Rd				90			01	02
POOLS BROOK (POOL)									
01	Mycenae, above Rte 290 bridge						96		
PUTNAM BROOK (PUTN)									
01	North Weedsport, above Rte 31 bridge							01	
RED CREEK (REDC)									
01	Palmyra, below Maple Ave							01	
ROCK STREAM (ROCK)									
01	Rock Stream, above Old Lake Rd							01	
SALMON CREEK (SMON)									
01	Myers Point, below falls, below gaging station						96	01	02
SAWMILL CREEK (SAWM)									
01	Liverpool, Rte 370			89		95		01	
SAWMILL CREEK (SMIL)									
01	Hector, above Peach Point Rd							01	

SENECA-OSWEGO-ONEIDA RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED										
SCONONDOA CREEK (SCON)												
01	Skinner Cemetery, Simmons Rd			86								
02	Above Vernon, Stuhlman Rd			86								
03	Below Vernon, railroad bridge			86								
04	Sherrill, Williams St			86								02
05	Sherrill, Second St			86								
06	Oneida Castle, Rte 365			86					95		01	
SCRIBA CREEK (SCRB)												
01	Constantia, above Co Rte 23 bridge										01	02
SENECA RIVER, UPPER (CCAN)												
12	Below Seneca Lake outlet, unnumbered light	74	80									
13	Above Waterloo, Light 50	74	80									
14	Below Waterloo, Light 87	74	80									
15	Seneca Falls, Light 70	74	80									
15A	Seneca Falls, Bridge St					89	90				01	
16	Above Cayuga Lake Outlet, Light 56	74	80									
17	Above junction with Erie Canal, Light 13	74	80									
SENECA RIVER (SEOS)												
01A	Seneca River, Weedsport, Buoy 460		78									
01B	Seneca River, Jacks Reef					89	90		95		01	
01	Seneca River, Baldwinsville, Buoy 339A	72	78									
02	Seneca River, below Baldwinsville, Buoy 302	72	78									
03	Seneca River, below Onondaga Lake outlet jct.	72	78									
04	Seneca River, above Belgium	72	78									
SIXMILE CREEK (SXML)												
01	Ithaca, S. Plain & S.Titus intersection;@ pedestrian bridge										01	
SKANEATELES CREEK (SKAN)												
01	Skaneateles, below lake outlet dam							92				
02	Willow Glen, Fennel St							92				
03	Skaneateles Falls, Jordan Rd							92				
04	Skaneateles Junction, Case Rd bridge				88			92				
05	Skaneateles Junction, Rodak Rd bridge				88							
06	Elbridge, Hamilton Rd bridge				88			92				
07	Above Jordan, Valley Dr							92				
08	Below Jordan, Rte 31							92		96	01	

SENECA-OSWEGO-ONEIDA RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED										
STONY CREEK (STN7)												
01	above Verona Mills, below Wehling Rd. bridge						96				01	
SUCKER BROOK (SCKR)												
01	Auburn, Co Rte 72 bridge										01	
SUGAR CREEK (SGAR)												
01	Branchport, below County House Rd										01	
TAUGHANNOCK CREEK (TGHN)												
01	Taughannock Falls State Park, above Rte 89										01	
VIRGIL CREEK (VIRG)												
01	Dryden, Route 13 bridge	80	87									
02	Below Dryden, Spring Rd bridge	80	87									
03	Above Freeville, Johnson Rd bridge	80	87								01	
VLY CREEK (VLY)												
01	Lakeport, Lakeport Rd			90								
WATERHOUSE CREEK (WHOS)												
01	Fulton, below Fremont Rd bridge										01	02
WEST ONONDAGA CREEK (WONN)												
01	South Onondaga, below Rte 80 bridge										01	
WEST RIVER (WEST)												
01	Middlesex, below Valley View Rd. bridge						96					
WOOD CREEK (WDCR)												
00	Rome, Rte 69											02
01	Seifert Corners, above Seifert Rd						96				01	
YAWGER CREEK (YAWG)												
05	Cross Roads, Cross Rd bridge				93	94		98	99	00	01	

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE SENECA-ONEIDA-OSWEGO RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Barge Canal, Central, Newark	moderately impacted	no change
Barge Canal, Central, below Clyde	moderately impacted	**DECLINED**
Barge Canal, Central, Howland Island	severely impacted	**DECLINED**
Big Salmon Creek, Genoa	moderately impacted	no prior data
Big Stream, above Dundee	slightly impacted	no prior data
Black Creek, Bundy Crossing	slightly impacted	no prior data
Bloody Brook, Middle Branch, Liverpool, below Limestone Dr.	severely impacted	no prior data
Bloody Brook, Middle Branch, Liverpool, below Martin Marietta pond	moderately impacted	no prior data
Bloody Brook, Middle Branch, Liverpool, below Sunflower Dr.	moderately impacted	no prior data
Bloody Brook, West Branch, Liverpool, below Vine St.	moderately impacted	no prior data
Bloody Brook, West Branch, below Thruway bridge	moderately impacted	no prior data
Bloody Brook, Liverpool, below Rt. 370	moderately impacted	**IMPROVED**
Butternut Creek, Jamesville	non-impacted	no prior data
Canada Creek, Seiffert Corners	non-impacted	no prior data
Canandaigua Outlet, Canandaigua	moderately impacted	**DECLINED**
Canandaigua Outlet, Manchester Center	slightly impacted	no change
Canandaigua Outlet, Alloway	slightly impacted	no prior data
Canaseraga Creek, Sullivan	slightly impacted	no prior data
Canastota Creek, Canastota	moderately impacted	no change
Carpenter's Brook, Peru	slightly impacted	no prior data
Cascadilla Creek, Ithaca	slightly impacted	no prior data
Catharine Creek, Montour Falls	non-impacted	no prior data
Cayuga Lake Inlet, near Newfield Station	slightly impacted	no prior data
Chittenango Creek, Bridgeport	slightly impacted	no prior data
Cold Brook, Hammondsport	slightly impacted	no prior data
Coldspring Brook, Weedsport	moderately impacted	no prior data
Cowaselon Creek, Canastota	moderately impacted	no change
Crane Brook, Montezuma, above Mentz Church Rd.	slightly impacted	no prior data
Crane Brook, Montezuma, East Loop Rd.	severely impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE SENECA-ONEIDA-OSWEGO RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Dead Creek, near Baldwinsville	moderately impacted	no prior data
Decker Brook, Moravia	slightly impacted	no prior data
Dresserville Creek, Moravia	non-impacted	no prior data
Dutch Hollow Brook, Niles	non-impacted	no prior data
Dutch Hollow Brook, Owasco	non-impacted	no prior data
Dutch Hollow Brook, below Owasco	non-impacted	no prior data
Fall Creek, Ithaca	non-impacted	**IMPROVED**
Fish Creek, West Branch, in Blossvale	non-impacted	no prior data
Fish Creek, Vienna	non-impacted	no prior data
Fish Creek, Fish Creek Landing	slightly impacted	no prior data
Flint Creek, Italy, below Basset Rd	non-impacted	no prior data
Flint Creek, Italy, below Warren Rd	slightly impacted	no prior data
Flint Creek, Potter	slightly impacted	no prior data
Flint Creek, Cole Corners	moderately impacted	no prior data
Flint Creek, Stanley	moderately impacted	no prior data
Flint Creek, Seneca Castle	slightly impacted	no prior data
Flint Creek, Phelps, above Griffith Rd.	slightly impacted	no prior data
Ganargua Creek, East Victor	moderately impacted	no prior data
Ganargua Creek, Brownsville	slightly impacted	no prior data
Ganargua Creek, Farmington	slightly impacted	no prior data
Ganargua Creek, Macedon	slightly impacted	**DECLINED**
Ganargua Creek, East Palmyra	slightly impacted	no prior data
Ganargua Creek, Mud Mills	moderately impacted	**DECLINED**
Geddes Brook, Camillus	slightly impacted	**IMPROVED**
Great Brook, Victor, below Maple Ave.	moderately impacted	no prior data
Great Brook, Victor, Plaster Mill Rd.	moderately impacted	no prior data
Grout Brook, Grout Mill	slightly impacted	no prior data
Harbor Brook, Syracuse	severely impacted	no change
Keuka Lake Outlet, Dresden	slightly impacted	no change
Ley Creek, Mattydale	moderately impacted	**IMPROVED**
Limestone Creek, Fayetteville	slightly impacted	no change
Limestone Creek, north of Minoa	moderately impacted	no prior data
Little Salmon Creek, Little Hollow	non-impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE SENECA-ONEIDA-OSWEGO RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Logan Creek, Burdett	non-impacted	no prior data
Mad River, Camden	non-impacted	no prior data
Mill Creek, Lodi	non-impacted	no prior data
Mud Creek, East Victor, above Rt. 96	slightly impacted	no prior data
Mud Creek, East Victor, below STP	moderately impacted	no prior data
Murray Brook, North Bay	slightly impacted	no prior data
Naples Creek, Naples	slightly impacted	no prior data
Nettle Valley Creek, Potter	slightly impacted	no prior data
Ninemile Creek, Lakeland	severely impacted	no change
Oneida Creek, Durhamville	slightly impacted	no prior data
Oneida River, Three Rivers	slightly impacted	no change
Onondaga Creek, Cardiff	moderately impacted	**DECLINED**
Onondaga Creek, Syracuse	severely impacted	no change
Oswego River, above Minetto	slightly impacted	no change
Owasco Inlet, Moravia	slightly impacted	no prior data
Owasco Outlet, Auburn, above STP	slightly impacted	no change
Owasco Outlet, Auburn, below STP	slightly impacted	**IMPROVED**
Owasco Outlet, Throopsville	slightly impacted	**IMPROVED**
Owasco Outlet, above Port Byron	slightly impacted	**IMPROVED**
Owasco Outlet, Port Byron	slightly impacted	no change
Owasco Outlet, North Port Byron	slightly impacted	**IMPROVED**
Pools Brook, Mycenae	non-impacted	no prior data
Putnam Brook, North Weedsport	slightly impacted	no prior data
Red Creek, Palmyra	slightly impacted	no prior data
Rock Stream, Rock Stream	non-impacted	no prior data
Salmon Creek, Myers Point	slightly impacted	no prior data
Sawmill Creek, Liverpool	moderately impacted	no change
Saw Mill, Hector	slightly impacted	no prior data
Sconondoa Creek, Sherrill, Williams St.	slightly impacted	no change
Sconondoa Creek, Oneida Castle	slightly impacted	no change
Scriba Creek, Constantia	non-impacted	no prior data
Seneca River, Upper, Seneca Falls	moderately impacted	**DECLINED**

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE SENECA-ONEIDA-OSWEGO RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Seneca River, Jacks Reef	moderately impacted	**DECLINED**
Sixmile Creek, Ithaca	non-impacted	no prior data
Skaneateles Creek, Jordan	slightly impacted	no change
Stony Creek, above Verona Mills	slightly impacted	no prior data
Sucker Brook, Auburn	slightly impacted	no prior data
Sugar Creek, Branchport	non-impacted	no prior data
Taughannock Creek, Taughannock State Park	slightly impacted	no prior data
Virgil Creek, above Freeville	slightly impacted	**DECLINED**
Waterhouse Creek, Fulton	slightly impacted	no prior data
West Onondaga Creek, South Onondaga	slightly impacted	no prior data
West River, Middlesex	moderately impacted	no prior data
Wood Creek, Rome	slightly impacted	no prior data
Wood Creek, Seifert Corners	slightly impacted	no prior data
Yawger Creek, Cross Roads	slightly impacted	no prior data

REPORTS OF MACROINVERTEBRATE SURVEYS WITHIN THE SENECA-OSWEGO-ONEIDA RIVER WATERSHED

STREAM	YEAR OF SURVEY	REPORT
Bloody Brook	1994	SBU,1994
Bloody Brook	2001	ESF
Canandaigua Outlet	1972	EPA
Canandaigua Outlet	1973	AVON
Canandaigua Outlet	1984	DOH,1985
Canandaigua Outlet	1985	DOH,1985
Canandaigua Outlet	1986	SBU,1987
Chittenango Creek	1972	AVON
Limestone Creek	1972	AVON
Cowaselon Creek	1975	AVON
Fall Creek	1974	AVON
Fall Creek	1987	SBU,1987
Flint Creek	2002	SBU,2002
Ganargua Creek	1996	SBU,1997
Keuka Inlet/Outlet	1974	AVON
Little Bay Creek	1984	DOH
Ninemile Creek	1973	AVON
Oneida Creek	1972	AVON
Oneida Creek	1986	SBU,1987
Onondaga Creek	1981	DOH,1982
Onondaga Creek	2001	ESF
Onondaga Lake Tributaries	1989	SBU,1989
Owasco Inlet/Outlet	1974	AVON
Owasco Outlet	1990	SBU,1990
Owasco Outlet	2002	SBU,2003
Sanders Creek	2002	SBU,2003
Scononddoa Creek	1976	AVON
Scononddoa Creek	1986	SBU,1987
Seneca River	1972	AVON
Seneca/Oswego Rivers	1972/1978	DOH
Skaneateles Creek	1972	AVON
Skaneateles Creek	1988	SBU,1988
Skaneateles Creek	1992	SBU,1993
Skaneateles Creek	2000	SBU,2001
Three Rivers System	1981	UFI
Virgil Creek	1987	SBU,1987
Watershed Streams	1989-1990	RIBS,1992
Watershed Streams	1995-1996	RIBS,1999

AVON	Avon Pollution Investigations Unit, Div. of Fish & Wildlife, NYS DEC
DOH	New York State Department of Health
ESF	SUNY College of Environmental Science & Forestry (Alexander Smith)
RIBS	Rotating Intensive Basin System, Statewide Waters Assessment Section, NYS DEC
SBU	Stream Biomonitoring Unit, Division of Water, NYS DEC
UFI	Upstate Freshwater Institute

Barge Canal

Multiplate sampling downstream of Wide Waters near Newark continues to indicate moderately impacted water quality, based on sampling in 1995 and 2001. The samples were inundated with zebra mussels. The herbicide EPTC was found in zebra mussel tissue at a concentration of 860 µg/kg at this site in 1996. Elevated levels of 4 PAHs were also recorded in the zebra mussels, at or exceeding the levels of concern for mollusks for these compounds.

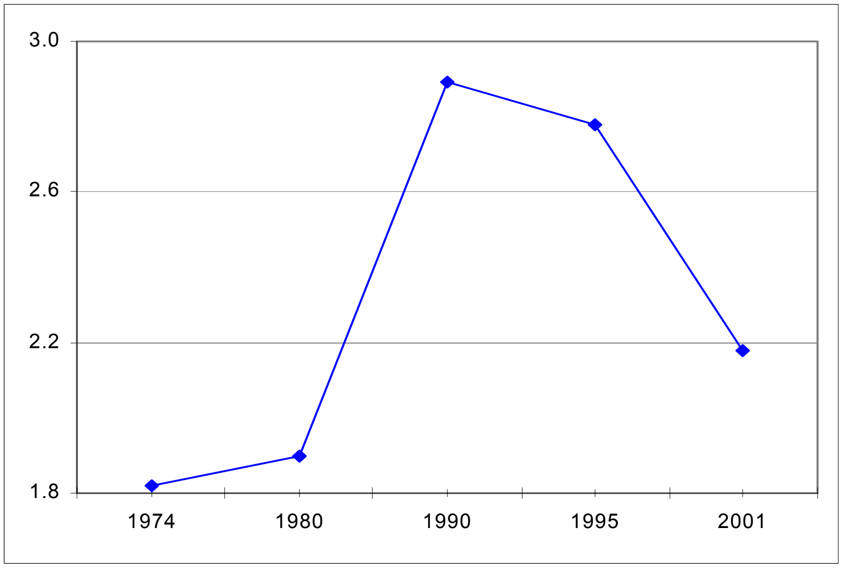


Figure 7-1. Species diversity in the Central Barge Canal below Clyde, 1974-2001.

Multiplate sampling of the Barge Canal directly downstream of the Clyde River at Clyde showed moderate impact in 2001, representing a decline in water quality (Figure 7-1). These samples were not influenced by zebra mussels. The high biotic index indicates impact from organic (decomposable) wastes. Sampling at this site in 1995 and 1990 showed only slight impact.

Severe impact is assessed for the Barge Canal at Port Byron, based on multiplate samples collected in 2001. This represents a decline in water quality, compared to assessments of moderate impact for the years 1974, 1980, and 1989. The cause of this difference is undoubtedly the arrival of zebra mussels in the canal in the early 1990's. One multiplate sample from 2001 contained over 21,000 zebra mussels, compared to average invertebrate densities at this site of less than 2000 individuals. The degree to which the 2001 samples reflect actual water quality versus macroinvertebrate population dynamics is undetermined.

Big Salmon Creek

Water quality was assessed is moderately impacted, based on macroinvertebrate sampling at Genoa in 1998 and 2000. Nonpoint source nutrient enrichment is considered the primary stressor.

Big Stream

Macroinvertebrate sampling was conducted in 2001 upstream of Dundee. Water quality was assessed as slightly impacted by nonpoint source nutrient enrichment. No prior data were available for this stream.

Black Creek

Water quality was assessed as slightly impacted, based on macroinvertebrate sampling at Bundy Crossing in 2001. ISD denoted nonpoint source nutrient enrichment as the primary stressor.

Bloody Brook

Water quality remains moderately impacted at most Bloody Brook sites. Six sites were sampled in 1994, and all sites were assessed as moderately impacted, with the exception of the most upstream site, which was assessed as severely impacted. Crayfish collected for tissue analysis showed elevated levels of cadmium, copper, mercury, and PCBs. The primary source was determined to be municipal/industrial and urban runoff. Mayflies are still entirely absent from the creek, and are looked for as an indicator of recovery.

Butternut Creek

Water quality is assessed as non-impacted, based on macroinvertebrate sampling at Jamesville in 1996 and 2001. The fauna contained a diversity of clean-water mayflies, stoneflies, and caddisflies.

Canada Creek

Based on macroinvertebrate sampling at Seiffert Corners in 2001, water quality was assessed as non-impacted. The fauna was dominated by clean-water mayflies.

Canandaigua Outlet

Sampling at Phelps Road in Canandaigua downstream of the Canandaigua (C) Sewage Treatment Plant has shown an apparent decline in water quality from 1990 to 2001 (Figure 7-2). Sampling at this site in 1990 documented improved conditions compared to previous years, with an assessment of slight impact. Sampling in 2001 found moderate impact, with a fauna composed almost entirely of caddisflies and midges. Further sampling is recommended at this site to determine if this decline is genuine.

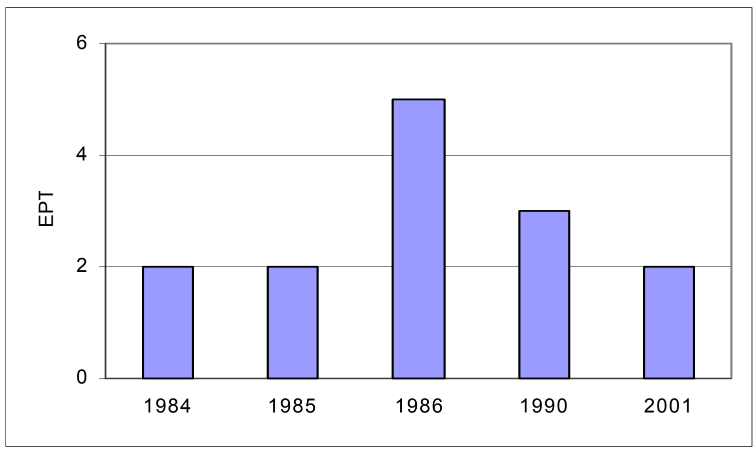


Figure 7-2. EPT trends (sensitive mayflies, stoneflies, and caddisflies), Canandaigua Outlet, Canandaigua, 1984-2001.

Water quality at Manchester did not change from 1990, being assessed as slightly impacted in 1995. In recent years the downstream site at Alloway has been monitored instead. Water quality at this site was determined to be slightly impacted by nonpoint sources, based on kick sampling in 1995 and 2001.

Canaseraga Creek

The downstream site at East Boston that was sampled in 1995 yielded an anomalous sample that was attributed to poor habitat, and considered invalid. A different site upstream at Sullivan was sampled in 1996, and this was assessed as slightly impacted, likely by nutrient enrichment.

Canastota Creek

Water quality at Canastota was assessed as moderately impacted in 2001, with toxicity being the primary stressor. This site was assessed as slightly impacted in 1995 and moderately impacted in 1990. Similar impacts had been documented previously by the NYS DEC Avon team in 1975.

Carpenter's Brook

This stream was sampled at Peru in 2001, and water quality was assessed as slightly impacted. Nonpoint source nutrient enrichment was the primary stressor.

Cascadilla Creek

This creek was sampled in 2001 at Lake Avenue and Madison Street in Ithaca. Water quality was assessed as slightly impacted, with the fauna dominated by filter-feeding caddisflies. The primary stressor is considered to be urban runoff.

Catharine Creek

Non-impacted water quality was assessed for this site in 1996 and 2001 samplings at Montour Falls. ISD denoted siltation as a stressor.

Cayuga Lake Inlet

Water quality was assessed as slightly impacted, based on 2001 macroinvertebrate sampling near Newfield Station. Nonpoint source nutrient enrichment was indicated to be the primary stressor.

Chittenango Creek

Slightly impacted water quality has been assessed for all years sampled in Chittenango Creek: 1990, 1995, 1996, and 2001. Nonpoint source nutrient enrichment is the primary stressor. Macroinvertebrate species richness was very low in these samples.

Cold Brook

Water quality is assessed as slightly impacted for this stream, based on macroinvertebrate sampling at Hammondsport in 2001. Nonpoint source nutrient enrichment was indicated to be the primary stressor.

Coldspring Brook

This stream was sampled in Weedsport at Oakland Street in 2001. Water quality was assessed as moderately impacted. The macroinvertebrate fauna was dominated by scuds and caddisflies, and ISD denoted municipal/industrial type of wastes as the primary stressor. Specific conductance at this site was very high, measured at 3380 µmhos, and is likely related to the impact.

Cowaselon Creek

Based on a 1996 kick sample taken at Canastota , water quality was assessed as moderately impacted. Poor habitat is a probable influence on the fauna at this site. Previous sampling in 1990 also found moderate impact. The Canastota (V) Water Pollution Control Facility discharge is the apparent cause of impact.

Crane Brook

Severe impact was documented in Crane Brook near Montezuma in 2002 macroinvertebrate sampling. A potato processing plant discharge was the cause of the impact. Specific conductance at the site was 6979 µmhos/cm, and dissolved oxygen was 0.8 mg/l. Upstream of this site, water quality was assessed as slightly impacted by nonpoint source nutrient enrichment. This problem is expected to be remediated in the near future.

Figure 7-3. Crane Brook near Montezuma, 2002.

Dead Creek

Moderately impacted water quality was assessed for this stream, based on macroinvertebrate sampling near Baldwinsville in 2001. The stream was small and sluggish, and had high specific conductance. ISD denoted nonpoint source nutrient enrichment as the primary stressor.

Decker Brook

This stream was sampled in Moravia in 2001. Water quality was assessed as slightly impacted, but very near the range of non-impact. ISD denoted nonpoint source nutrient enrichment as the likely stressor, but the impact is considered to be minor.

Dresserville Creek

Non-impacted water quality was assessed for this stream, based on macroinvertebrate sample in Moravia in 2001. The fauna was dominated by clean-water mayflies.

Dutch Hollow Brook

Water quality in Dutch Hollow Brook has ranged from non-impacted to slightly impacted over 5 samplings from 1993-2001. Most sampling has been conducted at the upstream location of Niles. Water quality here was assessed as non-impacted in 1993, 1999, and 2000, and slightly impacted in 1994 and 1998. Overall, this site is considered non-impacted. Downstream sites sampled above and below Owasco in 1993 and 2001 were also assessed as non-impacted.

Fall Creek

Following the initial sampling of 6 sites from Red Mills to Ithaca in 1987, only the site downstream of Ithaca Falls has been sampled since. Water quality at this site was assessed as slightly impacted in 1995 and 1996, and non-impacted in 2001. In 1995, lead was measured in crayfish tissue at a level of 5.9 µg/g, above the provisional level of concern of 4 µg/g for this organism. Based on the most recent sampling, current water quality is assessed as non-impacted, representing an improvement from 1987, but continued monitoring is recommended to verify this.

Fish Creek

Based on macroinvertebrate sampling at Vienna and on the West Branch at Blossvale in 1995 and 2001, non-impacted water quality was indicated for Fish Creek. The macroinvertebrate fauna included a high number of intolerant mayflies, stoneflies, and caddisflies. A downstream site was sampled for macroinvertebrates at Fish Creek Landing in 2002. Using sandy stream criteria to account for the low-gradient habitat and fine-sediment substrate at this site, slight impact was indicated.

Flint Creek

Most of Flint Creek is assessed as slightly impacted, based on sampling of 7 sites in 2002. Previous sampling at Phelps in 1995 and 1996 also found slight impact. The middle reach from Cole Corners to Stanley is assessed as moderately impacted, likely due to a combination of agricultural runoff, point sources such as the Gorham (T) Sewage Treatment Plant, and the influence of a large swampy area above Cole Corners. A site sampled upstream at Italy was assessed as non-impacted.

Ganargua Creek

Current water quality in Ganargua Creek is mostly assessed as slightly impacted, based on macroinvertebrate sampling of 6 mainstream sites and 4 tributary sites in 1996. Moderate impact was documented in two short reaches of the stream - one downstream of the Farmington (T) Sewage Treatment Plant and the Victor (V) Sewage Treatment Plant, and the other downstream of the Newark (V) Wastewater Treatment Facility.

Slight impact at the Macedon site, from nonpoint source nutrient enrichment, represents a decline in water quality compared to macroinvertebrate data from 1974 and 1980, when this site was used as an example of non-impacted conditions. Ganargua Creek has its headwaters in the town of Victor, a rapidly growing suburb of Rochester. In the 1980's and 1990's, development increased along the creek, including the construction of a golf course. Sampling in 1995, 1996, 2001 and 2002 confirmed the enriched conditions at this site from upstream development. The stream is typical of many in the State, in which non-impacted sites are becoming slightly impacted through development and nonpoint source nutrient enrichment.

Moderate impact at Mud Mills, downstream of the Newark (V) Wastewater Treatment Facility also represents a worsening of water quality compared to 1974 and 1980 data, when this reach was assessed as slightly impacted.

<u>Geddes Brook</u>

Geddes Brook was sampled at Camillus in 2001 and assessed as slightly impacted by municipal/industrial stressors. This represents an apparent improvement from conditions documented in 1989, when the fauna was heavily dominated by tolerant worms and sowbugs, and was assessed as moderately impacted. The reason for the improvement has not been determined.

<u>Great Brook</u>

Based on sampling in 2001, water quality was assessed as moderately impacted upstream of the Victor (V) Sewage Treatment Plant. This site had been assessed as slightly impacted in 1996. Downstream of the STP, water quality was assessed in 1996 as moderately impacted by sewage effluent.

<u>Grout Brook</u>

This stream was sampled at Grout Mill in 2001 and water quality was assessed as slightly impacted. ISD denoted nonpoint source nutrient enrichment as the primary stressor. No prior data were available for this stream.

<u>Harbor Brook</u>

Water quality remains severely impacted at this tributary to Onondaga Lake, based on 2001 macroinvertebrate sampling. The fauna consisted almost entirely of tolerant worms and midges. A 1995 kick sample indicated moderate impact, but the actual change in fauna was small. ISD denoted municipal/industrial discharges and decomposable wastes as the primary causes of impact.

<u>Keuka Lake Outlet</u>

Based on sampling in 1995 and 2001 at Dresden , water quality was assessed as slightly impacted, mostly by nonpoint source nutrient enrichment. These assessments are similar to those of sampling in 1989 and 1990.

<u>Ley Creek</u>

Water quality was assessed as moderately impacted, based on kick sampling in 1995 and 2001 at Mattydale. Toxicity was determined to be the primary cause of the impact. This represents an improvement from 1989-90, when the site was assessed as severely impacted. Samples from 1995 and 2001 each contained two species of caddisflies. None were found in the 1989 and 1990 samples. Mayflies are still not found at this site, and are looked for as an indicator of continuing improvement.

Limestone Creek

Water quality at Fayetteville is assessed as slightly impacted, mostly by nonpoint source nutrient enrichment, based on 1996 kick sampling, similar to results of sampling in 1990. In the 2001 sampling, a site further downstream at Minoa was sampled, and was determined to be moderately impacted, probably by decomposable wastes. Although this is downstream of the discharge of the Minoa (V) Sewage Treatment Plant, the impact more likely reflects effects of discharges from the larger Onondaga County Meadowbrook-Limestone Wastewater Treatment Facility, located upstream of Minoa. The plant is reported to be frequently in violation of their permit.

Little Salmon River

The 1996 kick sample taken at Little Hollow was assessed as non-impacted, although definite nonpoint nutrient enrichment was evident. No prior data were available for this stream.

Logan Creek

Water quality was assessed as non-impacted for this stream, based on 2001 sampling in Burdett. The habitat was largely bedrock, but harbored a diversity of clean-water mayflies, stoneflies, and caddisflies.

Mad River

Water quality was clearly non-impacted at this site, based on samplings in 2001 and 2002 at Camden. An exemplary macroinvertebrate fauna was present, and the habitat was very good.

Mill Creek (Seneca County)

Non-impacted water quality was assessed for this site, based on macroinvertebrate sampling in 2001 at Lodi. The fauna was dominated by clean-water mayflies and caddisflies, with stoneflies, riffle beetles, dragonflies, and hellgrammites also present.

Mud Creek

This tributary of Ganargua Creek was assessed as slightly impacted in 2001 at the site upstream of the Farmington STP in East Victor. Water quality had been assessed as non-impacted in 1996 sampling. Downstream of the STP water quality was assessed as moderately impacted by municipal/industrial wastes. Elevated levels of ammonia and/or chlorine may be primary causes of impact.

Murray Brook

Water quality was assessed as slightly impacted by nonpoint source nutrient enrichment, based on macroinvertebrate sampling in 2001 at North Bay. A high diversity of organisms was present, and water quality impairments were considered to be minor.

Naples Creek

Water quality is assessed as slightly impacted for this stream, based on sampling near Naples in 2001. The impact may reflect impoundment effect, and is not considered substantial. A good diversity of macroinvertebrates was present, including mayflies, stoneflies, and caddisflies. However many worms and scuds were also present, likely reflecting high levels of silt and algae.

A similar situation was found in 1996 sampling, although the metrics from that sampling was within the range of non-impacted water quality.

Nettle Valley Creek

This small tributary of Flint Creek was assessed as slightly impacted in a 2002 macroinvertebrate sampling. ISD denoted nonpoint source nutrient enrichment as the primary factor affecting the fauna.

Ninemile Creek

Water quality in Ninemile Creek at Lakeland remains severely impacted, based on macroinvertebrate sampling in 2001. The fauna was heavily dominated by tolerant midges and worms, and ISD denoted sewage wastes as the primary stressor. This site was also assessed as severely impacted in 1989-90. The site was sampled in 1995, and metrics were within the range of moderate impact. Poor habitat is also a factor at the site.

Oneida Creek

Water quality monitoring in Oneida Creek has been continued at the Durhamville site. Water quality continues to be assessed as slightly impacted at this site, based on kick samples taken in 1995, 1996, and 2001. Nonpoint source nutrient enrichment and possible toxicity were indicated.

Oneida River

Based on multiplate sampling in 1995 and 2001 above Three Rivers, water quality was assessed as slightly impacted. Several species of mayflies and caddisflies were found at this site, and zebra mussels were numerous in the August sample. Multiplate sampling near here in 1978 also yielded assessments of slight impact.

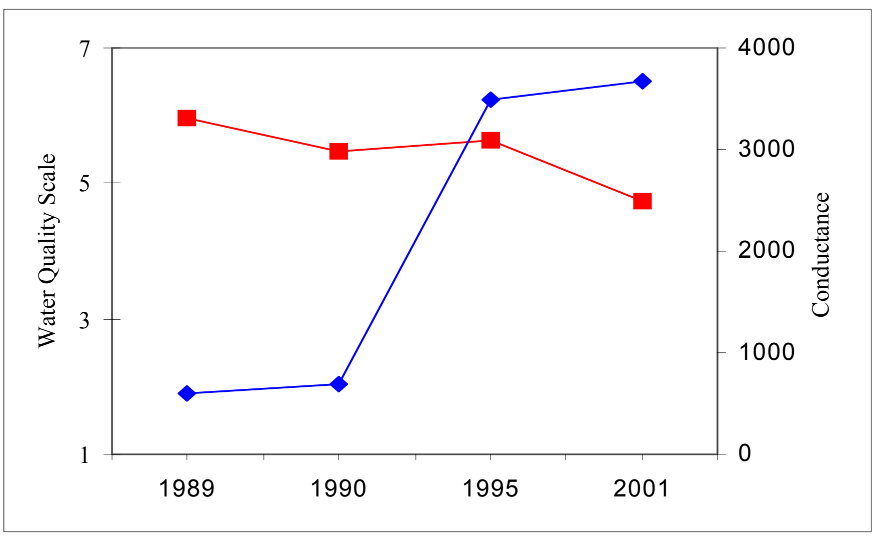


Figure 7-4. Water quality (red) vs. conductance (blue) in upper Onondaga Creek at Cardiff, 1989-2001.

Onondaga Creek

Current water quality at Cardiff is assessed as moderately impacted, representing an apparent decline from previous findings (Figure 7-4). Slight impact had been indicated by the kick sampling in 1989, 1990, and 1995. High turbidity and high conductivity from mud boils continue to be the primary factors influencing the invertebrate fauna. Continued monitoring of this site is recommended to verify the apparent decline.

The water quality of Onondaga Creek at Spenser Street in Syracuse continues to be severely impacted by municipal/industrial sources, based on 2001 kick sampling. The macroinvertebrate fauna was composed entirely of tolerant worms and midges. This site was previously assessed as moderately impacted in 1995, and severely impacted in 1989-90. Combined sewer overflows are the likely cause of impairment.

Oswego River

Slight impact was determined for the Minetto site, based on three month's multiplate samples in both 1995 and 2001. Zebra mussels were found here, and were likely responsible for the increase in water clarity compared to previous years. The assessment represents no change from water quality documented in 1990 sampling.

Owasco Inlet

Owasco Inlet was assessed as slightly impacted in 2001, based on sampling at Moravia. ISD denoted nonpoint source nutrient enrichment as the likely stressor.

Owasco Outlet

Water quality in Owasco Outlet is currently assessed as slightly impacted at all sites, representing a substantial improvement compared to conditions documented in 1990 (Figure 7-5). Of the 6 sites sampled from Auburn to North Port Byron in 2002, 4 had been assessed as moderately impacted in 1990. Most of the improvement is linked to substantial improvements in the Auburn (C) Sewage Treatment plant, upgraded in 1995. The new treatment includes activated sludge treatment, phosphorus removal, post-aeration, and UV disinfection. A notable indicator of improved water quality in the stream is the mayfly populations which now comprise 8-17% of the fauna, compared to 1990 when they were 0-4% of the fauna.

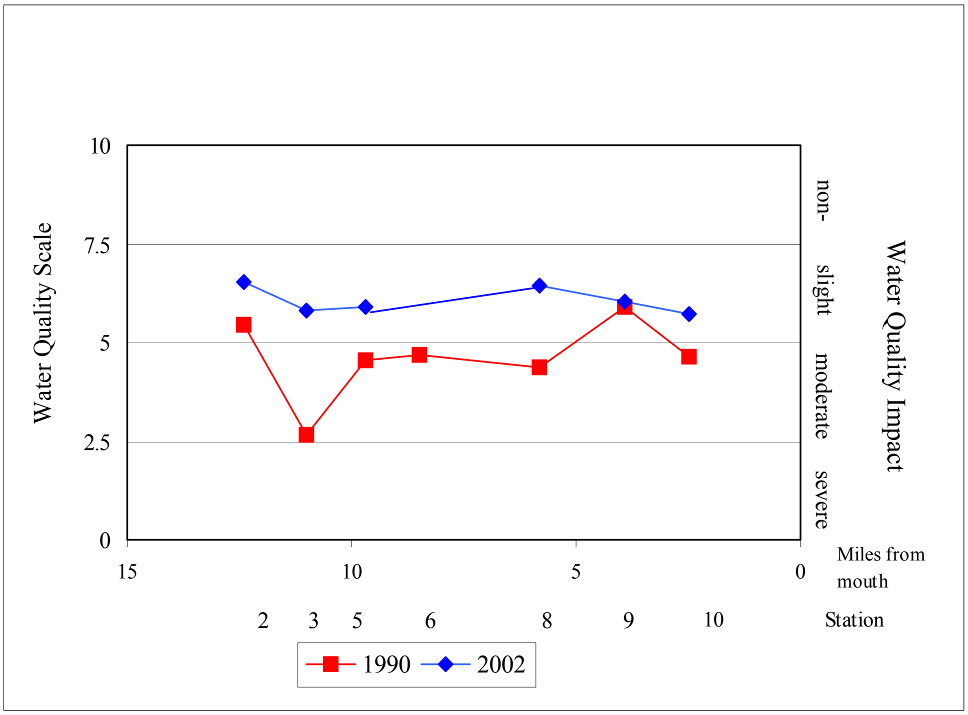


Figure 7-5. Water quality in Owasco Outlet, Auburn to North Port Byron, 1990 and 2002.

Pools Brook

The site at Mycenae was a moss-dominated headwater habitat, and resulted in anomalous community indices. The overall assessment of non-impacted water quality was based on the similarity to other invertebrate communities with similar habitat conditions. The fauna was heavily dominated by scuds, and the indices were not considered representative of actual water quality.

Figure 7-6. Owasco Outlet at North Port Byron, 2002.

Putnam Brook

Putnam Brook was assessed as slightly impacted in 2001, based on sampling at North Weedsport. ISD denoted nonpoint source nutrient enrichment as the likely stressor.

Red Creek

Water quality of Red Creek is assessed as slightly impacted, based on macroinvertebrate sampling at Palmyra in 2001. The stream carried an abundance of duckweed, indicating pond-like conditions upstream, and this likely was a major factor influencing the fauna. Specific conductance was high at this site: 1762 μmhos/cm.

Rock Stream

Water quality was assessed as non-impacted for this stream, based on macroinvertebrate sampling in 2001. This was a small bedrock stream in a gorge-like setting. Productivity was low, but the fauna was diverse and well-balanced.

Salmon Creek

Water quality is assessed as slightly impacted, based on macroinvertebrate sampling at Ludlowville in 2001. ISD denoted siltation and nonpoint source nutrient enrichment as the primary stressors. A previous kick sample in 1996 was field-assessed as non-impacted, but this sample was not retained for laboratory processing.

Sawmill Creek (Onondaga County)

Water quality at Liverpool was determined to be moderately impacted, probably by toxic discharges, based on kick sampling in 1995 and 2001. This assessment is the same as the 1989 assessment.

Sawmill Creek (Schuyler County)

This small tributary of Seneca Lake was assessed as slightly impacted, based on macroinvertebrate sampling in 2001 near the mouth at Hector. The assessment of impact may be an anomaly, as the fauna consisted almost entirely of clean-water species. Low species richness may be a function of the substrate of loose slate and rubble. No prior data were available for this stream.

Sconondoa Creek

Water quality in Sconondoa Creek is currently assessed as slightly impacted. The site in Sherrill was sampled in 2002 and assessed as slightly impacted by nonpoint sources, as in 1986. The downstream site at Oneida Castle was sampled in 1986, 1995, and 2001. All samplings indicated slight impact from nonpoint sources. Siltation may also be an influence on the invertebrate fauna. No change in water quality is indicated for the past ten years.

Scriba Creek

Non-impacted water quality was assessed for this stream, based on macroinvertebrate sampling at Constantia in 2002. Sampling at this site in 2001 yielded an assessment of slight impact. No prior data were available for the stream.

Seneca River

Moderate impact is assessed for the Seneca River at Seneca Falls, based on multiplate sampling in 2001. This represents a decline compared to results of sampling in 1989-1990 (Figure 7-7). The fauna was comprised almost entirely of facultative and tolerant midges. The cause of the decline is unknown.

Water quality at Jacks Reef is assessed as moderately impacted, based on multiplate sampling in 1995 and 2001. Species richness was low, and mayflies and caddisflies were rare. This represents a decline from 1989-90 conditions, and may be related to heavy zebra mussel populations. Depletion of dissolved oxygen levels in this reach due to high zebra mussel densities was documented by Effler and Siegfried (1994). Chlorpyrifos was detected in the zebra mussel tissue collected at this site in 1996 at a concentration of 510 µg/kg; any detectable quantities of the organophosphate pesticides are considered to be of concern.

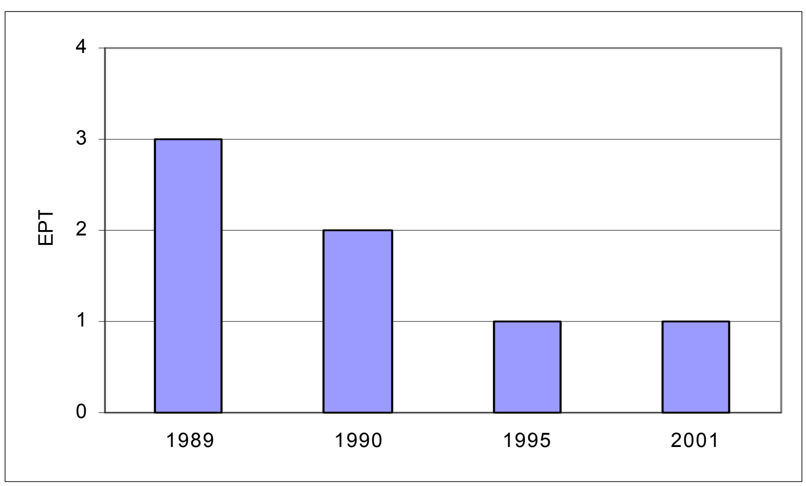


Figure 7-7. EPT trends (sensitive mayflies, stoneflies, and caddisflies), Seneca River at Jacks Reef, 1989-2001.

Sixmile Creek

Non-impacted water quality was indicated for this stream, based on macroinvertebrate sampling in Ithaca in 2001. The fauna was dominated by clean-water mayflies. No prior data were available for the stream.

Skaneateles Creek

Slight impact from nonpoint sources was indicated in sampling in Jordan in 1995, 1996, and 2001. This is also consistent with macroinvertebrate sampling at this site in 1992. Crayfish collected at this site in 1995 contained 0.55 µg/g of mercury, above the level of concern of 0.30 µg/g for this organism.

Skaneateles Creek biota have been documented with elevated levels of PCBs for many years. Intensive sampling of crayfish at several sites in Skaneateles Junction in 2000 pinpointed the apparent source of the PCBs, and remediation efforts are underway..

Stony Creek

Slightly impacted water quality was assessed for this sluggish nutrient-rich stream near Verona Mills, based on sampling in 1996 and 2001. Algae was abundant in the stream, and the macroinvertebrate community was dominated by filter-feeding caddisflies and midges.

Sucker Brook

This tributary of Owasco Lake is assessed as slightly impacted by nonpoint source nutrient enrichment, based on macroinvertebrate sampling at Auburn in 2001. Algal-feeding riffle beetles dominated the fauna. No prior data were available for the stream.

Sugar Creek

Non-impacted water quality is assessed for this tributary of Keuka Lake. A macroinvertebrate sample was taken in Branchport in 2001, yielding a diverse fauna of clean-water organisms. No prior data were available for the stream.

Taughannock Creek

Water quality was assessed as slightly impacted for this stream in Taughannock Falls State Park, based on sampling in 2001 near the mouth at Cayuga Lake. Rocks were covered with diatoms, and nonpoint source nutrient enrichment was indicated as the primary stressor.

Virgil Creek

Water quality upstream of Freeville was assessed in 2001 as slightly impacted by nonpoint source nutrient enrichment. This represents an apparent decline in water quality compared to 1987 sampling, when non-impacted water quality was documented from Dryden to Freeville. Further monitoring at this site is recommended to verify the apparent decline.

Waterhouse Creek

Slightly impacted water quality was assessed for this stream, based on macroinvertebrate sampling in Fulton in 2001. Urban runoff and siltation were the likely stressors affecting the fauna. No prior data were available for this stream.

West Onondaga Creek

Based on macroinvertebrate sampling at South Onondaga in 2001, water quality was assessed as slightly impacted. Mayflies and stoneflies were present in the fauna, but filter-feeding caddisflies were overwhelmingly dominant. ISD denoted nonpoint source nutrient enrichment as the primary stressor.

West River

Water quality at Middlesex was assessed as moderately impacted, based on a 1996 kick sample. Nonpoint sources were the likely cause of the impact. No prior data were available for this stream.

Wood Creek

Water quality for this stream, sampled at Seifert Corners, is assessed as slightly impacted, based on sampling in 2001. The primary stressors include nonpoint source nutrient enrichment, siltation, and likely decomposable wastes. Habitat is also a mitigating factor at this stream, which is mostly composed of runs rather than riffles. This site was sampled in 1996 and water quality was assessed as severely impacted, but this assessment is considered non-representative. Dissolved oxygen measured at midday in the 1996 sampling was only 4.5 ppm, possibly attributable to upstream wetlands. An upstream site in Rome was sampled in 2002, and was also found to be slightly impacted, likely from urban runoff.

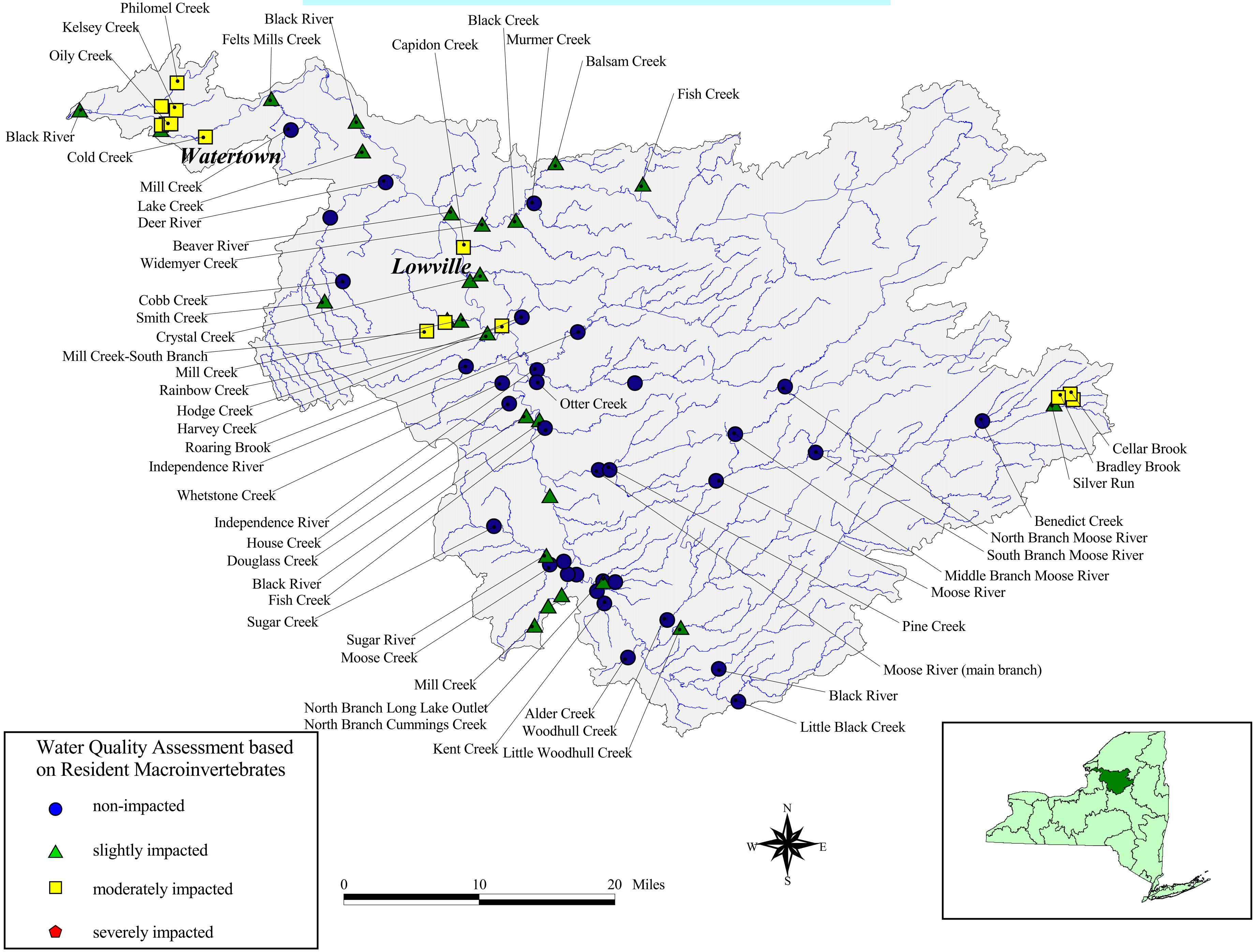
Yawger Creek

Yawger Creek was sampled extensively from 1993 to 2001 in a nonpoint source study. All assessments at the Cross Roads site have indicated slight impact, with the exception of 1999, when the metrics fell within the range of moderate impact. The watershed is predominantly agricultural, and nonpoint source nutrient enrichment is the major stressor affecting the fauna.

Literature cited:

Effler, S. W., and C. Siegfried. 1994. Zebra mussel (*Dreissena polymorpha*) populations in the Seneca River, New York: impact on oxygen resources. Environ. Sci. Technol. 28(12): 2216-2221.

Black River Drainage Basin



BLACK RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED							
ALDER CREEK (ALDR)									
01	Alder Creek, below Egypt Rd bridge								02
BALSAM CREEK (BALS)									
01	Near Belfort, Erie Canal Rd.						96		02
BEAVER RIVER (BLCK)									
09	Above Crogham, Indian River Rd bridge	76	82						
10	Naumburg, at Van Amber Rd bridge	76	82		91	92		97	02
BENEDICT CREEK (BENE) (Hamilton County)									
01	The Plains, Otter Brook Rd.								02
BLACK CREEK (BLAC)									
01	Croghan, below Rt. 126 bridge						96		02
BLACK RIVER (BLCK)									
A	Enos, below Enos Rd./ Bellingertown Rd.						96		
B	Hawkinsville, above Hawkinsville Rd. bridge						96	97	02
00	Boonville, Moose River Rd, Norton Rd				91				
01	Port Leyden, above Davis Rd bridge	76	82			92		97	02
04A	Lyons Falls, above lagoon discharge						96		
04B	Lyons Falls, below lagoon discharge						96		
04	Greig, Burdicks Crossing Rd bridge	76	82	86	91				02
05	Below Glenfield, above Whetstone Creek confl	76							
05A	Below Glenfield, below Roaring Brook confl		82						
06	Above Lowville, Number Four Rd bridge	76	82						
07	Below Lowville, Rte 26A bridge	76	82					97	02
08	Castorland, above Beaver River confl	76	82						
11	Above Carthage, above village line	76	82						
12	Below Carthage, above Herring dam	76	82			92		97	02
13	Below Deferiet, below dam	76	82						
14	Above Watertown, Duffey Rd	76	82						

BLACK RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED							
BLACK RIVER (BLCK) cont'd.									
15	In Watertown, Vanduzee St bridge	76		82		91			
16	Below Dexter, below Rt. 180 bridge	76		82	86	91		97	02
17	Black River Bay, from mouth	76							
BRADLEY BROOK (SLVR)									
03	Arietta, above Silver Run confluence		80						02
CAPIDON CREEK (CDON)									
01	Naumburg, Van Amber Rd								02
CELLAR BROOK (SLVR)									
02	Arietta, above Silver Run		80						02
COBB CREEK (COBB)									
01	Bellwood, below Cobb Rd								02
COLD CREEK (COLC)									
01	East Watertown, above Ridge Rd bridge								02
CRYSTAL CREEK (CRYS)									
01	below New Bremen, below VanAmber Rd. bridge						96		
CUMMINGS CREEK (CMMG)									
02	Hawkinsville, below Cummings Rd								02
CUMMINGS CREEK, NORTH BRANCH (CMMG)									
01	Hawkinsville, below Smith Rd bridge								02
DEER RIVER (DEER)									
00	Liberty Corners, above McDonald Rd bridge								02
01	Copenhagen, above Rt. 12 bridge						96		02
02	Deer River, above Rt.26 bridge						96		02
DOUGLASS CREEK (DOUG)									
01	Greig, below Rte 12 bridge								02
FELTS MILLS CREEK (FELT)									
01	Felts Mills, above Rt. 3 bridge						96		02
FISH CREEK (FSHB)									
01	near Eagle Falls, off Fish Creek Rd								02

BLACK RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED					
FISH CREEK (FSHC)							
01	Grieg, Fish Creek Rd.,off Grieg Rd. at DEC fishing access			96			02
HARVEY CREEK (HARV)							
01	Bushes Landing, below culvert crossing #4 Rd						02
HODGE CREEK (HODG)							
01	Bushes Landing, #4 Rd						02
HOUSE CREEK (HOUS)							
01	Glenfield, above Lover's Lane bridge						02
INDEPENDENCE RIVER (INDY)							
01	Sperryville, McPhilmy Rd. bridge; dead end at river			96			
02	Pine Grove, near Otter Creek, below Pine Grove Rd. bridge			96			02
KELSEY CREEK (KLSY)							
02	Watertown, below Rte 37 bridge		91			00	02
04	Watertown, below Rte 12 bridge		91			00	02
05	Watertown, above Railroad bridge at Rte 12E		91	96		00	02
KENT CREEK (KNTC)							
01	Hawkinsville, below LaChausse/Hays Rd bridge						02
LAKE CREEK (LKCR)							
01	West Carthage, above Lumburg Forks Rd						02
LITTLE BLACK CREEK (LBLK)							
01	Bardwell Mills, Roberts Rd. bridge at DEC fishing access			96			02
LITTLE WOODHULL CREEK (LWDH)							
01	Woodhull at Anos Siding, above Kincaid Rd. bridge;below spillway			96			02
MILL CREEK (MILB)							
00	Above Boonville, below Murry Hill Rd.				97		
01	Above Boonville, Route 294	86		96	97		
02	Boonville, Sargent Rd., near Sargent Furniture	86			97		
05	Below Boonville, Devoe Road		91	96	97		02

BLACK RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED						
MILL CREEK (MLBL)								
01	Great Bend, below Austin Rd bridge							02
MILL CREEK (MLLL)								
04	Lowville, below E. State Street bridge					97		02
MILL CREEK, NORTH BRANCH (MLLL)								
02	North Branch - Lowville, below Cemetery St. bridge					97		02
MILL CREEK, SOUTH BRANCH (MLLL)								
01	South Branch -West Martinsburg, below West Rd. bridge					97		
03	South Branch - Lowville, below Cemetery Rd. bridge					97		
MOOSE CREEK (MOOC)								
01	Talcottville, below East Rd. bridge				96			02
MOOSE RIVER, UPPER (MOOS)								
03	Above McKeever, above Rt.28 bridge				96			
04	Fowlersville, above Fowlerville Rd. bridge				96	97		02
MOOSE RIVER, LOWER (BLCK)								
03	Lyonsdale, above Lowdale Rd. bridge	76	82					
04	Above Lyons Falls	76	82	91				
MOOSE RIVER, MIDDLE BRANCH (MOOS)								
01	Webb, off Minnehaha Rd.; off Rt. 28				96			02
MOOSE RIVER, NORTH BRANCH (MOOS)								
00	Old Forge, Thendara Golf Course							02
MOOSE RIVER, SOUTH BRANCH (MOOS)								
02	Near Old Forge, above Bisby Rd. bridge				96			02
MURMUR CREEK (MURM)								
01	Near High Falls, under Belfort Rd. bridge				96			02
NORTH BRANCH LONG LAKE OUTLET (NBLL)								
01	Boonville, below Smith Rd. bridge (culvert)				96			
OILY CREEK (KLSY)								
03	Watertown, Morrison Ave, above Kelsey Ck						00	02
03A	Watertown, LeRay Ave, access via trailer park						00	02

BLACK RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED		
OTTER CREEK (OTTR)				
00	Brantingham, off Partridgeville Rd			02
01	Otter Creek, above the Pine Grove Rd. bridge		96	02
PHILOMEL CREEK (PHIL)				
02	Pamelia Center, below Rte 37 bridge			02
03	Pamelia Center, below Rte 12 bridge			02
PINE CREEK (PINC)				
01	Fowlersville, above Youngs Rd bridge			02
RAINBOW CREEK (RBOW)				
01	Lowville, above E. Martinsburg Rd			02
ROARING BROOK (ROAR)				
01	Martinsburg, above Rt. 26 bridge		96	02
SILVER RUN (SLVR)				
01	Arietta, above Cellar Brook confluence	80		02
04	Arietta, entrance to Moose River rec.area	80	96	02
SMITH CREEK (SMTH)				
01	Bellwood, below Rte 177			02
SUGAR RIVER (SUGR)				
00	Constableville, above Highmarket St bridge			02
01	Talcottville, above Denly Rd. bridge		96	02
02	near Port Leyden, above Rt. 12 bridge		96	
WHETSTONE CREEK (WHET)				
01	Glendale, above Glendale Rd. bridge		96	02
WIDMYER CREEK (WDMR)				
01	Beaver Falls, above Rte 126			02
WOODHULL CREEK (WDHL)				
01	above Woodhull, below Horton Rd.bridge		96	02

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE BLACK RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Alder Creek, Alder Creek	non-impacted	no prior data
Balsam Creek, near Belfort	slightly impacted	no prior data
Beaver River, Naumburg	slightly impacted	no change
Benedict Creek, The Plains	non-impacted	no prior data
Black Creek, Croghan	slightly impacted	no prior data
Black River, Enos	non-impacted	no prior data
Black River, Hawkinsville	non-impacted	no prior data
Black River, Port Leyden	slightly impacted	no change
Black River, Greig	slightly impacted	no change
Black River, Lowville	slightly impacted	no change
Black River, Carthage	slightly impacted	no change
Black River, Dexter	slightly impacted	**IMPROVED**
Bradley Brook, Arietta	moderately impacted	no change
Capidon Creek, Naumburg	moderately impacted	no prior data
Cellar Brook, Arietta	moderately impacted	no change
Cobb Creek, Bellwood	non-impacted	no prior data
Cold Creek, East Watertown	moderately impacted	no prior data
Crystal Creek, below New Bremen	slightly impacted	no prior data
Cummings Creek, Hawkinsville	non-impacted	no prior data
Cummings Creek, North Branch, Hawkinsville	slightly impacted	no prior data
Deer River, Liberty Corners	non-impacted	no prior data
Deer River, Copenhagen	non-impacted	no prior data
Deer River, Deer River	non-impacted	no prior data
Douglass Creek, Greig	slightly impacted	no prior data
Felts Mills Creek, Felts Mills	slightly impacted	no prior data
Fish Creek, near Eagle Falls	slightly impacted	no prior data
Fish Creek, Greig	non-impacted	no prior data
Harvey Creek, Bushes Landing	non-impacted	no prior data
Hodge Creek, Bushes Landing	moderately impacted	no prior data
House Creek, Glenfield	non-impacted	no prior data
Independence River, Sperryville	non-impacted	no prior data
Independence River, Pine Grove	non-impacted	no prior data
Kelsey Creek, Watertown, below Rt. 37	moderately impacted	no change

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE BLACK RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Kelsey Creek, Watertown, below Rt. 12	moderately impacted	**IMPROVED**
Kelsey Creek, Watertown, above RR bridge at Rt. 12E	moderately impacted	**IMPROVED**
Kent Creek, Hawkinsville	non-impacted	no prior data
Lake Creek, West Carthage	slightly impacted	no prior data
Little Black Creek, Bardwell Mills	non-impacted	no prior data
Little Woodhull Creek, Woodhull	slightly impacted	no prior data
Mill Creek, above Boonville, Murry Hill Rd	slightly impacted	no prior data
Mill Creek, above Boonville, Rt. 294	slightly impacted	**DECLINED**
Mill Creek, Boonville, Sargent Rd.	slightly impacted	no change
Mill Creek, Boonville, DeVoe Rd.	non-impacted	**IMPROVED**
Mill Creek, Great Bend	non-impacted	no prior data
Mill Creek, Lowville	slightly impacted	no prior data
Mill Creek, North Branch, Lowville	slightly impacted	no prior data
Mill Creek, South Branch, West Martinsburg	moderately impacted	no prior data
Mill Creek, South Branch, Lowville	moderately impacted	no prior data
Moose Creek, Talcottville	non-impacted	no prior data
Moose River, near McKeever	non-impacted	no prior data
Moose River, Fowlersville	non-impacted	no prior data
Moose River, Middle Branch, Webb	non-impacted	no prior data
Moose River, North Branch, Old Forge	non-impacted	no prior data
Moose River, S. Branch, near Old Forge	non-impacted	no prior data
Murmur Creek, near High Falls	non-impacted	no prior data
North Branch Long L. Outlet, Boonville	non-impacted	no prior data
Oily Creek, Watertown, Morrison Ave	moderately impacted	no prior data
Oily Creek, Watertown, LeRay Ave	moderately impacted	no prior data
Otter Creek, Brantingham	non-impacted	no prior data
Otter Creek, Otter Creek	non-impacted	no prior data
Philomel Creek, Pamelia Center, below (first) Rt 37 bridge	moderately impacted	no prior data
Philomel Creek, Pamelia Center, below Rt 12 bridge	moderately impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE BLACK RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Pine Creek, Fowlersville	non-impacted	no prior data
Rainbow Creek, Lowville	slightly impacted	no prior data
Roaring Brook, Martinsburg	non-impacted	no prior data
Silver Run, Arietta, Rt 12, Campsite 2, area 4	slightly impacted	**DECLINED**
Silver Run, Arietta, opposite wetland	moderately impacted	no change
Smith Creek, Bellwood	slightly impacted	no prior data
Sugar River, Constableville	non-impacted	no prior data
Sugar River, Talcottville	slightly impacted	no prior data
Sugar River, near Port Leyden	non-impacted	no prior data
Whetstone Creek, Glendale	non-impacted	no prior data
Widmyer Creek, Beaver Falls	slightly impacted	no prior data
Woodhull Creek, above Woodhull	non-impacted	no prior data

REPORTS OF MACROINVERTEBRATE SURVEYS WITHIN THE BLACK RIVER WATERSHED

STREAM	YEAR OF SURVEY	REPORT
Black River	1973	EPA,1974
Kelsey Creek	1991	SBU,1991
Kelsey Creek	2000	SBU,2001
Mill Creek	1975	AVON
Mill Creek	1997	SBU,1997
Watershed Streams	1991-1992	RIBS,1994

AVON	Avon Pollution Investigations Unit, Div. of Fish & Wildlife, NYS DEC
DOH	New York State Department of Health
EPA	United States Environmental Protection Agency
RIBS	Rotating Intensive Basin System, Statewide Waters Assessment Section, NYS DEC
SBU	Stream Biomonitoring Unit, Division of Water, NYS DEC

Alder Creek

This stream was sampled for macroinvertebrates in 2002. A diversity of clean-water macroinvertebrates were found, and water quality was field-assessed as non-impacted. No prior data were available for the stream.

Balsam Creek

Water quality is currently assessed as slightly impacted for this stream. The 1996 sample was taken at Erie Canal Road near Belfort. The stream was mostly sandy, except for a “swimmer’s dam” of rubble, where the kick sample was taken. Filamentous algae and moss were covering many rocks. The invertebrate fauna consisted mostly of clean-water organisms, dominated by caddisflies and midges. Water quality indices placed the assessment as slightly impacted, but habitat is a partial factor in this assessment.

Beaver River

Assessments at the site near Naumburg have consistently remained at slightly impacted since 1976. Multiplate samples are dominated by filter-feeding black fly larvae, midges, and caddisflies, indicating effects of nutrient enrichment. Upstream discharges include septic discharges from Beaver Falls and discharges from two paper mills at Beaver Falls.

Benedict Creek

This remote stream was sampled for macroinvertebrates in 2002. A diverse macroinvertebrate fauna was found, and water quality was field-assessed as non-impacted. No prior data were available for the stream.

Black Creek

The 1996 kick sample was taken below the Route 126 bridge near Croghan. The invertebrate fauna was dominated by filter-feeding caddisflies. Most indices were within the range of slightly impacted water quality. Agricultural enrichment and siltation are considered to be the major factors affecting the fauna. Analysis of crayfish from this site for the presence of PAHs found two exceeding levels of concern: chrysene and benzo(a) anthracene.

Black River

Water quality in the Black River is currently assessed as non-impacted from Enos to Hawkinsville, and slightly impacted from Port Leyden to the mouth at Dexter. Macroinvertebrate sampling in the upper river from 1996-2002 included sites at Enos and Hawkinsville. All assessments showed excellent water quality. Analysis of hellgrammites from Hawkinsville in 1996 for metals found two PAHs - chrysene and benzo(a) anthracene - exceeding levels of concern.

Water quality at Port Leyden remains slightly impacted. This site was assessed as non-impacted in 1976 and slightly impacted in all following years. Samples from this site have been strongly dominated by filter-feeding midges, indicating nutrient enrichment.

The river bottom at Lyons Falls was sampled with a Ponar sampler upstream and downstream of the discharge of the Lyons Falls Paper Company lagoons in 1996, to determine if any impacts were attributable to the discharge. The fauna at both sites was initially assessed as slightly impacted. When an adjustment was made for the sandy substrate, the assessment was upgraded to non-impacted. No significant impairments were assignable to the discharge.

Water quality at Greig continues to be slightly impacted, but macroinvertebrate community composition improved substantially from 1991 to 2002 (Figure 8-1). Aquatic worms, indicators of organic wastes, dominated the fauna at this site from 1976 to 1991, contributing 42 to 54% of the macroinvertebrate community. In 2002 sampling, aquatic worms were greatly reduced, contributing less than 1% of the fauna; caddisflies, midges, and mayflies dominated the sample. This faunal change is likely related to the upstream reduction of pulp and paper mill wastes in Lyons Falls, and the installation of a sewage treatment plant in Lyons Falls.

Multiplate samples retrieved from the site below Lowville in July, August, and September, 1997, indicated slightly impacted water quality. Samples were dominated by high numbers of worms, likely indicating organic inputs. Analysis of crayfish from this site for metals found nickel

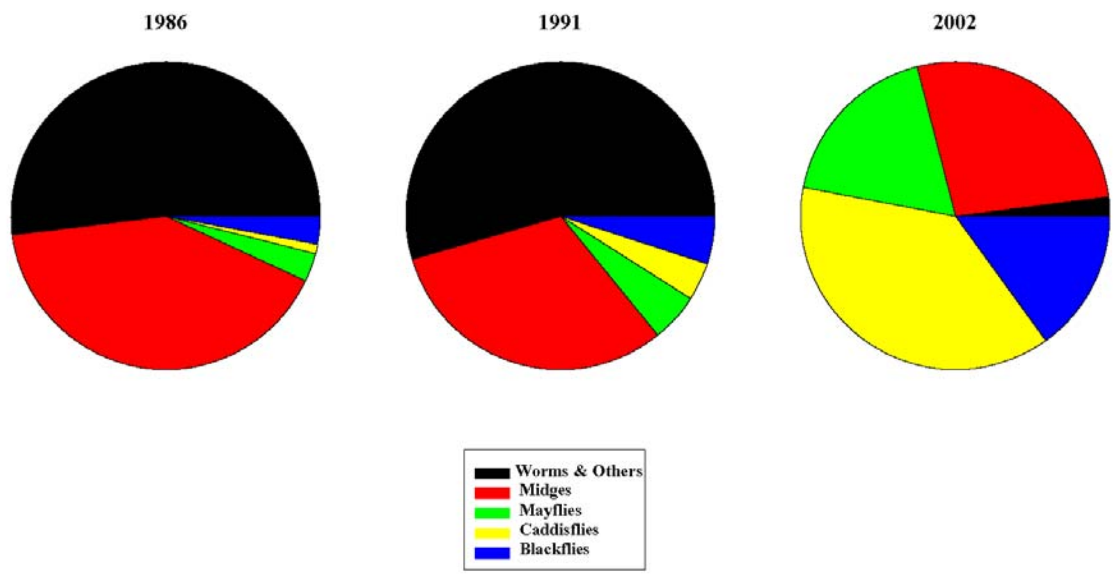


Figure 8-1. Changes in macroinvertebrate community composition, Black River at Greig, 1986-2002.

at the level of concern, and titanium exceeding the level of concern. Two PAHs - chrysene and benzo(a) anthracene - exceeded levels of concern.

Multiplate samples retrieved from the site below Carthage in July, August, and September, 1997, indicated slightly impacted water quality. Water quality was non-impacted at this site in 1982, but since 1992 has remained at slightly impacted. Samples were dominated by midges and worms, indicating organic inputs. This likely reflects discharges of the Carthage/West Carthage (V)

Wastewater Treatment Facility.

Water quality in the Black River at Dexter has shown substantial improvement in recent years (Figure 8-2). This site exhibited moderately impacted water quality in 1986 and 1991 multiplate sampling. High numbers of tolerant midges and worms clearly reflected organic inputs. In 1992, the Dexter (V) Sewage Treatment Plant completed a substantial upgrade, resulting in a much cleaner effluent. Multiplate sampling in 1997 and 2002 showed the improvement resulting from the upgrade. Samples from this site in 2002 included greatly reduced numbers of tolerant worms, and diverse populations of clean-water mayflies.

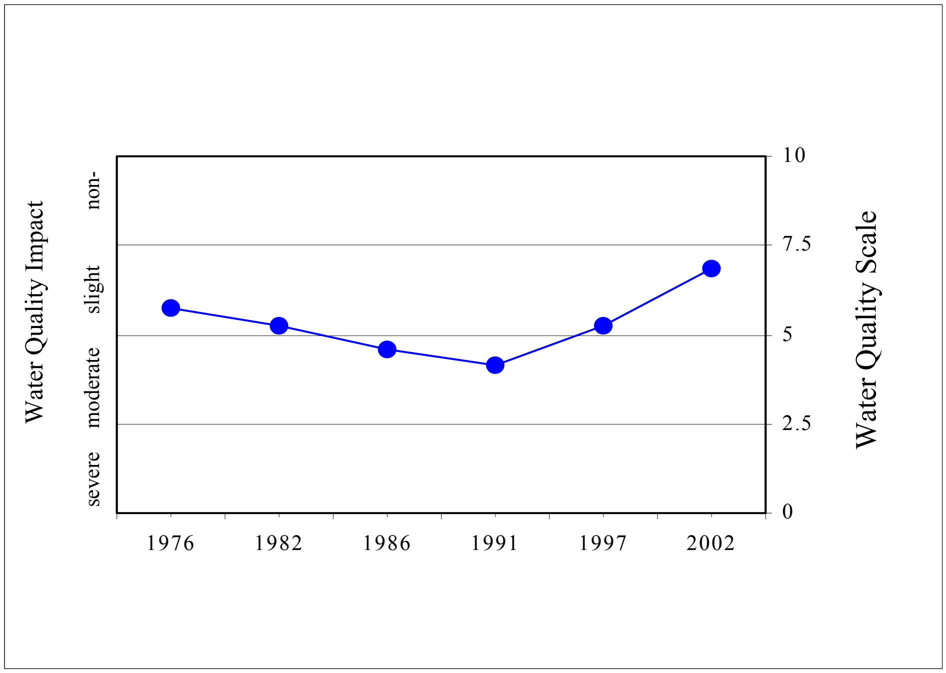


Figure 8-2. Water quality trends in the Black River below Dexter, 1975-2002.

Bradley Brook

Moderate impact from acid precipitation was documented for this remote Adirondack stream in 1980. It was sampled again in 2002, and showed little change from 1980 conditions. The macroinvertebrate fauna is dominated by acid-tolerant midges and stoneflies.

Capidon Creek

Capidon Creek was sampled near Naumburg in 2002. The habitat of a gravel substrate downstream of a ponded area produced a sample dominated by an impoundment fauna consisting of caddisflies and midges. Water quality was placed as moderately impacted, but mostly reflects habitat rather than water quality. No prior data were available for the stream.

Cellar Brook

This remote stream was assessed as moderately impacted by acidity in 1980. It was sampled again in 2002, and showed little change from 1980 conditions. The macroinvertebrate fauna is dominated by acid-tolerant midges and stoneflies.

Cobb Creek

This small sluggish tributary of the Deer River was sampled at Bellwood in 2002. At the time of sampling, the stream had very little flow, due to prevailing drought conditions. Nevertheless, the macroinvertebrate fauna contained many clean-water mayflies, stoneflies, caddisflies, and hellgrammites, and water quality was assessed as non-impacted.

Cold Creek

Cold Creek is a small, slow-moving tributary of the Black River in East Watertown. It was sampled for macroinvertebrates in 2002. The habitat was poor, consisting of gravel, sand, and silt, and sandy stream criteria were used to evaluate the data. Moderate impact was assessed, with the primary stressor being organic wastes. The daytime dissolved oxygen level at the site was only 3.0 mg/l, and gray water was present. The fauna was dominated by sewage-tolerant sowbugs. No prior data were available for the stream.

Crystal Creek

This stream was sampled for macroinvertebrates in 1996 at Van Amber Road near New Bremen. The habitat was less than ideal, consisting of gravel, sand, and rubble, downstream of an impoundment. The invertebrate fauna was quite diverse, but indices were just within the range of slight impact. This is considered to be due to the habitat and impoundment, and likely does not reflect real impact.

Cummings Creek

Cummings Creek was sampled at Hawkinsville in 2002. A diverse macroinvertebrate fauna was found, and water quality was assessed as non-impacted. The fauna included many clean-water mayflies, stoneflies, and caddisflies. No prior data were available for the stream. The North Branch of Cummings Creek at Hawkinsville was also sampled in 2002. Water quality was assessed as slightly impacted by nonpoint source nutrient enrichment. The macroinvertebrate fauna was dominated by filter-feeding caddisflies and algal-feeding riffle beetles.

Deer River

Non-impacted water quality is assessed for the Deer River. An upstream site at Liberty Corners was sampled in 2002, and was field-assessed as non-impacted. A site at Copenhagen was sampled in 1996 and 2002. The river bottom was mostly bedrock, but an area of rubble near the shore was located and sampled. The fauna contained many mayflies, stoneflies, and caddisflies. The water quality indices for the 1996 sample were just within the range of slight impact, but this was upgraded to non-impacted, and water quality is considered excellent. Macroinvertebrate samples were taken above the Route 26 bridge in Deer River in 1996 and 2002. The invertebrate fauna was diverse, and the screening criteria were met. Water quality was field-assessed as non-impacted, and the samples were not retained.

Douglass Creek

This creek was sampled at Greig in 2002. Water quality was assessed as slightly impacted by nonpoint source nutrient enrichment. The macroinvertebrate fauna was dominated by filter-feeding midges and caddisflies. No prior data were available for the stream.

Felts Mills Creek

The creek was sampled above the Route 3 bridge at Felts Mills in 1996 and 2002. This stream was in an area of limestone rock, and upstream of the sampling location, the stream traveled underground. Many rocks at this site were covered with moss and filamentous algae. The invertebrate fauna contained some mayflies, stoneflies, and caddisflies, but scuds were the dominant organism. Water quality indices denoted slight impact, but this was likely due to the unique spring-like nature of the stream.

Fish Creek (Lewis County, near Eagle Falls)

This small stream was sampled near Eagle Falls in 2002. Water quality was assessed as slightly impacted, but this may be partly caused by the slow current speed and sandy substrate. The fauna was dominated by filter-feeding caddisflies, and ISD denoted nonpoint source nutrient enrichment as a primary stressor.

Fish Creek (Lewis County, near Greig)

Sampling was conducted in 1996 at the DEC Fishing Access site on Fish Creek Road, Greig. The habitat and fauna were excellent, with the community dominated by mayflies, stoneflies, and caddisflies. Non-impacted water quality was clearly indicated.

Harvey Creek

This small creek was sampled at Bushes Landing in 2002. Non-impacted water quality was denoted by the metrics. The macroinvertebrate fauna was diverse and well-balanced, with many species of clean-water mayflies, stoneflies, and caddisflies. No prior data were available for the stream.

Hodge Creek

Hodge Creek was sampled at Lowville in 2002. The stream was only one meter wide, and the substrate was mostly gravel, sand, and silt, with many leaves and organic detritus. The macroinvertebrate fauna was dominated by facultative scuds and midges, mostly reflecting the habitat conditions. Using sandy stream criteria, water quality was assessed as moderately impacted, but the stream is considered a poor candidate for biomonitoring. No prior data were available for the stream.

House Creek

This creek was sampled at Glenfield in 2002. Although the stream had a mostly bedrock substrate, a diverse fauna was present, and water quality was field-assessed as non-impacted. No prior data were available for the stream.

Independence River

The Independence River is currently assessed as non-impacted. The habitat at the Sperryville site in 1996 consisted of interlocking boulders and cobble, with some sand and gravel. Obtaining an adequate kick sample was difficult, but the screening criteria were met, and non-impacted water quality was assessed. A sample was taken in 1996 at Pine Grove Road near Otter Creek. The habitat was favorable, and a diverse invertebrate community was present, with many mayflies, stoneflies, and caddisflies. Indices placed water quality just within the range of slight impact, but this was not considered representative of the fauna, and the assessment was upgraded to non-impacted.

Kelsey Creek

All Kelsey Creek sites are currently assessed as moderately impacted, mostly due to toxic stressors, based on macroinvertebrate sampling in 2000 and 2002. Slight improvements in water quality are documented compared to 1991, when the lower two sites were assessed as severely impacted (Figure 8-3). Extensive remediation efforts, including excavation of the creek bed and stormwater treatment, were completed in 1998. Sampling in 2000 showed reductions in crayfish body burdens for metals, but elevated PCB levels persisted in crayfish tissues. Comparisons of

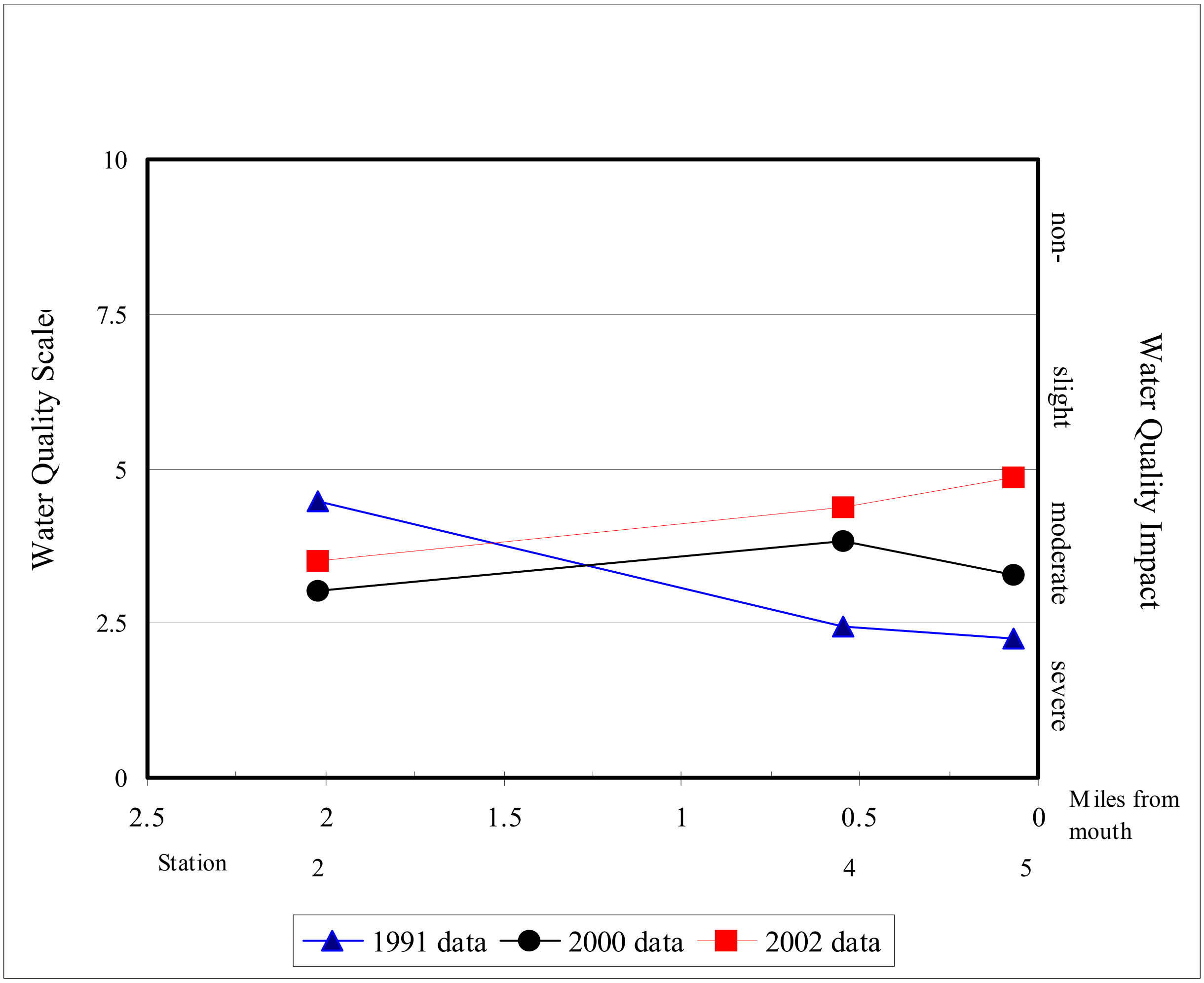


Figure 8-3. Water quality trends in Kelsey Creek, 1991-2002.

water quality assessments from 1991, 2000, and 2002 show a gradual improvement in water quality. Mayflies were documented at two of the three sites in 2000, a noteworthy sign of recovery in Kelsey Creek.

Kent Creek

This creek was sampled at Hawkinsville in 2002. The macroinvertebrate fauna was dominated by clean-water organisms, and water quality was field-assessed as non-impacted. No prior data were available for the stream.

Lake Creek

This small creek was sampled for macroinvertebrates at West Carthage in 2002. The sample metrics indicated slightly impacted water quality. The cause of impact was undetermined. The fauna was dominated by midge species that sometimes indicate intermittent flow. No prior data were available for the stream.

Little Black Creek

Overall water quality in this creek is assessed as non-impacted. The substrate at Bardwell Mill consisted of rock and rubble embedded in sand. Three of the four indices in 1996 were clearly in the range of non-impacted water quality. Species richness was not considered representative of the sample, and was not used in the water quality assessment procedure.

Little Woodhull Creek

The indices from a 1996 sample at Anos Siding were within the range of slight impact, but this is considered mostly impoundment effect, as the site was downstream of an impoundment. Impact Source Determination showed that nonpoint sources of nutrients and/or pesticides were likely responsible for the impact.

Mill Creek (Oneida County)

Water quality currently ranges from non-impacted to slightly impacted in Mill Creek. Four sites were sampled in 1997: two above Boonville, one in Boonville, and one downstream of Boonville. Water quality was assessed as slightly impacted at the three upstream sites and non-impacted at the downstream site. Impacts above Boonville were agricultural and in Boonville were related to the discharge of the Boonville (V) Wastewater Treatment Facility. The site above Boonville represents an apparent decline in water quality compared to the 1986 assessment, and the site below Boonville represents an apparent improvement compared to 1986 and 1991 conditions. Further monitoring of these sites is recommended to verify these trends.

Mill Creek (Jefferson County)

This slow-moving tributary of the Black River was sampled in 2002. The habitat was silt over bedrock, but the fauna appeared diverse, including mayflies, caddisflies, hellgrammites, and dragonflies. Using sandy stream criteria to evaluate the sample, water quality was assessed as non-impacted. No prior data were available for the stream.

Mill Creek (Lewis County)

Four sites were sampled on Mill Creek near Lowville in 1997. Water quality ranged from slightly to moderately impacted. The two sites on the South Branch were moderately impacted by livestock wastes. The North Branch site and the downstream site were assessed as slightly impacted. Fish communities in Mill Creek were dominated by creek chubs, dace, and white suckers, and were considered indicative of stress (Pers. comm., Doug Carlson, DEC). Analysis of crayfish from the most downstream site found two PAHs - chrysene and benzo(a) anthracene - exceeding levels of concern.

Moose Creek

The 1996 sampling site was below East Road near Talcottville. An excellent riffle was sampled, and the resident invertebrate fauna was diverse and well-balanced. Non-impacted water quality was clearly indicated.

Moose River

All currently monitored Moose River sites are assessed as non-impacted: the reach below Lyonsdale has not been sampled in recent years. The 1996 sample was taken above the Fowlersville Road bridge, Fowlersville. The invertebrate fauna was diverse, and all screening criteria were met. Water quality was assessed as non-impacted. A site at the Route 28 bridge near McKeever was sampled in 1996. The habitat was good, and the resident invertebrate fauna was diverse. Indices placed water quality as non-impacted. A Middle Branch site in the town of Webb was sampled in 1996. Many rocks were covered with short-stranded green algae. The invertebrate fauna was diverse, and all indices were within the range of non-impacted water quality. An excellent invertebrate fauna was found at a South Branch site near Old Forge in 1996, with all community indices within the non-impacted range. Excellent water quality was indicated. The North Branch of the Moose River at Old Forge was field-assessed as non-impacted in 2002.

Murmur Creek

This stream was sampled at the Belfort Road bridge near High Falls in 1996 and 2002. The stream was slow-moving, and the bottom consisted mostly of gravel, sand, and rubble. A diverse fauna was found, including mayflies, stoneflies, caddisflies, beetles, and hellgrammites. The screening criteria were met, and a non-impacted assessment was assigned.

North Branch, Long Lake Outlet

The 1996 site was located at Smith Road near Boonville. The substrate was largely gravel and sand with some rubble. The invertebrate fauna was diverse, and the screening criteria were met. Non-impacted water quality was clearly indicated.

Oily Creek

This small stream is a tributary of Kelsey Creek. Sites sampled at Morrison Avenue and LeRay Avenue in Watertown were both assessed as moderately impacted in 2000 and 2002. The macroinvertebrate fauna was dominated by tolerant scuds and sowbugs, and ISD denoted municipal/industrial inputs as the primary stressors. No prior data were available for the stream.

Otter Creek

Non-impacted water quality is assessed for Otter Creek. Macroinvertebrate samples were taken at Pine Grove Road at Otter Creek in 1996 and 2002. The invertebrate fauna was diverse, and all screening criteria were met. Water quality was assessed as non-impacted. An upstream site at Brantingham was also field-assessed as non-impacted in 2002 sampling.

Philomel Creek

Two sites were sampled at Pamelia Center in 2002, upstream at the Route 37 bridge and downstream at the Route 12 bridge. Both sites were assessed as moderately impacted, based on macroinvertebrate metrics. Both sites were challenged by poor habitat, the upstream site having a silt substrate and the downstream site having a bedrock substrate. Although the faunal composition differed between the two, both appeared to be influenced by organic wastes. No prior data were available for the stream.

Pine Creek

This Moose River tributary was sampled at Fowlersville in 2002. The macroinvertebrate fauna clearly indicated non-impacted water quality. No prior data were available for the stream

Rainbow Creek

This small stream in Lowville, sampled in 2002, featured a dead cow in the stream downstream of the sampling site. The stream habitat was poor, with a slow current speed and a substrate of gravel and silt. Using sandy stream criteria to evaluate the data, water quality was assessed as slightly impacted. The fauna was dominated by facultative scuds, with many worms present. The cause of impact was not determined, and the stream was considered a poor candidate for biomonitoring No prior data were available for the stream.

Roaring Brook

Macroinvertebrate sampling was conducted in 1996 and 2002 upstream of Route 26 at Martinsburg. The habitat was considered good, although silt deposits were noticeable. The invertebrate fauna was very diverse, and the indices placed water quality clearly in the range of non-impact, reflecting excellent conditions.

Silver Run

The most upstream site sampled on this remote stream in the vicinity of Limekiln exhibited an apparent decline in water quality compared to 1980. The 2002 sampling documented slightly impacted water quality, likely from acid precipitation effects. In 1980 this site was found to have an excellent invertebrate fauna, and was assessed as non-impacted.

Downstream of the Cellar Brook confluence, water quality in Silver Run was assessed as moderately impacted by acidity in both 1980 and 2002. In 1996 sampling at a downstream Silver Run location, two PAHs, chrysene and benzo(a) anthracene, exceeded levels of concern in crayfish tissues.

Smith Creek

This small stream was sampled for macroinvertebrates at Bellwood in 2002. Slightly impacted water quality was indicated, with a fauna of facultative midges and riffle beetles. ISD denoted nonpoint source nutrient enrichment as the primary stressor. No prior data were available for the stream.

Sugar River

Current water quality in the Sugar River ranges from non-impacted to slightly impacted. Non-impacted water is assessed for the upper river at Constable, based on a 2002 macroinvertebrate field-assessment. Clean-water mayflies, stoneflies, and caddisflies dominated the fauna. A site at Denley Road near Talcottville sampled in 2002 was assessed as slightly impacted by nonpoint sources. The fauna was heavily dominated by filter-feeding caddisflies and algal-feeding riffle beetles. Livestock wastes were noticed at the site. The PMA metric for this sample was set aside as being non-representative. A site was also sampled at Route 12 near Port Leyden in 1996. The invertebrate fauna was diverse, and included mayflies, stoneflies, caddisflies, riffle beetles, and hellgrammites. Indices clearly denoted non-impacted water quality.

Whetstone Gulf

The stream was sampled in 1996 above Glendale Road in Glendale, approximately 50 meters downstream of a waterfall. The invertebrate fauna sampled was diverse and well-balanced, and the indices clearly indicated non-impacted water quality.

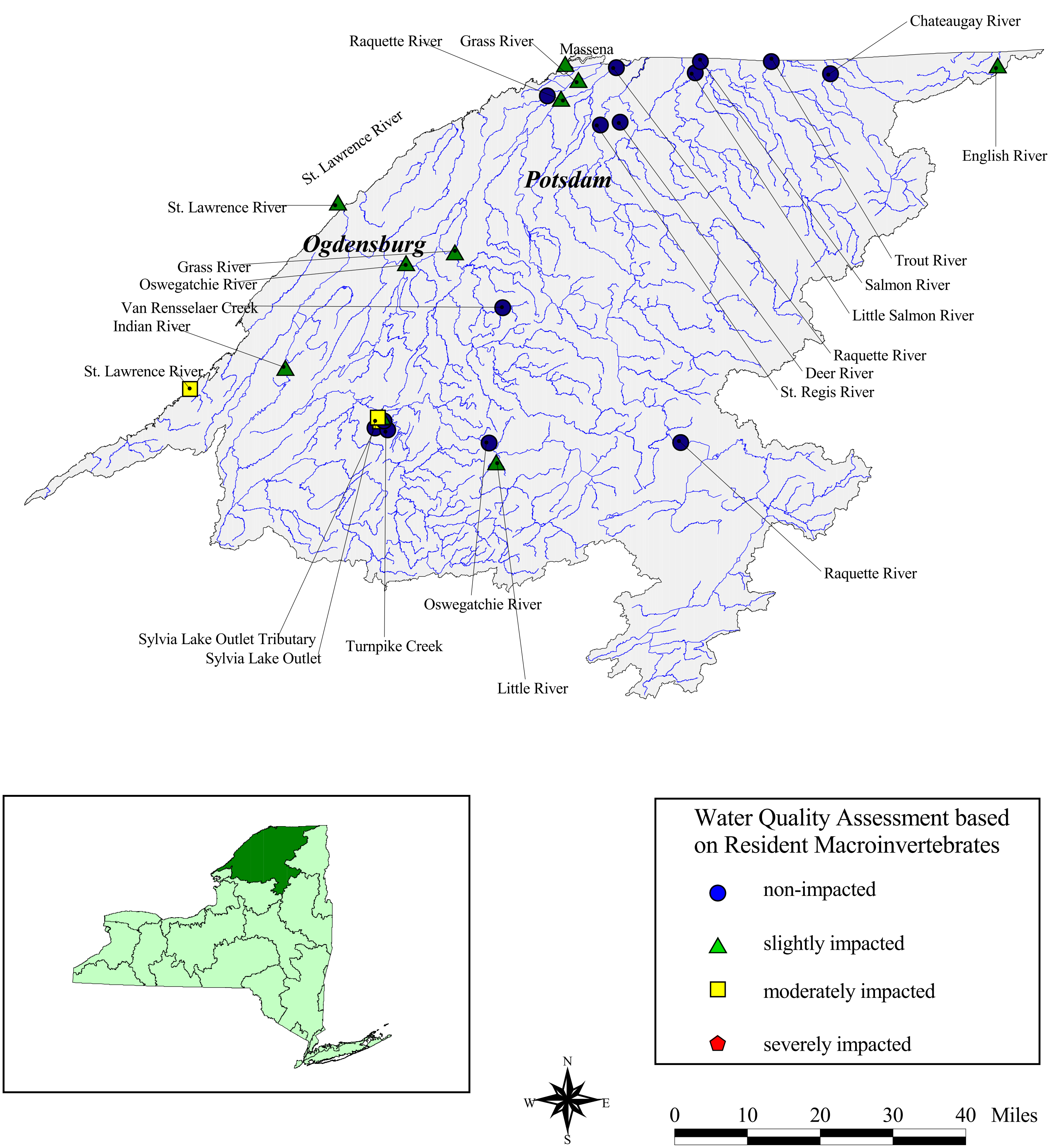
Widmyer Creek

This small stream in Beaver Falls was sampled in 2002 was assessed as slightly impacted. Facultative midges, mayflies, and caddisflies dominated the sample, and ISD denoted siltation as the primary stressor. No prior data were available for the stream.

Woodhull Creek

The sampling site was at the DEC Fishing Access off Horton Road near Woodhull. The invertebrate fauna sampled in 1996 was diverse, and included mayflies, stoneflies, caddisflies, and hellgrammites. Screening criteria were met, and non-impacted water quality was assessed for this site.

St. Lawrence River Drainage Basin



ST. LAWRENCE RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED						
CHATEAUGAY RIVER (CGAY)								
01	Cooks Mill, above Sam Cook Rd. bridge							97
DEER RIVER (DERR)								
01	Helena, below Depot Rd.bridge							97
ENGLISH RIVER (ENGL)								
01	Cannon Corners, above Bush Rd. bridge site							97
GRASS RIVER (STLW)								
12A	Below Canton, under power lines						92	
13B	Louisville, below Rt. 39 bridge						92	
13	Above Massena, Rte 37 bridge	77	83				92	
14	Massena Center	77	83	86		91		97
INDIAN RIVER (INDN)								
01	Above Philadelphia, Webb Rd bridge				87			
02	Below Philadelphia, Sandy Hollow Rd bridge				87			
03	Anstead Bridge, Elm Ridge Rd				87			
04	Joachim Bridge				87			
05	Above Rivergate, Coon Bridge				87			
08	Rossie, Mill Road							97
LITTLE RIVER (LTTL)								
01	Lower Oswegatchie, below Oswegatchie Trail Rd bridge							97
LITTLE SALMON RIVER (LSAL)								
01	Ft. Covington, above Foster Rd bridge							97
OSWEGATCHIE RIVER (GTCH)								
01	Above Fine							97
07A	Rensselaer Falls, Rte 186 bridge					91		97
07	Ogdensburg, Rte 37 bridge	77	83	86				
07B	Ogdensburg, Lafayette St			86		91		
RAQUETTE RIVER (STLW)								
16B	Piercefield, Rte 3 bridge					91		97
16A	Massena, Rte 420 bridge			86		91		97
16An	Massena, Rte 420 bridge, starboard side, below sulfur spring			86			92	97
16As	Massena, Rte 420 bridge, port side						92	
16	Rooseveltown	77	83				92	

ST. LAWRENCE RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED							
ST. LAWRENCE RIVER (STLW)									
01	Cape Vincent, Buoy B241	77	83	86					
02	Clayton, Buoy B225	77	83						
03	Point Vivian, Buoy R202	77	83				92	97	
04	Near Chippewa Bay, Buoy B167	77	83						
05	Near J. Cartier State Park, Buoy 139	77	83						
06	Brooks Point, Buoy Nsmo (A) W	77	83						
08	Ogdensburg, Buoy R2 in shipping channel	77	83			91			
08A	Ogdensburg, Red Buoy R2, opposite Oswegatchie R mouth							97	
09	Ogdensburg, Buoy B131B	77	83	86			92		
09A	Ogdensburg, Buoy 133			86			92		
10	Cardinal, Buoy B113	77	83						
11	Waddington, Buoy B89	77	83						
12	Wilson Hill Island, Buoy 67	77	83						
15	Above Long Sault Dam, Buoy B75	77	83						
15A	Below Moses Saunders Dam					91			
18	Near St. Regis, Buoy B1	77	83						
18A	Massena/Cornwall Bridge, Buoy B15			86			92	97	
ST. REGIS RIVER (STLW)									
17A	Brasher Center					91		97	
17	St. Regis, at mouth	77	83						
SALMON RIVER (SAL9)									
01	Below Chasm Falls, Moon Valley Rd bridge								98
02	Below Malone, DEC access off Lower Flat Rock Rd								98
03	Ft. Covington, above Center St. bridge							97	
SYLVIA LAKE OUTLET (SYLV)									
01	At lake outlet, below lake						92		
03	Sylvia Lake Rd bridge				89		92	97	
TROUT RIVER (TROU)									
01	Constable, above Stebins Rd. bridge							97	
TURNPIKE CREEK (TURN)									
01	Fullerville, Fullerville Rd						92		
02	Fowler, Rte 58						92		
04	Fowler, Little York Rd						92		
05	Fowler, Emeryville Rd						92		
VAN RENSSELAER CREEK (VREN)									
02	West Pierrepont, Rte 91 bridge				89				

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE ST. LAWRENCE RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Chateaugay River, Cooks Mill	non-impacted	no prior data
Deer River, Helena	non-impacted	no prior data
English River, Cannon Corners	slightly impacted	no prior data
Grass River, Massena Center	slightly impacted	no change
Indian River, Rossie	slightly impacted	no prior data
Little River, Lower Oswegatchie	slightly impacted	no prior data
Little Salmon River, Fort Covington	non-impacted	no prior data
Oswegatchie River, above Fine	non-impacted	no prior data
Oswegatchie River, Rensselaer Falls	slightly impacted	**DECLINED**
Raquette River, Piercefield	non-impacted	no change
Raquette River, Massena Springs	slightly impacted	**DECLINED**
St. Lawrence River, Point Vivian	moderately impacted	no change
St. Lawrence River, Ogdensburg, red buoy R2 - opposite River mouth	slightly impacted	no prior data
St. Lawrence River, below Massena	slightly impacted	no change
St. Regis River, Brasher Center	non-impacted	no change
Salmon River, Fort Covington	non-impacted	no prior data
Sylvia Lake Outlet, Fowler	moderately impacted	no change
Trout River, Constable	non-impacted	no prior data

REPORTS OF MACROINVERTEBRATE SURVEYS WITHIN THE ST. LAWRENCE RIVER WATERSHED

STREAM	YEAR OF SURVEY	REPORT
Indian River	1987	SBU,1988
St. Lawrence River		CU,1978
St. Lawrence River	1985	OME,1988
St. Lawrence/Ottawa Rivers	1965-1967	ROM
Turnpike Creek	1992	SBU,1994
Van Rensselaer/Turnpike Crk.	1989	SBU,1990
Watershed Streams	1991-1992	RIBS,1994

AVON	Avon Pollution Investigations Unit, Div. of Fish & Wildlife, NYS DEC
CU	Cornell University, Department of Natural Resources
DOH	New York State Department of Health
OME	Ontario Ministry of the Environment
RIBS	Rotating Intensive Basin System, Statewide Waters Assessment Section, NYS DEC
ROM	Royal Ontario Museum
SBU	Stream Biomonitoring Unit, Division of Water, NYS DEC

Chateaugay River

The kick sample from Cooks Mill in 1997 showed non-impacted water quality, with the fauna dominated by intolerant mayflies and caddisflies. No prior data were available for the stream. Analysis of crayfish from this site found two nitrogen/phosphorous pesticides present above detection levels: chlorpyrifos (Dursban) and simazine. For nitrogen/phosphorous pesticides, any amount above detection levels are currently considered to be a level of concern.

Deer River

Water quality for this tributary of the St. Regis River was assessed as non-impacted, based on 1997 kick sampling at Helena. The sampling met all field criteria for non-impacted conditions, and the sample was not retained. No prior data were available for the stream.

English River

Water quality was assessed as slightly impacted at Cannon Corners, based on 1997 macroinvertebrate sampling. An unidentified white flocculent material covered much of the stream bottom, and this appeared to have a substantial influence on the fauna. Midges were the dominant invertebrate group, although clean-water mayflies, stoneflies, and caddisflies were also present. ISD denoted siltation as the primary stressor. Further investigation is recommended for this site.

Grass River

Water quality in the Grass River continues to be slightly impacted downstream of Massena Center. Multiplate samples were collected from this site in 1977, 1983, 1986, 1991, and 1997. Although the assessment has not changed since 1991, slight improvement appears to have occurred, indicated by a reduction in the percentage contribution of tolerant worms (Figure 9-1).

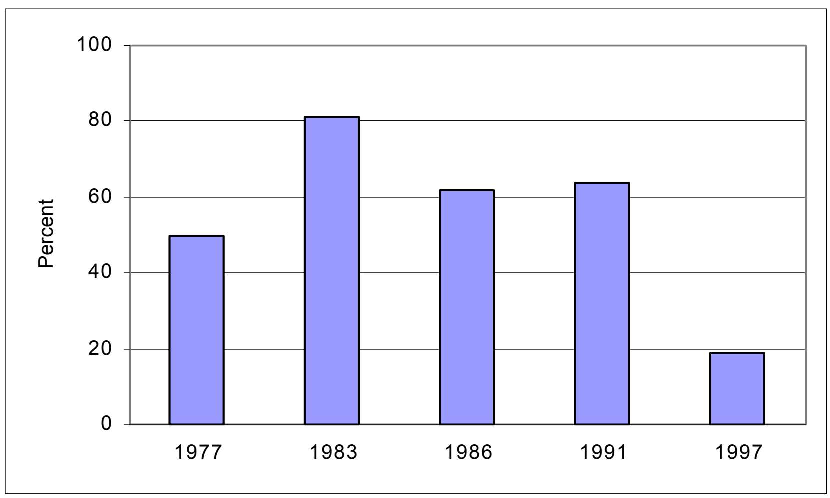


Figure 9-1. Percent contribution of tolerant worms in samples from the Grass River at Massena Center, 1977-1997.

Indian River

Slightly impacted water quality was assessed for Rossie, based on 1997 sampling. The slow-moving nature of the stream above the sampling site likely contributed to the assessment, although indications of nutrient enrichment were also present. Productivity was very high, and filamentous algae was abundant. Analysis of caddisfly tissues from this site in 1997 found three PAHs exceeding provisional levels of concern: chrysene, fluoranthene, and benzo (a) anthracene. Previous sampling of the Indian River from Philadelphia to Rivergate in 1987 indicated slightly impacted water quality.

Little River

Non-impacted water quality was assessed for this Oswegatchie River tributary, based on kick sampling at Lower Oswegatchie in 1997. Although some indices were in the range of slight impact, these were determined to be caused by high dominance by an intolerant midge. The faunal type is one often encountered in streams in forested areas that maintain excellent water quality.

Little Salmon River

Water quality for this stream was assessed as non-impacted, based on 1997 kick sampling at Fort Covington. The fauna was dominated by clean-water caddisflies and mayflies. Although this site appeared enriched, with filamentous algae and a highly productive invertebrate community, diversity and balance were maintained.

Oswegatchie River

Non-impacted water quality was assessed for the upper Oswegatchie River at Fine, based on 1997 kick sampling. The fauna was exemplary, and no water quality problems were indicated. Water quality downstream at Rensselaer Falls was assessed as slightly impacted, based on a 1997 kick sample. The fauna was dominated by filter-feeding caddisflies, and nonpoint source nutrient enrichment was determined to be the primary factor affecting water quality. Crayfish collected at this site showed three PAHs exceeding provisional levels of concern: chrysene, fluoranthene, and benzo (a) anthracene. The assessment at this site represents an apparent decline in water quality compared to 1991 results. Further monitoring of this site is recommended to verify this trend.

Raquette River

Water quality of the upper Raquette River at Piercefield was assessed as non-impacted, based on 1997 kick sampling. The sampling met all field criteria for non-impacted conditions, and the sample was not retained. This assessment was unchanged from 1991. Water quality at Massena Springs was assessed as slightly impacted, based on 1997 kick sampling. All indices were just within this category but close to the non-impacted category. Productivity was low, and aquatic worms were abundant. The fauna may be affected by a sulfur spring, which enters the river upstream of the sampling site. Crayfish collected at this site showed the nitrogen/phosphorous pesticide trifluralin present at 2800 μg/kg. Three PAHs exceeded provisional levels of concern: chrysene, pyrene, and benzo (a) anthracene. The assessment at this site represents an apparent decline in water quality compared to 1991 results. Further monitoring of this site is recommended to verify this trend.

St. Lawrence River

Water quality at Point Vivian was assessed as moderately impacted in 1997, based on multiplate samples. The 1992 assessment was placed at slight impact, although most indices differed only slightly from those of 1997. The assessment at this site represents an apparent decline in water quality compared to results from 1992, as well as those from 1977 and 1983 (Figure 9-2). Zebra mussels were a sizeable component of the 1997 samples.

Water quality at Ogdensburg was also assessed as moderately impacted, based on multiplate samples from 1997. This site is upstream of the Ogdensburg shipping canal site sampled in 1977, 1983, and 1991, although both buoys are numbered R2. The shipping canal site was considered to be non-representative, and was discontinued.

Water quality at Massena was assessed as slightly impacted, based on multiplate samples

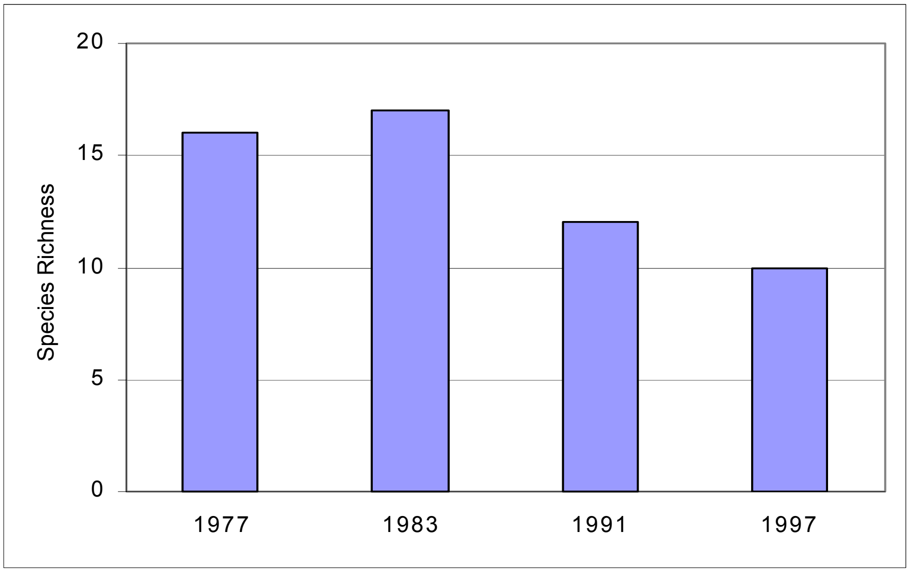


Figure 9-2. Species richness in the St. Lawrence River at Point Vivian, 1977-1997.

from 1997. These results are comparable to those from 1992 at this site. Crayfish collected at this site showed very high levels of PCB Aroclor 1248 - at 2,600 µg/kg- greatly exceeding levels of concern. The pesticide Deet was also found in crayfish collected at this site.

St. Regis River

The only site sampled on the St. Regis River was at Brasher Falls. Water quality was assessed as non-impacted, based on 1997 kick sampling. The sample met all field criteria for non-impacted conditions, and was not retained for laboratory analysis. This site was previously assessed as non-impacted in 1991.

Salmon River

Non-impacted water quality was assessed for the Salmon River, based on 1997 kick sampling at Fort Covington and 1998 kick sampling below Chasm Falls and Malone . The fauna appeared very productive, but still maintained excellent water quality. Analysis of caddisfly larvae from the Fort Covington site found three PAHs exceeding provisional levels of concern: chrysene, fluoranthene, and benzo (a) anthracene.

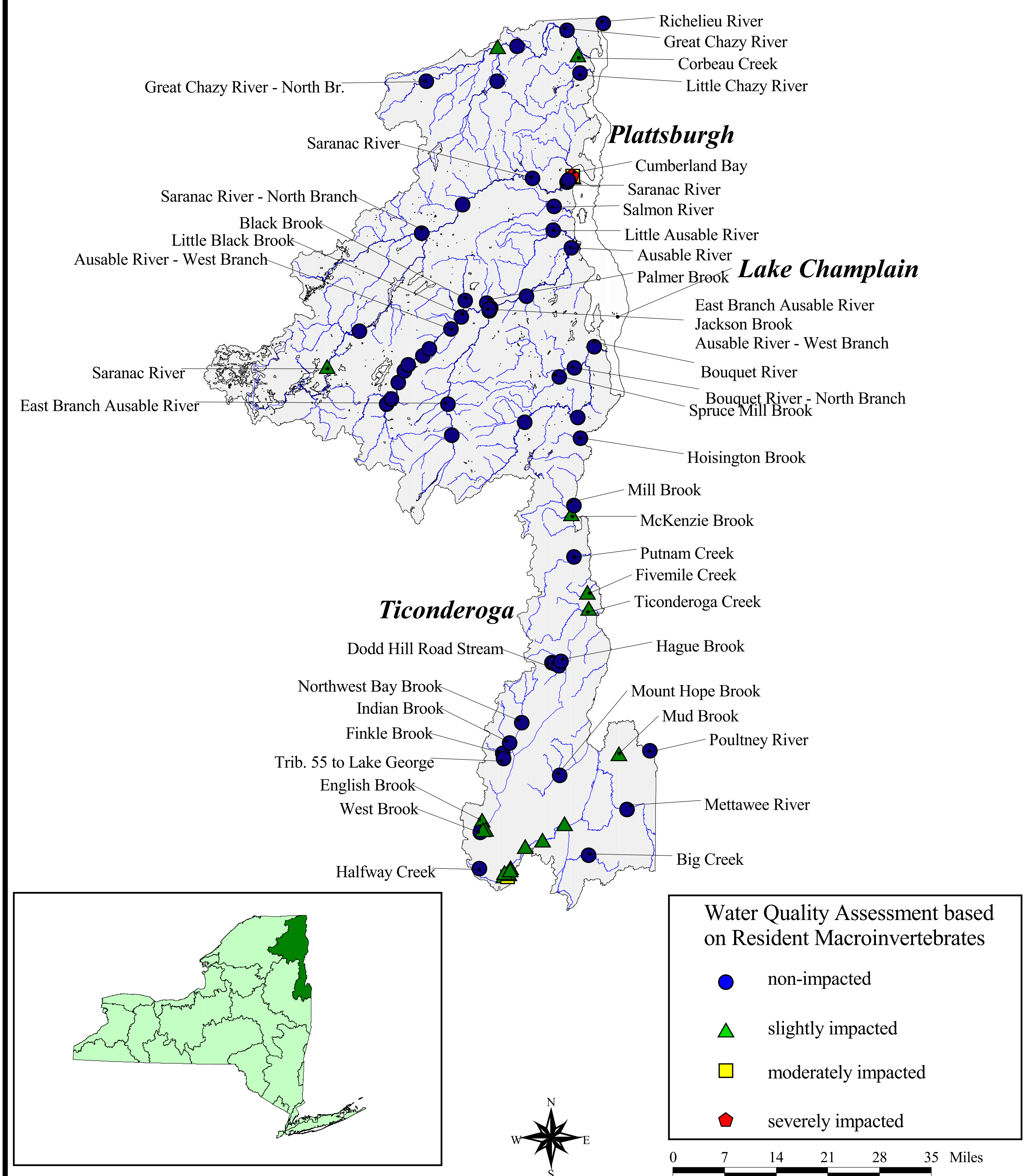
Sylvia Lake Outlet

This tributary of Turnpike Creek at Fowler was assessed as moderately impacted, based on 1997 kick sampling. The fauna was very similar to that found in 1989 and 1992 at this site, dominated by caddisflies and midges, with mayflies absent. This area has a history of extensive zinc mining, and toxicity from high zinc levels, likely from tailings, is considered to be the primary factor influencing water quality in this stream. Caddisflies from the stream analyzed for metals were found to carry zinc body burdens of 433 µg/g in 1989 and 432 µg/g in 1992, greatly exceeding the level of concern of 200 µg/g for caddisflies. Impoundment effects from Sylvia Lake may be a secondary stressor at this site.

Trout River

Macroinvertebrate sampling at Constable documented all indices within the range of non-impacted water quality for the 1997 kick sample. The fauna was dominated by clean-water mayflies, caddisflies, riffle beetles, and midges. No water quality problems were indicated.

Lake Champlain Drainage Basin



LAKE CHAMPLAIN DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED
AUSABLE RIVER (SABL)		
12	Clintonville, above bridge off Lower Rd.	98
13	Ausable Chasm, Route 9 bridge	93 94 98
AUSABLE RIVER, EAST BRANCH (ESAB)		
04	Keene Valley, above Barclay Rd. bridge	98
05	Keene, above Rte 73 bridge	98
11	Au Sable Forks, below Co. Rt. 9R bridge	93 94 98
AUSABLE RIVER, WEST BRANCH (SABL)		
01	Lake Placid, below Route 73, near ski jump	89 94 97 98 99
02	Below Lake Placid, Riverside Drive	89
03	Route 86 at Riverside Drive	89
04	Owen Pond trailhead, Route 86	89
05	Above Wilmington Notch, opp. Winch Pond Trailhead	89
06	Whiteface Mt. ski area	89
07	Above Wilmington, Rt. 86 at Flume Fall	89
08	Below Wilmington, above Haselton bridge	89 98
11A	Au Sable Forks, Route 9N bridge	93 94 98
BIG CREEK (BIGC)		
01	Hartford, Rt. 149 bridge	98
BLACK BROOK (BLBR)		
01	Black Brook, below Co. Rt. 17 bridge	98
BOUQUET RIVER (BOQT)		
04	Elizabethtown, above Rte 8 bridge	93 98
05	below Wadhams, below Morrison Rd. bridge	98
07	Willsboro, above Route 22 bridge	87 88 93 98 99
BOUQUET RIVER, NORTH BRANCH (NBQT)		
01	Reber, below Co. Rt. 68 (West Rd.) bridge	98
CHUBB RIVER (CHUB)		
03	Lake Placid, above confluence with West Br. Ausable River	97 98
CORBEAU CREEK (CORB)		
01	Coopersville, below Stetson Rd. bridge	98
ENGLISH BROOK (ENBR)		
01	Lake George, below Rt. 9 bridge	98
FINKLE BROOK (FINK)		
01	Bolton Landing, below Horicon Ave. bridge	98

LAKE CHAMPLAIN DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED
FIVEMILE CREEK (FMIL)		
01	Crown Point, above Rt. 49 bridge	98
GREAT CHAZY RIVER (GCHZ)		
01	Altona, above Route 191 bridge	93 94 98
02A	Mooers, off Mill St.	98
03	Champlain, above Rte 9 bridge	93 94 98
GREAT CHAZY RIVER, NORTH BRANCH (GCHZ)		
00	Ellenburg, above Rt. 54 bridge	98
02	Mooers Forks, below Rte 11 bridge	93 98
HAGUE BROOK (HAGE)		
01	Hague, above Rt. 9N bridge; off Rt. 8	98
HALFWAY CREEK (HALF)		
01	above Glens Falls, above Thunderbird Rd bridge	99
02	Glens Falls, above Rte 9 bridge	99 01
02B	Glens Falls, Bay Road at Lowes	01
02B1	Glens Falls, above confluence with Halfway Bk.	01
02C	Glens Falls, Cronin Road @ swimmers dam	01
02C2	Glens Falls, below Webster Ave.bridge	01
02C3	Glens Falls, Homer Rd, just below culvert	01
03	Glens Falls, above Meadowbrook Rd bridge	99 01
04	Pattens Mills, above Patten Mills Rd bridge	99
05	Tripoli, above Farley Rd bridge	99
06	Fort Ann, below Co. Rt. 16 bridge	98 99
HOISINGTON BROOK (HOIS)		
01	Westport, below Rt. 22-9N culvert	98
INDIAN BROOK (INBR)		
01	North Bolton, above Rt. 9N bridge	98 99
JACKSON BROOK (JACK)		
01	Au Sable Forks, below Golf Course Rd. bridge	98
LITTLE AUSABLE RIVER (LSAB)		
01	Laphams Mills, above Fuller Rd bridge	93 98 99
LITTLE BLACK BROOK (LBBR)		
01	Haselton, above Co. Rte. 12 bridge	98
LITTLE CHAZY RIVER (LCHZ)		
01	Chazy, below Stetson Road bridge	93 94 98
MCKENZIE BROOK (MCKN)		
01	Port Henry, above Rt. 22 bridge	98

LAKE CHAMPLAIN DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED
METTAWEE RIVER (METT)		
01	North Granville, above Whitehall Turnpike bridge	93 98
MILL BROOK (MILC)		
01	Port Henry, below Dock St. bridge	98
MOUNT HOPE BROOK (HOPE)		
01	South Bay, below Co. Rt. 16 bridge	98
MUD BROOK (MDBR)		
01	Whitehall, below Beckwith Rd. bridge	98
NORTHWEST BAY BROOK (NBAY)		
01	North Bolton, at Rt. 9N bridge	98
PALMER BROOK (PALM)		
01	Ausable Forks, below Palmer Hill Rd. bridge	98
POULTNEY RIVER (PTNY)		
01	Hampton Flats, above Rte 22A bridge	93 98
PUTNAM CREEK (PUTM)		
01	Above Factoryville, below Rt. 2 bridge	98 99
RICHELIEU RIVER (RICH)		
01	Rouses Point, south of Rte 2 bridge	87 93 94 98 99
SALMON RIVER (SAMN)		
01	South Plattsburgh, above Salmon River Rd. bridge	93 98 99
SARANAC RIVER (SARA)		
01	Saranac Lake, Pine St bridge	93
02	Bloomingdale, below Moose Pond Rd.	93 98 99
04	Saranac, below Hardscrabble Rd bridge	93 94 98
05	Morrisonville, off Banker Rd	93
06	Plattsburgh, S. Catherine St bridge	86 93
06A	Plattsburgh, above Saranac St bridge	87 88 98 99
SARANAC RIVER, NORTH BRANCH (SARA)		
03	Riverview, above Rt. 3 bridge; off Amell Rd.	93 98
SPRUCE MILL BROOK (SPRU)		
01	Reber, below Co. Rt. 12 culvert	98
TICONDEROGA CREEK (TCON)		
01	Ticonderoga, above Elk Drive	87 88 93 94 98

LAKE CHAMPLAIN DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED		
WEST BROOK (WSBR)				
01	Lake George, below culvert off Prospect Hwy		98	99
02	Lake George, above culvert @Gage Rd.			99
03	Lake George, below foot bridge; opposite Action Park			99
UNNAMED DODD HILL ROAD TRIBUTARY (DODD)				
01	Hague, below culvert under Dodd Hill Rd.	96		
02	Hague, Dodd Hill Rd.; path just past "chalet" house	96		
03	Hague, above Rt. 9N bridge	96		
UNNAMED LAKE GEORGE TRIB. 55 (LG55)				
01	Bolton Landing, above Goodman Ave. bridge		98	

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE LAKE CHAMPLAIN DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Ausable River, Clintonville	non-impacted	no prior data
Ausable River, below Ausable Chasm	non-impacted	no prior data
Ausable River, East Branch, Keene Valley	non-impacted	no prior data
Ausable River, East Branch, Keene	non-impacted	no prior data
Ausable River, East Branch, Au Sable Forks	non-impacted	no prior data
Ausable River, West Branch, Lake Placid	non-impacted	no change
Ausable River, West Branch, below Wilmington	non-impacted	no change
Ausable River, West Branch, Au Sable Forks	non-impacted	no prior data
Big Creek, Hartford	non-impacted	no prior data
Black Brook, Black Brook	non-impacted	no prior data
Bouquet River, Elizabethtown	non-impacted	no prior data
Bouquet River, below Wadhams	non-impacted	no prior data
Bouquet River, Willsboro	non-impacted	no change
Bouquet River, North Branch, Reber	non-impacted	no prior data
Chubb River, Lake Placid	slightly impacted	no prior data
Corbeau Creek, Coopersville	slightly impacted	no prior data
English Brook, Lake George	slightly impacted	no prior data
Finkle Brook, Bolton Landing	non-impacted	no prior data
Fivemile Creek, Crown Point	slightly impacted	no prior data
Great Chazy River, Altona	non-impacted	no prior data
Great Chazy River, Mooers	non- impacted	no prior data
Great Chazy River, Champlain	non-impacted	no prior data
Great Chazy River, North Branch, Ellenburg	non-impacted	no prior data
Great Chazy R., N. Br., Mooers Forks	slightly impacted	no prior data
Hague Brook, Hague	non-impacted	no prior data
Halfway Creek, above Glens Falls	non-impacted	no prior data
Halfway Creek, Glens Falls, Rte 9	slightly impacted	no prior data
Halfway Creek, Glens Falls, Bay Road	slightly impacted	no prior data
Halfway Creek, Glens Falls, just above confluence	slightly impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE LAKE CHAMPLAIN DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Halfway Creek, Glens Falls, Cronin Rd.	slightly impacted	no prior data
Halfway Creek, Glens Falls, Webster Ave.	moderately impacted	no prior data
Halfway Cr. trib., Glens Falls, Homer Rd	slightly impacted	no prior data
Halfway Creek, Glens Falls, Meadowbrook Rd	slightly impacted	no prior data
Halfway Creek, Pattens Mills	slightly impacted	no prior data
Halfway Creek, Tripoli	slightly impacted	no prior data
Halfway Creek, Fort Ann	slightly impacted	no prior data
Hoisington Brook, Westport	non-impacted	no prior data
Indian Brook, North Bolton	non-impacted	no prior data
Jackson Brook, Au Sable Forks	non-impacted	no prior data
Little Ausable River, Laphams Mills	non-impacted	no prior data
Little Black Brook, Haselton	non-impacted	no prior data
Little Chazy River, Chazy	non-impacted	no prior data
McKenzie Brook, Port Henry	slightly impacted	no prior data
Mettawee River, North Granville	non-impacted	no prior data
Mill Brook, Port Henry	non-impacted	no prior data
Mount Hope Brook, South Bay	non-impacted	no prior data
Mud Brook, Whitehall	slightly impacted	no prior data
Northwest Bay Brook, North Bolton	non-impacted	no prior data
Palmer Brook, Ausable Forks	non-impacted	no prior data
Poultney River, Hampton Flats	non-impacted	no prior data
Putnam Creek, above Factoryville	non-impacted	no prior data
Richelieu River, Rouses Point	slightly impacted	no change
Salmon River, South Plattsburgh	non-impacted	no prior data
Saranac River, Saranac Lake	non-impacted	no prior data
Saranac River, Bloomingdale	non-impacted	no prior data
Saranac River, Saranac	non-impacted	no prior data
Saranac River, Morrisonville	non-impacted	no prior data
Saranac River, Plattsburgh, South Catherine St.	non-impacted	no change
Saranac River, Plattsburgh, Saranac St.	slightly impacted	**DECLINED**

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE LAKE CHAMPLAIN DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Saranac River, North Branch, Riverview	non-impacted	no prior data
Spruce Mill Brook, Reber	non-impacted	no prior data
Ticonderoga Creek, Ticonderoga	slightly impacted	no change
West Brook, Lake George, off Prospect Hwy	non-impacted	no prior data
West Brook, Lake George, Gage Rd	slightly impacted	no prior data
West Brook, Lake George, below foot bridge	slightly impacted	no prior data
Unnamed Dodd Hill Road Stream, Hague, under Dodd Hill Rd.	non-impacted	no prior data
Unnamed Dodd Hill Road Stream, Hague, past "chalet" house	non-impacted	no prior data
Unnamed Dodd Hill Road Stream, Hague, above Rt. 9N	non-impacted	no prior data
Unnamed Lake George Trib. 55, Bolton Landing	non-impacted	no prior data

REPORTS OF MACROINVERTEBRATE SURVEYS WITHIN THE LAKE CHAMPLAIN WATERSHED

STREAM	YEAR OF SURVEY	REPORT
Ausable River, West Branch	1975	AVON
Ausable River, West Branch	1976	AVON
Ausable River, West Branch	1989	SBU,1990
Cumberland Bay	1986	SBU,1987
Cumberland Bay	1993	SBU,1994
Halfway Creek	1999	SBU,2000
Saranac River	1986	SBU,1987
Saranac River	1993	SBU,1994
West Brook	1999	SBU,2000
Watershed Streams	1987-1988	RIBS,1990
Watershed Streams	1993-1994	RIBS,1996

AVON	Avon Pollution Investigations Unit, Div. of Fish & Wildlife, NYS DEC
DOH	New York State Department of Health
RIBS	Rotating Intensive Basin System, Statewide Waters Assessment Section, NYS DEC
SBU	Stream Biomonitoring Unit, Division of Water, NYS DEC

Ausable River

Water quality was assessed as non-impacted for the Ausable River reach from Clintonville to Ausable Chasm, based on sampling in 1993, 1994, and 1998. Mayflies, stoneflies, and caddisflies were well-represented in the samples.

On the East Branch Ausable River, the reach from Keene Valley to Ausable Forks was sampled for macroinvertebrates in 1993, 1994, and1998, and was assessed as non-impacted. Mayflies, stoneflies, caddisflies, and hellgrammites were well-represented. Water quality was exemplary.

Water quality in the West Branch Ausable River also remains non-impacted (Figure 10-1). Recent sampling includes macroinvertebrate sampling at Haselton and Au Sable Forks in 1998 and at Lake Placid in 1999. Water quality was clearly non-impacted, with mayflies, stoneflies, and caddisflies well-represented in both samplings. No water quality problems were indicated.

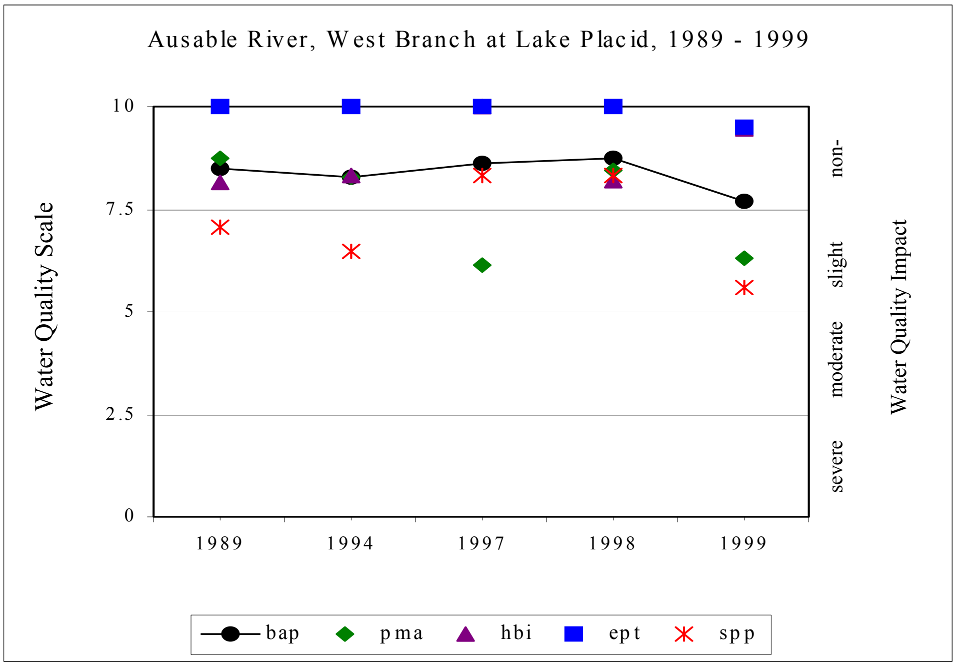


Figure 10-1. Water quality in the West Branch Ausable River at Lake Placid, 1989-1999. SPP= species richness, HBI= Hilsenhoff biotic index, EPT= richness of mayflies, stoneflies, and caddisflies, PMA- Percent Model Affinity, BAP= Biological Assessment Profile value

Big Creek

Water quality was assessed as non-impacted, based on macroinvertebrate sampling at Hartford in 1998. The habitat was considered poor, with the stream bottom consisting primarily of bedrock. Pockets of rubble that were sampled contained a diverse fauna of mayflies, stoneflies, and caddisflies. No water quality problems were indicated.

Black Brook

Black Brook is a tributary of the West Branch Ausable River. Based on macroinvertebrate sampling in 1998, water quality was assessed as non-impacted. The fauna was dominated by intolerant caddisflies and mayflies. No prior data were available for the stream.

Bouquet River

Water quality remains non-impacted in the Bouquet River at all sites sampled. Three sites were sampled from Elizabethtown to Willsboro in 1998. Based on macroinvertebrate indices, water quality was assessed as non-impacted. The faunas were diverse, well-balanced, and composed of clean-water species. The Willsboro site was sampled again in 1999 and was assessed as non-impacted, although Impact Source Determination indicated siltation as a factor influencing the macroinvertebrate community. The sites at Elizabethtown and Willsboro were field-assessed as non-impacted in 1993.

The North Branch Bouquet River was sampled at Reber in 1998, and water quality was assessed as non-impacted. The fauna was diverse and well-balanced, with many clean-water species.

Chubb River

Slightly impacted water quality is assessed for the Chubb River near its mouth, based on macroinvertebrate sampling in 1997 and 1998. The fauna reflected minor impact from the Lake Placid (V) Sewage Treatment Plant discharge.

Corbeau Creek

Based on 1998 sampling at Coopersville, water quality was assessed as slightly impacted. The fauna was dominated by filter-feeding caddisflies, and nutrient enrichment was indicated. Possible contributors to the impact include an upstream wetland, and numerous farms in the watershed.

English Brook

This stream was sampled in 1998 below the Route 9 bridge in Lake George. Based on macroinvertebrate indices, water quality was assessed as slightly impacted. Impact Source Determination indicated nonpoint source nutrient enrichment. Mayflies, stoneflies, and caddisflies were numerous at this site, and the enrichment was considered minor.

Finkle Brook

Based on macroinvertebrate sampling in 1998 at Bolton Landing, water quality was assessed as non-impacted. Productivity appeared low, but the fauna was dominated by clean-water species of mayflies, stoneflies, and caddisflies.

Five Mile Creek

Water quality was assessed as slightly impacted, based on 1998 macroinvertebrate sampling at Crown Point. Impact Source Determination indicated effects of nonpoint source nutrient enrichment. Filamentous algae and filter-feeding caddisflies were abundant in the stream. Dairy farms are numerous in this watershed.

Great Chazy River

Non-impacted water quality was assessed for the reach from Altona to Champlain, based on macroinvertebrate sampling in 1993, 1994, and 1998. Most sites were dominated by bedrock, with small areas of rubble. The rubble sampled contained diverse populations of mayflies, stoneflies, and caddisflies.

The North Branch Great Chazy River was sampled from Ellenburg to Mooers Forks. Non-impacted water quality was assessed for the Ellenburg site, and slightly impacted water quality was assessed for the Mooers Forks site, based on 1998 macroinvertebrate sampling. The fauna was heavily dominated by *Brachycentrus* caddisflies, and ISD denoted nonpoint source nutrient enrichment as the primary stressor.

Hague Brook

The macroinvertebrate sample taken in 1998 was above the Route 9N bridge in Hague. Although productivity seemed low, all indices were within the range of non-impacted water quality. Mayflies, stoneflies, and caddisflies were well-represented. This site was previously sampled in 1996 and was assessed as slightly impacted, although this impact may have been a remnant of severe flooding in January, 1996.

Halfway Creek

Water quality in Halfway Creek ranges from non-impacted to slightly impacted, based on sampling at several sites from Glens Falls to Fort Ann in 1999 and 2001. Non-impacted water quality was documented at the upstream site above Glens Falls. A decline in water quality in the reach downstream of the city of Glens Falls was documented in 1999 sampling. In 1999 sampling, PAHs (polycyclic aromatic hydrocarbons) in crayfish tissues were elevated at many stream locations, and were highest downstream of Glens Falls, likely due to urban runoff. Crayfish were resampled in 2001, and PAHs were not elevated at any sites. It was postulated that high levels of PAHs in 1999 may have been the result of a heavy flood one week before sampling, causing more urban runoff. Community analysis in 2001 found a tributary originating in Crandall Park to be moderately impacted, and likely contributing urban runoff to Halfway Creek. The lower portion of the creek from Glens Falls to Fort Ann appears to be affected by nonpoint source nutrient enrichment and siltation. Fish communities sampled in 1999 in Halfway Creek were dominated by coolwater species, but with few gamefish species present (Doug Carlson, DEC, pers. comm.). Water quality assessments based on fish communities correlated well with assessments based on macroinvertebrate communities for upstream sites, and showed differences at downstream sites (Figure 10-2).

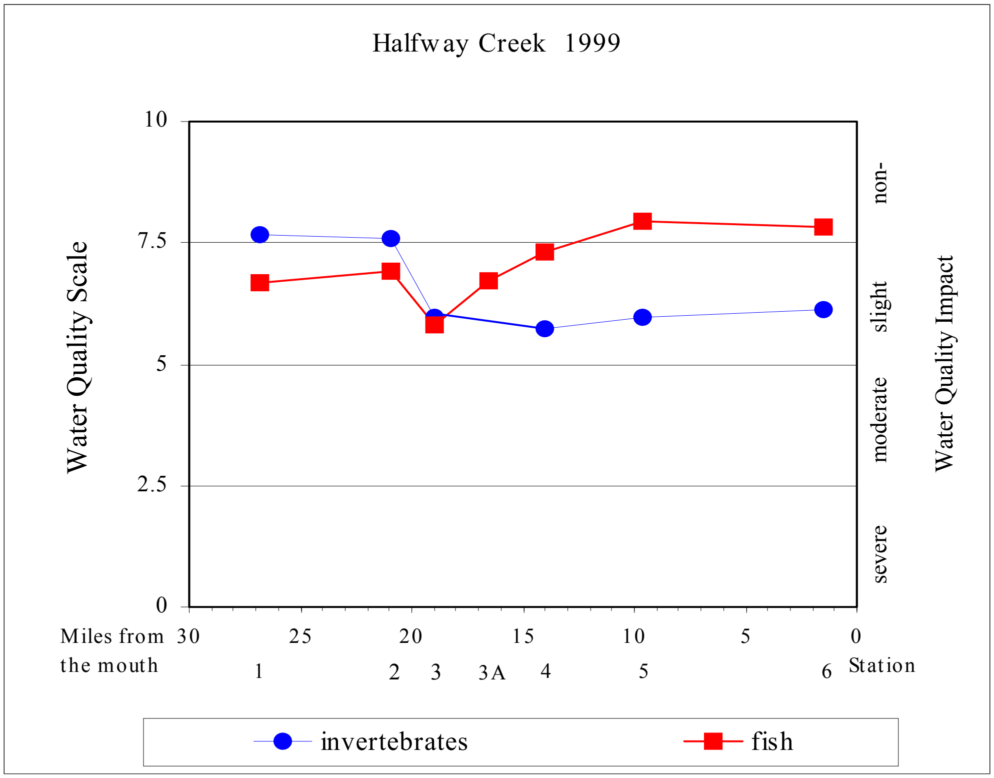


Figure 10-2. Water quality in Halfway Creek, Glens Falls to Fort Ann, 1999, as determined by macroinvertebrate sampling and fish sampling.

Hoisington Brook

Non-impacted water quality was assessed for a site in Westport, based on 1998 macroinvertebrate sampling. The sample passed the field screening criteria, and was not retained. No prior data were available for the stream.

Indian Brook

Non-impacted water quality was assessed for the North Bolton site, based on 1998 sampling at the Route 9N bridge. The sample passed the field screening criteria, and was not retained. The site was sampled again in 1999; the retained sample confirmed non-impacted water quality, with all macroinvertebrate indices in the non-impacted range.

Jackson Brook

Water quality was assessed as non-impacted for this tributary of the Ausable River based on 1998 macroinvertebrate sampling at Au Sable Forks. Mayflies, stoneflies, and caddisflies were well-represented. No prior data were available for the stream.

Little Ausable River

Based on macroinvertebrate sampling at Lapham Mills in 1993, 1998, and 1999, non-impacted water quality was clearly indicated. The fauna was diverse and well-balanced, with all indices within the non-impacted range.

Little Black Brook

Non-impacted water quality was assessed for this tributary of the West Branch Ausable River, based on 1998 sampling at Haselton. The sample passed the field screening criteria, and was not retained. No prior data were available for the stream.

Little Chazy River

Current water quality in the Little Chazy River is assessed as slightly impacted, based on 1998 macroinvertebrate sampling at Chazy. The fauna was dominated by filter-feeding caddisflies, and nutrient enrichment was indicated. Many farms in the watershed are likely contributors to the nonpoint source enrichment. Previous sampling at this site in 1993 and 1994 documented non-impacted water quality, but close to the range of slight impact.

Mckenzie Brook

A site on Mckenzie Brook at Port Henry was sampled at the Route 22 bridge in 1998. Macroinvertebrate indices placed water quality as slightly impacted. Mayflies, stoneflies, and caddisflies were numerous at this site. Impact Source Determination showed likely influences of nonpoint source nutrient enrichment. Water quality problems are considered to be minor.

Mettawee River

Based on 1998 macroinvertebrate sampling at North Granville, water quality was assessed as non-impacted, though close to the range of slightly impacted. The fauna was dominated by mayflies, caddisflies, and riffle beetles. This site was assessed as slightly impacted in 1993 sampling. Further sampling is needed to document whether or not the improvement represents a genuine trend.

Mill Brook

Non-impacted water quality was assessed for this Lake Champlain tributary, based on 1998 sampling at Port Henry. The sample passed the field screening criteria, and was not retained. No prior data were available for the stream.

Mount Hope Brook

Non-impacted water quality was clearly assessed for the South Bay site, based on 1998 sampling. The sample passed the field screening criteria, and was not retained. The fauna was considered exemplary.

Mud Brook

This stream was sampled for macroinvertebrates in 1998 below the Beckwith Road bridge at Whitehall. Although the stream was very muddy, the fauna included many mayflies, stoneflies, caddisflies, riffle beetles, and hellgrammites. All indices were within the range on slight impact. Impact Source Determination showed high affinities to nutrient enrichment, siltation, and natural conditions.

Northwest Bay Brook

Non-impacted water quality was assessed for a site at North Bolton, based on 1998 sampling at the Route 9N bridge. The sample passed the field screening criteria, and was not retained. No prior data were available for the stream.

Palmer Brook

A site at Ausable Forks was sampled downstream of the Palmer Hill Road bridge. Based on 1998 macroinvertebrate sampling, water quality was assessed as non-impacted. The fauna was dominated by intolerant species of mayflies and caddisflies, with stoneflies and hellgrammites also present. No prior data were available for the stream.

Poultney River

The Hampton Flats site was sampled above the Route 22A bridge in 1998, and was assessed as non-impacted. Although the stream bottom was considered poor habitat, the fauna was diverse and well-balanced, with mayflies dominant. This site was assessed as slightly impacted in 1993 sampling. Further sampling is need to document whether or not the improvement represents a genuine trend.

Putnam Creek

Non-impacted water quality was assessed for Putnam Creek at Factoryville, based on sampling at the Route 2 bridge in 1999. The sample was field-assessed and was not retained for laboratory analysis. No prior data were available for the stream.

Richelieu River

Water quality in the Richelieu River at Rouses Point is currently assessed as slightly impacted. The 1999 Ponar sample appeared to reflect slight organic enrichment. The 1998 Ponar sample was assessed as non-impacted. The diverse fauna was dominated by crustaceans, worms, mollusks, and midges. Ponar samples taken in 1993 and 1994 were also assessed as non-impacted.

Salmon River

Non-impacted water quality was assessed for the Salmon River at South Plattsburgh, based on macroinvertebrate sampling in 1993, 1998, and 1999. The fauna was dominated by clean-water species of mayflies, stoneflies, and caddisflies.

Saranac River

The Saranac River currently is considered non-impacted, with the exception of the most downstream site in Plattsburgh. Six sites were sampled in 1993 and were assessed as non-impacted from Riverview to Plattsburgh. The Bloomingdale site was re-sampled in 1998, and was assessed as non-impacted. The site in Saranac Lake is considered to be affected by impoundment effects rather than water quality impacts. The 1999 sampling at the Plattsburgh site yielded an assessment of slightly impacted, with siltation denoted as a possible stressor. Continued monitoring of this site is recommended to determine if the decline is genuine.

Non-impacted water quality was also assessed for the North Branch Saranac River, based on 1998 macroinvertebrate sampling at Riverview. The sample passed the field screening criteria, and was not retained. This site was previously assessed as non-impacted in 1993 sampling.

Spruce Mill Creek

Water quality was assessed as non-impacted, based on 1998 macroinvertebrate sampling at Reber. Although the stream bottom was largely composed of sand, the fauna was dominated by clean-water mayflies, caddisflies, riffle beetles, and stoneflies. No prior data were available for the stream.

Ticonderoga Creek

Water quality remains slightly impacted in Ticonderoga Creek, based on 1998 macroinvertebrate sampling at Ticonderoga. The assessment for this site has been mostly the same since 1987. Sampling in 1993 pointed to non-impacted conditions, but the 1994 sample was assessed as slightly impacted. ISD indicated that the primary stressors were nonpoint source runoff and toxicity, possibly denoting urban runoff.

West Brook

Based on 1999 sampling of 3 sites at Lake George, water quality in West Brook is generally good, ranging from non-impacted upstream to slightly impacted downstream. Road runoff, groundwater contributions, and differences in habitat and land use appear to account for the faunal differences seen. A groundwater seep downstream of the Lake George (V) Wastewater Treatment Facility may contribute small amounts of nutrients to the stream. The downstream site was sampled for macroinvertebrates in 1998 and was assessed as moderately impacted, although very close to the range of slight impact.

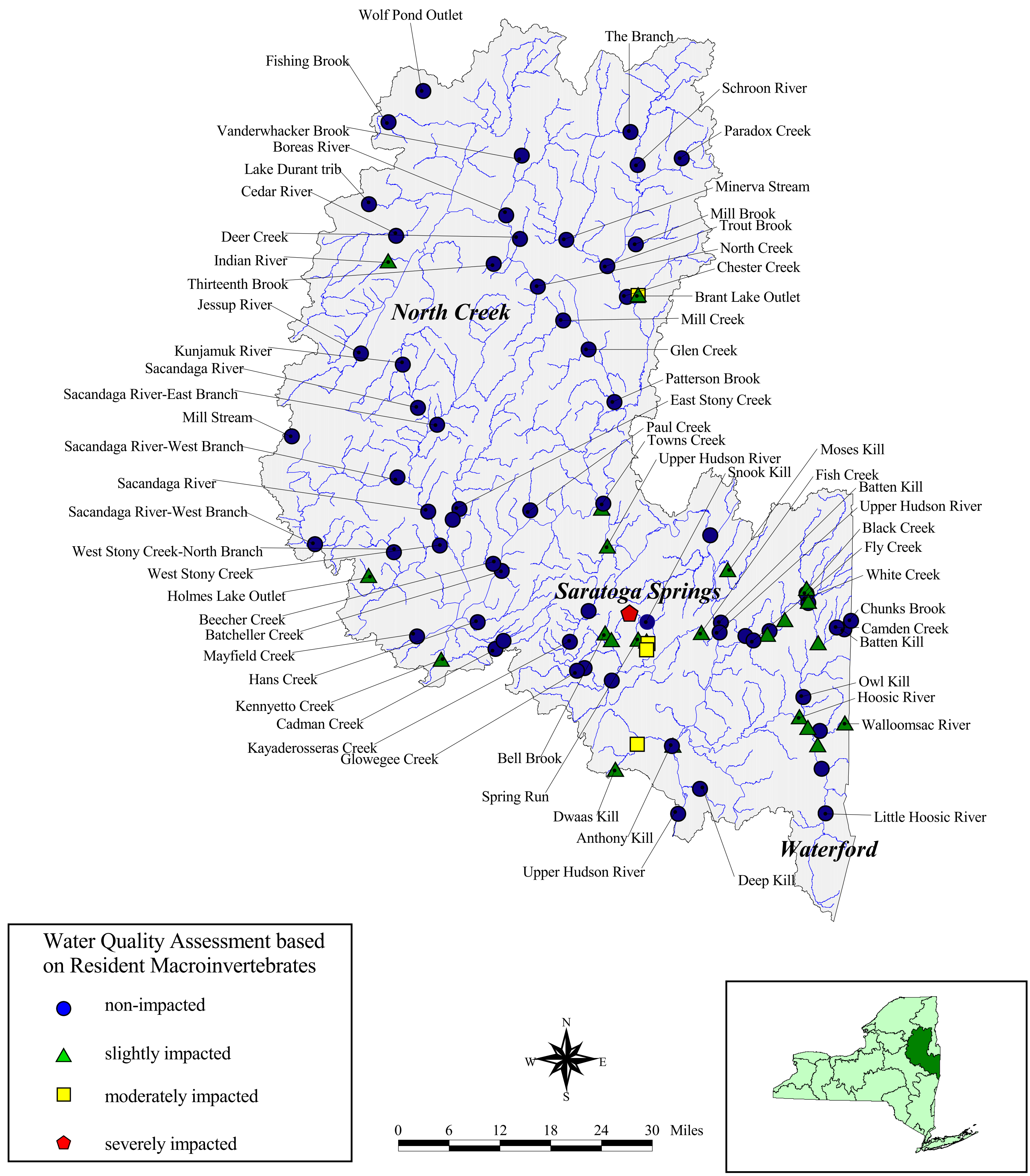
Unnamed Dodd Hill Road tributary (Hague)

Excellent water quality was diagnosed for this unnamed Lake George tributary southwest of Hague. Three sites sampled in 1996 exhibited macroinvertebrate faunas dominated by clean-water mayflies, stoneflies, and caddisflies.

Unnamed Lake George tributary 55 (Bolton Landing)

This unnamed tributary was sampled for macroinvertebrates in 1998 above the Goodman Avenue bridge at Bolton Landing. The stream bottom rocks were covered with a red-brown flocculent that appeared to be iron bacteria. The macroinvertebrate fauna was dominated by midges, although mayflies, stoneflies, and caddisflies were also numerous. Overall water quality was assessed as non-impacted, based on the indices.

Upper Hudson River Drainage Basin



UPPER HUDSON RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED									
ANTHONY KILL (ANTH)											
01	Mechanicville, above Viall St									01	02
02	Mechanicville, below Rte 4 bridge									01	
BATCHELLER CREEK (BACH)											
01	Batchellerville, above Saratoga Co Rte 7 bridge									01	
BATTEN KILL (BATT)											
VT1	Manchester Center, VT, below Union St bridge									01	
VT2	below Manchester, VT,off Riverbend Rd									01	
VT2A	Below Manchester, VT, below Manchester STP									01	
VT3	Arlington, VT, above Benedict Crossing bridge									01	
AA	Vermont border, above Rt. 313 parking area					93	94		99	01	
A	Above Shushan, Route 64 bridge		86						99	01	
B	Below Rexleigh, below Rte 22 bridge								99	01	
00	Above Battenville, 0.8 mi above bridge	84	86		88				99	01	
01	Above Center Falls, Ray Road bridge	84	86								
03	Below Center Falls, Route 29	84	86						99	01	
08	Greenwich, Hegeman Road bridge	84	86	87		93			99		
16	Clarks Mills, below bridge	84	86						99	01	
BEECHER CREEK (BECH)											
01	Edinburg, off Co Rte 4									01	
BELL BROOK (BELL)											
03	Below Greenfield Center, below Canty Rd. bridge							97			
05	Saratoga Springs, above Locust Grove Rd. bridge							97			
BLACK CREEK (BLKC)											
01	Fitch Point, above Cemetery Rd bridge								99	01	
BOREAS RIVER (BORE)											
01	Minerva, Northwoods Club Road bridge					93				01	
THE BRANCH (BRAN)											
01	North Hudson, Blue Ridge Rd @pull-off									01	
BRANT LAKE OUTLET (BRNT)											
01	Brant Lake, below Rt. 8 bridge									01	
CADMAN CREEK (CADM)											
01	Skinner Corners, below Co Rte 13 bridge									01	
CAMDEN CREEK (CAMD)											
01	below Vermont border, Hickory Hill Rd bridge								99		
CEDAR RIVER (CEDR)											
01	Indian Lake, Cedar River Road					93				01	

UPPER HUDSON RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED
CHESTER CREEK (CHST)		
01	Starbuckville, above Schroon River Rd (Co Rte 30) bridge	01
CHUNKS BROOK (CHNK)		
01	At Vermont line, above Rte 313 bridge	99 01
CLOVER MILL BROOK (CLOV)		
01	Milton, East Galway Road	87 88
02	Milton, Route 29 bridge	87 88
DEEP KILL (DKIL)		
01	Grant Hollow, below Grant Hollow Rd	01
DEER CREEK (DERC)		
01	SW of Minerva, above culvert crossing @Co Rte 37	01
DWAAS KILL (DWAS)		
01	Clifton Park, above Vischer Ferry Rd. bridge	00
03	Ushers, below culvert @Tabor Rd	01
EAST STONY CREEK (STNC)		
E	Hope Falls, below Creek Rd bridge	93 01
FISH CREEK (FISC)		
01	Saratoga, Burgoyne Road bridge	88
03	Victory Mills, Bridge Street	87 88 94 01 02
FISHING BROOK (FISB)		
01	Near Long Lake, below Rte 28N bridge	01
FLY CREEK (FLYG)		
01	Greenwich, above Rte 372	01
GLEN CREEK (GLNC)		
01	The Glen, Glen Creek Rd @dirt road to creek	01
GLOWEGEE CREEK (GLOW)		
01	Milton Center, above Lewis Rd	01
HANS CREEK (HANC)		
01	Benedict, below Fulton Co Rte 110 bridge	01
HOLMES LAKE OUTLET (HOLO)		
01	Lindsley Corners, below Rte 125	01
HOOSIC RIVER (HOOS)		
06	North Petersburg, NY/VT border at Route 346	73 83 84 85 86 87 88 02
06B	Petersburg Junction, Route 95 bridge	83 93 94 01
07	Hoosick, Rte 22, below Rte 7 bridge	83 84 85 86 01

UPPER HUDSON RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED												
HOOSIC RIVER (HOOS) cont.														
08	Hoosick Falls, Church St bridge			84	85	86							01	
09	Below Hoosick Falls, Marker Rd		83	84	85	86							01	
10	Eagle Bridge, Route 67 bridge			84	85	86	87			93			01	
11	Johnsonville, Johnsonville bridge			84	85	86			89					
12	Below Valley Falls			84										
13	Below Schaghticoke, Knickerbocker Road				85	86								
HUDSON RIVER, UPPER (UHUD)														
X	Indian Lake, at Gooley Club house													02
Y	Above Indian Lake, @confluence w/Indian River													02
A	North River, Rte 28; above 13th Brook												01	
00	North Creek at Route 28N bridge						87	88						
01A	Riparius, Route 8 bridge									93	94			02
01	Above Corinth, River St	72	77				87	88		93	94		01	
02	Below Corinth, above Spier Falls Dam	72	77											
02A	Below Corinth, below Spier Falls Dam					86								
03	Above Glens Falls, Big Bay Rd peninsula	72												
04	Bakers Falls, above Bakers Falls	72		78		86								
04A	Below Fort Edward		77				87	88		93			01	
05	Below Fort Edward, below canal junction	72	77											
06	Above Fort Miller, Buoy 189	72	77			86								
07	Schuylerville, Buoy 148	72					87	88		93			01	
08	Below Schuylerville, Buoy 109	72												
09	Stillwater, Buoy 81	72				86								
10	Below Mechanicville, Buoy 39	72												
11	Above Waterford, Buoy 13	72	77				87	88		93	94		01	
12	Troy, above Troy lock, Buoy 85	72												
INDIAN RIVER (INDI)														
01	Indian Lake, Chain Lakes Road									93			01	02
JESSUP RIVER (JESS)														
01	Near Perkins Clearing, above Rte 30 bridge												01	
KAYADEROSSERAS CREEK (KAYD)														
01	Porter Corners, above Bockes Rd. bridge											97		
02	Middle Grove, below Rt. 21 bridge											97		
03	Milton Center, below Middle Line Rd. bridge											97	01	
03A	Ballston Spa, above Ralph St.													02
04	Ballston Spa, above Grays Crossing Rd. (Co. Rt. 45)									93		97	01	
KENNYETTO CREEK (KYET)														
00	Hagedorns Mills, above Co Rte 14 bridge												01	
01	Vail Mills, Route 30 bridge									93	94		01	

UPPER HUDSON RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED
KUNJAMUK RIVER (KUNJ)		
01	Long Level, below Elm Lake Rd bridge	01
LAKE DURANT TRIB (DURT)		
01	Blue Mountain Lake, off Rte 28/30,above bridge @L. Durant campground	01
LITTLE HOOSIC RIVER (HOOS)		
06A	North Petersburg, Route 346	83 84 85 86 94 01 02
MAYFIELD CREEK (MAYF)		
01	Riceville, above Knott Rd bridge	01
MILL BROOK (MLHD)		
01	Adirondack, near Redwing Rd/ Co Rt 15 intersection	01
MILL CREEK (MILW)		
01	Wevertown, Rte 8 @ pulloff up from Harrington Rd	01
MILL STREAM (MLLP)		
01	Piseco, T-Lake, above trail & stream junction	01
MINERVA STREAM (MIRV)		
01	Olmstedville, Trout Brook Rd @bridge	01
MOSES KILL (MOSE)		
01	Lick Springs, below Rte 46 bridge	01
NORTH CREEK (NORH)		
01	North Creek, Rte 28 bridge, @Ski Bowl Rd	01
OWL KILL (OWL)		
01	White Creek, Owl Kill Road bridge	93 01
PARADOX CREEK (PDOX)		
01	Paradox, below Letsonville Rd bridge	01
PATTERSON BROOK (PATR)		
01	Warrensburg, River Rd (up from Buyce Cross Rd)	01
PAUL CREEK (PAUL)		
01	Day Center, above North Shore Rd	01
SACANDAGA RIVER (SACN)		
A	Auger Falls, old Rt 8 bridge	01
B	Griffin, below Rte 8 bridge	02
00	Hope, 5 mi. below gage	93 01
01	Hadley, below Old Corinth Rd. bridge	94 01

UPPER HUDSON RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED
SACANDAGA RIVER, EAST BRANCH (SACN)		
E1	East Branch Sacandaga, below Griffin, pulloff on Rte 8	01
SACANDAGA RIVER, WEST BRANCH (SACN)		
W1	West Branch Sacandaga @Arietta, above Rte 10 bridge	01
W2	West Branch Sacandaga @Blackbridge, above Blackbridge Rd bridge	01
SCHROON RIVER (SCHR)		
00	Schroon Falls, under Rte 9 bridge	94 01
01A	Warrensburg, above Rt. 9 bridge	93 94 01 02
01	Warrensburg, Route 418 bridge	87 88
SNOOK KILL (SNOK)		
01	Dimmick Corners, above Dimmick Rd	01
SPRING RUN (SRUN)		
00	Saratoga Springs, Excelsior @East Ave	02
01	Saratoga Springs, above Excelsior Springs Dr	01 02
02	Saratoga Springs, above Weibel Ave	01
03	Saratoga Springs, below Gilbert Rd	01
04	Saratoga Springs, below Union Ave	01
THIRTEENTH BROOK (THIR)		
01	North River, under gap btwn Rte 28 & pulloff bridges	01
TOWNS CREEK (TWNS)		
01	Lake Luzerne, above Main St bridge	01
TROUT BROOK (TBRK)		
01	Pottersville, Rte 9 & 87 bridge; below bridge (I-87 northbound)	01
VANDERWHACKER BROOK (WACK)		
01	Aiden Lair, above Rte 28 bridge	01
WALLOOMSAC RIVER (WALL)		
01	Riverside School, Vt., below Henry Bridge	83 84 85 89 91
02	North Bennington, Vt., below WWTF	83 84 85 89 91
03	Above Walloomsac, Cottrell Rd	83 84 85 89 91 93 94
04	North Hoosick, Rte 22 bridge	83 84 85 89 91 01
WEST STONY CREEK (STNC)		
W	Benson, above West Stony Creek Rd	01
N	(North Branch) Upper Benson, below Co Rte 6 bridge	01

UPPER HUDSON RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED	
WHITE CREEK (WHIT)			
01	Salem; Greenwich Jct, above Hanks Rd bridge	01	02
WOLF POND OUTLET (WOPO)			
01	Newcomb, Arbutus Lake Rd bridge - ESF Huntington Forest	01	

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE UPPER HUDSON RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Anthony Kill, Mechanicville, above Viall St	non-impacted	no prior data
Anthony Kill, Mechanicville, below SR 4	non-impacted	no prior data
Batcheller Creek, Batchellerville	non-impacted	no prior data
Batten Kill, Manchester Center	non-impacted	no prior data
Batten Kill, below Manchester, off Riverbend Rd	non-impacted	no prior data
Batten Kill, below Manchester, below Manchester STP	non-impacted	no prior data
Batten Kill, Arlington	non-impacted	no prior data
Batten Kill, Vermont border	non-impacted	no prior data
Batten Kill, above Shushan	slightly impacted	**DECLINED**
Batten Kill, below Rexleigh	non-impacted	no prior data
Batten Kill, above Battenville	slightly impacted	**DECLINED**
Batten Kill, below Center Falls	slightly impacted	**DECLINED**
Batten Kill, Greenwich	non-impacted	no change
Batten Kill, Clarks Mills	slightly impacted	**DECLINED**
Beecher Creek, Edinburg	non-impacted	no prior data
Bell Brook, below Greenfield Center	slightly impacted	no prior data
Bell Brook, Saratoga Springs	slightly impacted	no prior data
Black Creek, Fitch Point	slightly impacted	no prior data
Boreas River, Minerva	non-impacted	no prior data
The Branch, North Hudson	non-impacted	no prior data
Brant Lake Outlet, Brant Lake	slightly impacted	no prior data
Cadman Creek, Skinner Corners	non-impacted	no prior data
Camden Creek, below Vermont border	non-impacted	no prior data
Cedar River, Indian Lake	non-impacted	no prior data
Chester Creek, Starbuckville	non-impacted	no prior data
Chunks Brook, at Vermont line	non-impacted	no prior data
Deep Kill, Grant Hollow	non-impacted	no prior data
Deer Creek, SW of Minerva	non-impacted	no prior data
Dwaas Kill, Clifton Park	slightly impacted	no prior data
Dwaas Kill, Ushers	moderately impacted	no prior data
East Stony Creek, Hope Falls, below Creek Rd	non-impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE UPPER HUDSON RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Fish Creek, Victory Mills	slightly impacted	no change
Fishing Brook, near Long Lake	non-impacted	no prior data
Fly Creek, Greenwich	non-impacted	no prior data
Glen Creek, The Glen	non-impacted	no prior data
Glowegee Creek, Milton Center	non-impacted	no prior data
Hans Creek, Benedict	non-impacted	no prior data
Holmes Lake Outlet, Lindsley Corners	slightly impacted	no prior data
Hoosic River, North Petersburg	slightly impacted	no change
Hoosic River, Petersburg Junction	slightly impacted	no change
Hoosic River, Hoosick	non-impacted	**IMPROVED**
Hoosic River, Hoosick Falls	slightly impacted	no change
Hoosic River, Hoosick Junction	slightly impacted	no change
Hoosic River, Eagle Bridge	slightly impacted	no change
Hudson River, Upper, Indian Lake	non-impacted	no prior data
Hudson River, Upper, Indian Lake, @ confluence with Indian River	slightly impacted	no prior data
Hudson River, Upper, North River	non-impacted	no prior data
Hudson River, Upper, Riparius	non-impacted	no prior data
Hudson River, Upper, Corinth	slightly impacted	**IMPROVED**
Hudson River, Upper, Fort Edward	non-impacted	**IMPROVED**
Hudson River, Upper, Schuylerville	non-impacted	**IMPROVED**
Hudson River, Upper, Waterford	non-impacted	**IMPROVED**
Indian River, Indian Lake	slightly impacted	no prior data
Jessup River, near Perkins Clearing	non-impacted	no prior data
Kayaderosseras Creek, Porter Corners	non-impacted	no prior data
Kayaderosseras Creek, Middle Grove	non-impacted	no prior data
Kayaderosseras Creek, Milton Center	non-impacted	no prior data
Kayaderosseras Creek, Ballston Spa, above Ralph St.	slightly impacted	no prior data
Kayaderosseras Creek, Ballston Spa, Co. Rt. 45	non-impacted	no prior data
Kennyetto Creek, Hagedorns Mills	non-impacted	no prior data
Kennyetto Creek, Vail Mills	slightly impacted	no prior data
Kunjamuk River, Long Level	non-impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE UPPER HUDSON RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Lake Durant trib, Blue Mountain Lake	non-impacted	no prior data
Little Hoosic River, North Petersburg	non-impacted	no change
Mayfield Creek, Riceville	non-impacted	no prior data
Mill Brook, Adirondack	non-impacted	no prior data
Mill Creek, Wevertown	non-impacted	no prior data
Mill Stream, Piseco	non-impacted	no prior data
Minerva Stream, Olmstedville	non-impacted	no prior data
Moses Kill, Lick Springs	slightly impacted	no prior data
North Creek, North Creek	non-impacted	no prior data
Owl Kill, White Creek	non-impacted	no prior data
Paradox Creek, Paradox	non-impacted	no prior data
Patterson Brook, Warrensburg	non-impacted	no prior data
Paul Creek, Day Center	non-impacted	no prior data
Sacandaga River, Auger Falls	non-impacted	no prior data
Sacandaga River, Griffin	non-impacted	no prior data
Sacandaga River, Hope	slightly impacted	no prior data
Sacandaga River, Hadley	slightly impacted	no prior data
Sacandaga River, East Branch, below Griffin	non-impacted	no prior data
Sacandaga River, West Branch, Arietta	non-impacted	no prior data
Sacandaga River, West Branch, Blackbridge	non-impacted	no prior data
Schroon River, Schroon Falls	slightly impacted	no prior data
Schroon River, Warrensburg	non-impacted	no prior data
Snook Kill, Dimmick Corners	non-impacted	no prior data
Spring Run, Saratoga Springs, Excelsior Ave. @ East Ave	severely impacted	no prior data
Spring Run, Saratoga Springs, above Excelsior Springs Dr.	severely impacted	no prior data
Spring Run, Saratoga Springs, above Weibel Ave	slightly impacted	no prior data
Spring Run, Saratoga Springs, below Gilbert Rd	moderately impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE UPPER HUDSON RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Spring Run, Saratoga Springs, below Union Ave	moderately impacted	no prior data
Thirteenth Brook, North River	non-impacted	no prior data
Towns Creek, Lake Luzerne	non-impacted	no prior data
Trout Brook, Pottersville	non-impacted	no prior data
Vanderwhacker Brook, Aiden Lair	non-impacted	no prior data
Walloomsac River, above Walloomsac	slightly impacted	no change
Walloomsac River, North Hoosick	non-impacted	no change
West Stony Creek, Benson	non-impacted	no prior data
West Stony Creek, North Branch, Upper Benson	non-impacted	no prior data
White Creek, Salem	non-impacted	no prior data
Wolf Pond Outlet, Newcomb	non-impacted	no prior data

REPORTS OF MACROINVERTEBRATE SURVEYS WITHIN THE UPPER HUDSON RIVER WATERSHED

STREAM	YEAR OF SURVEY	REPORT
Cataract Brook	2002	HBRW
Batten Kill	1984	DOH,1985
Batten Kill	1986	SBU,1987
Batten Kill	1999	SBU,1999
Batten Kill	2001	SBU,2002
Hamilton Co. Streams	2000	Ham. Co.
Hoosic River	1983	DOH,1983
Hoosic River	2001	SBU,2001
Kayaderosseras Creek	1997	SBU,1998
Millington Brook	2001	HBRW
Millington Brook	2002	HBRW
Spring Rum	2002	SBU,2002
Upper Hudson River	1972	DOH
Walloomsac River	1984	DOH,1985
Walloomsac River	1991	SBU,1991
White Creek	2001	HBRW
Watershed Streams	1987-1988	RIBS,1990

AVON	Avon Pollution Investigations Unit, Div. of Fish & Wildlife, NYS DEC
DOH	New York State Department of Health
Ham. Co.	Hamilton County Soil & Water Conservation District
HBRW	Hudson Basin River Watch, Rapid Watershed Assessment Program
RIBS	Rotating Intensive Basin System, Statewide Waters Assessment Section, NYS DEC
SBU	Stream Biomonitoring Unit, Division of Water, NYS DEC

Anthony Kill

Non-impacted water quality is assessed for the Anthony Kill, based on macroinvertebrate sampling at two Mechanicville sites in 2001. The fauna was dominated by clean-water mayflies. No prior data were available for the stream.

Batcheller Creek

Excellent water quality was diagnosed for this tributary of Great Sacandaga Lake, based on macroinvertebrate sampling at Batcheller in 2001. Clean-water mayflies, stoneflies, and caddisflies dominated the diverse fauna. No prior data were available for the stream

Batten Kill

Current water quality in the Batten Kill ranges between non-impacted and slightly impacted. Many sites are borderline between these two categories, depending on flow-year. In recent macroinvertebrate sampling, apparent declines in water quality were documented at Shushan, Battenville, Center Falls, and Clarks Mills, compared to 1986 conditions. Impacts appear assignable to nonpoint source nutrient enrichment. Slight increases in conductance in the river occurred since 1984 (Figure 11-1), likely related to residential and commercial development in the watershed. Further sampling is needed in the upper Batten Kill to examine the apparent trend. Crayfish collected in 1994 near the Vermont border showed endosulfan sulfate present above detection limits, and mercury present at 0.50 µg/g, exceeding the provisional level of concern of 0.20 µg/g for crayfish.

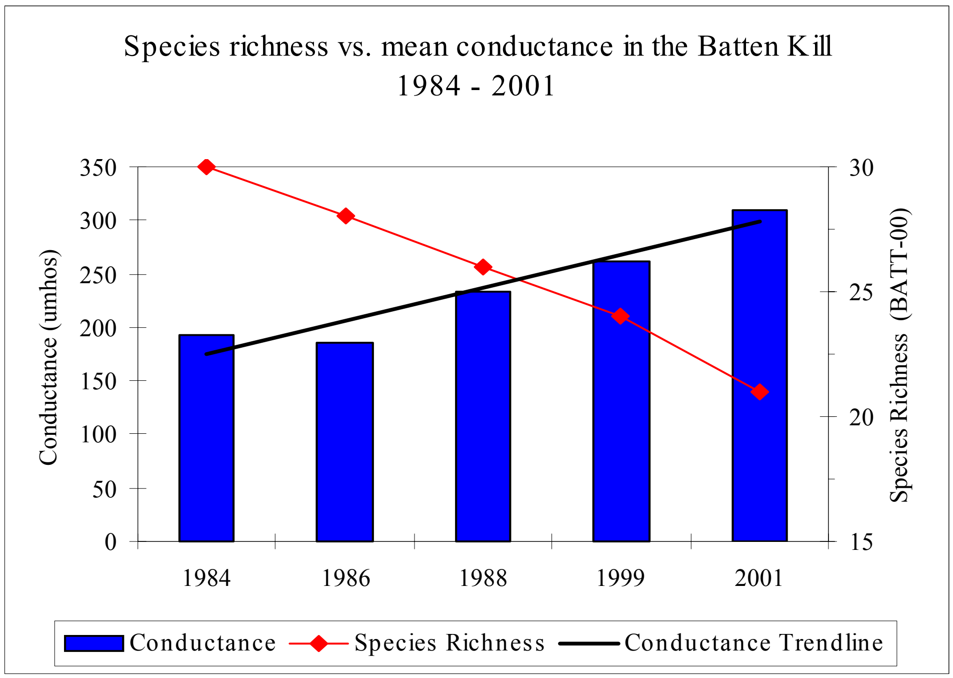


Figure 11-1. Species richness vs. mean conductance in the Batten Kill at Battenville, 1984-2001. Trendline for conductance (r=0.91) shown in black.

Beecher Creek

Excellent water quality was diagnosed for this tributary of Great Sacandaga Lake, based on macroinvertebrate sampling at Edinburg in 2001. Clean-water mayflies, stoneflies, and caddisflies dominated the diverse fauna. No prior data were available for the stream

Bell Brook

This tributary of Kayaderosseras Creek was sampled at two sites in 1997, and was assessed as slightly impacted. The fauna included some clean-water species and some species possibly indicating organic wastes.

Black Creek

Water quality in this Batten Kill tributary is assessed as slightly impacted, based on sampling at Fitch Point in 2001. ISD denoted nonpoint source nutrient enrichment as the primary stressor. This site was assessed as non-impacted in a 1999 sampling.

Boreas River

Non-impacted water quality was clearly indicated by the 1993 and 2001 macroinvertebrate samples at Minerva. Mayflies, stoneflies, and caddisflies were very numerous in the samples.

The Branch

Water quality is assessed as non-impacted for this stream. A site in North Hudson was sampled in 2001, and all metrics were within the range of the non-impacted category. Clean-water mayflies, stoneflies, and caddisflies dominated the fauna.

Brant Lake Outlet

This stream was sampled in 2001 below the Route 8 bridge, approximately one mile downstream of Brant Lake. The sample was assessed as moderately impacted, but clearly reflected impoundment effects from Brant Lake, being heavily dominated by filter-feeding caddisflies. A final corrected water quality assessment of slightly impacted is assigned to this stream, with a secondary stressor of nutrient enrichment.

Cadman Creek

Based on macroinvertebrate sampling at Skinner Corners in 2001, water quality is assessed as non-impacted for this tributary of Kennyetto Creek. The site and fauna showed minor effects of nutrient enrichment, including diatoms on stream rocks and many filter-feeding caddisflies in the sample. No prior data were available for the stream.

Camden Creek

This tributary of the Batten Kill exhibited non-impacted water quality, based on macroinvertebrate sampling at Hickory Hill Road bridge in 1999. The fauna contained many species of clean-water mayflies, stoneflies, and caddisflies.

Cedar River

Non-impacted water quality was clearly indicated by macroinvertebrate samples taken at Indian Lake in 1993 and 2001. Clean-water mayflies, stoneflies, and caddisflies were numerous.

Chester Creek

Water quality in Chester Creek is assessed as slightly impacted by nonpoint nutrient enrichment. The stream was sampled at Starbuckville, near the confluence with the Schroon River, in 2001. No prior data were available for the creek.

Chunks Brook

This tributary of the Batten Kill exhibited non-impacted water quality, based on macroinvertebrate sampling near the Vermont border in 1999. The fauna contained many species of clean-water mayflies, stoneflies, and caddisflies.

Deep Kill

Water quality was assessed as non-impacted for this Hudson River tributary, based on macroinvertebrate sampling at Grant Hollow in 2001. The stream showed evidence of nonpoint source nutrient enrichment, but faunal metrics were within the range of non-impact. No prior data were available for the stream.

Deer Creek

Non-impacted water quality is assessed for this Hudson River tributary, based on macroinvertebrate sampling near Minerva in 2001. The fauna contained many species of clean-water mayflies, stoneflies, and caddisflies. No prior data were available for the stream.

Dwaas Kill

Water quality of the Dwaas Kill in Clifton Park was assessed as slightly impacted in 2000 sampling. Nonpoint source nutrient enrichment was the primary stressor. A downstream site at Ushers was sampled in 2001, and was assessed as moderately impacted, likely reflecting additional runoff through residential and business areas.

East Stony Creek

Based on sampling at Hope Falls in 1993 and 2001, water quality was assessed as non-impacted. There was an abundance of clean-water mayflies, stoneflies, and caddisflies. No prior data were available for the stream.

Fish Creek

Monitoring of the creek has continued at the Victory Mills site. Macroinvertebrate sampling of this site in 1994 and 2001 indicated slightly impacted water quality, similar to previous findings. Nonpoint source nutrient enrichment was the primary stressor.

Fishing Brook

Water quality is assessed as non-impacted, based on sampling in 2001 east of Long Lake. Although the fauna was heavily dominated by filter-feeding caddisflies, this reflected effects of a wetland immediately upstream. The fauna included many clean-water stoneflies and mayflies. The metrics were adjusted for impoundment effects, yielding an assessment of non-impacted.

Fly Creek

Non-impacted water quality was indicated for this Batten Kill tributary by a macroinvertebrate sample taken in Greenwich in 2001. Within this category, the fauna exhibited some traits of nutrient enrichment and siltation. No prior data were available for the stream.

Glen Creek

Water quality was clearly non-impacted in this Hudson River tributary, based on sampling at The Glen in 2001. The macroinvertebrate fauna contained many species of clean-water mayflies, stoneflies, and caddisflies.

Glowegee Creek

Non-impacted water quality was indicated for this tributary of Kayaderosseras Creek by a macroinvertebrate sample taken in Milton Center in 2001. Within this category, the fauna exhibited some traits of nutrient enrichment. No prior data were available for the stream.

Hans Creek

Water quality was clearly non-impacted for this tributary of Great Sacandaga Lake. A site in Benedict was sampled in 2001, and all metrics were within the range of non-impacted conditions. The macroinvertebrate fauna contained many species of clean-water mayflies, stoneflies, and caddisflies.

Holmes Lake Outlet

Water quality was assessed as slightly impacted, based on macroinvertebrate sampling at Lindsley Corners in 2001. The primary factor affecting the fauna was the wetland area upstream. The fauna was dominated by filter-feeding caddisflies and midges. No major water quality problems were indicated.

Hoosic River

Nearly all of the Hoosic River in New York State is currently assessed as slightly impacted. A short reach at Hoosick was assessed as non-impacted in 2001 sampling, and may represent an improvement from previously documented conditions. The most upstream site at North Petersburg at the Vermont border was clearly slightly impacted by nonpoint

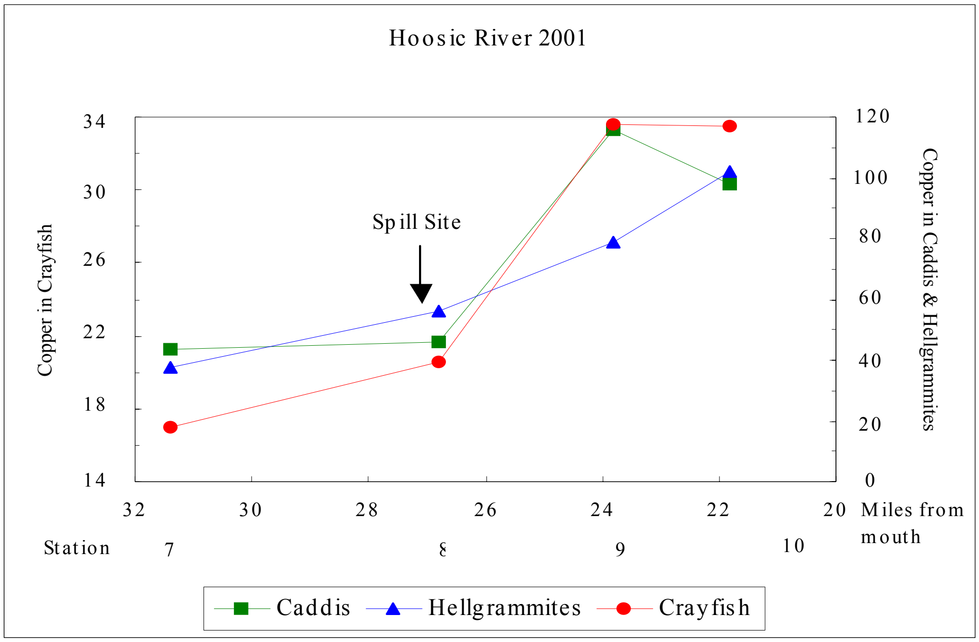


Figure 11-2. Copper levels in invertebrate tissues, Hoosic River, 2001, following a copper spill. The scale for crayfish is normalized to the scale for caddisflies and hellgrammites, based on levels of concern for each.

sources in 2002. Kick sampling at Petersburg Junction in 1993, 1994, and 2001 also indicated slightly impacted water quality. Community types suggest principal impacts were from silt and nonpoint source nutrient enrichment. Caddisflies collected in 1993 showed PCBs present at 1400 µg/kg, and caddisflies collected in 1994 also showed PCBs present at 1400 µg/kg. Crayfish collected in 1994 showed PCBs present at 520 µg/kg and four organochlorine pesticides above detection limits: 4,4'-DDE, 4,4'-DDD, 4,4'-DDT, and endosulfan sulfate.

In 2001, a large spill of copper sulfate from the Oak Mitsui plant in Hoosick Falls was investigated to determine the extent of damage to aquatic invertebrate life. The damage to resident macroinvertebrate communities in the river appeared to be slight, but significant. Although all sites downstream of the spill maintained populations of stoneflies, caddisflies, hellgrammites, and crayfish, populations of mayflies were greatly depleted downstream of Hoosick Falls. Midge populations were also greatly reduced. The estimated recovery time for community impact was one year. Copper levels in invertebrate tissues increased an average of 85% downstream of the spill, and exceeded levels of concern (Figure 11-2). The site at Eagle Bridge was assessed as slightly impacted in the 2001 sampling. This site had been assessed as non-impacted in 1993 macroinvertebrate sampling, but was slightly impacted in samplings before then.

<u>Hudson River, Upper</u>

Water quality upstream of the confluence with the Indian River was assessed as non-impacted, and water quality immediately downstream of the confluence was assessed as slightly impacted, based on sampling in 2002. It was not determined how far downstream the impact extended. Sampling at North River in 2001 clearly indicated non-impacted conditions. Non-impacted water quality was also indicated at Riparius by kick sampling in 1993 and 1994. All indices from these samples were favorable, and very similar for the two years.

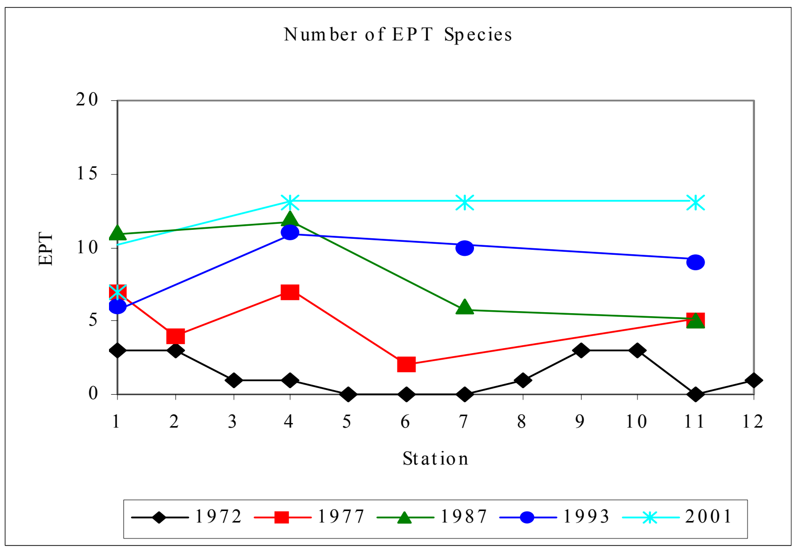


Figure 11-3. Water quality in the Upper Hudson River, Corinth to Waterford, 1972-2001, indicated by richness of clean-water mayflies, stoneflies and caddisflies (EPT).

From Corinth to Waterford, long-term improvements in the river are shown by increased EPT richness (Figure 11-3). At Corinth, water quality was assessed as slightly impacted in 1993 and 2001, representing improvement compared to previous samplings. Multiplate samples were dominated by caddisflies, with mayflies also present. Assessments of Ponar samples taken from this site in 1994 ranged from non-impacted to slightly impacted. *Brachycercus maculatus*, a member of a rare group of mayflies (Figure 11-4), was recorded for the first time from New York State in the 1994 Ponar samples from this site and the Waterford site (Burian et al., 1997). Crayfish

Figure 11-4. ***Brachycercus maculatus*****, a rare mayfly, was collected for the first time in New York State in the 1994 Ponar samples from Corinth and the Waterford site.**

collected at the Corinth site in 1993 showed titanium at 10.4 µg/g, above the provisional level of concern of 8 µg/g. Crayfish collected in 1994 showed methoxychlor above the reportable value, and no other organochlorine pesticides or PCBs above detection limits. Non-impacted water quality was assessed for the site above Fort Edward, based on multiplate sampling in 2001. This represents an improvement compared to sampling in 1987-88. In 1993 sampling, water quality had been assessed as non-impacted to slightly impacted. Mayflies and caddisflies were numerous in these samples, and stoneflies were found in the August sample.

Water quality at Schuylerville was assessed as non-impacted, based on multiplate sampling in 1993 and 2001. Mayflies and caddisflies were numerous in these samples (Figure 11-5), and stoneflies were found in some samples. These clean-water organisms were not previously collected at this site.

Non-impacted water quality was also found at Waterford in 2001 multiplate sampling. This site had been assessed as slightly impacted in 1988, and non-impacted to slightly impacted in 1993. Mayflies and caddisflies are well-represented in recent samples. Ponar sampling in 1994 assessed water quality as non-impacted to slightly impacted. PCB levels in macroinvertebrates remain a concern in the Upper Hudson River. Caddisfly larvae collected in Waterford in1993 showed total PCBs at 6400 mcg/kg, greatly exceeding the provisional level of concern of 1000 mcg/kg. Lead and copper in caddisflies also exceeded provisional levels of concern.

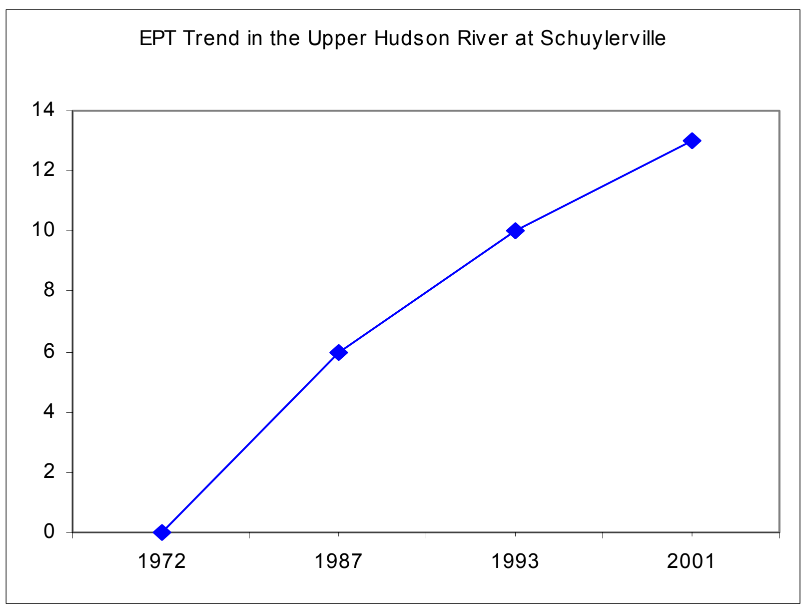


Figure 11-5. Clean-water mayflies, stoneflies, and caddisflies (EPT) in the Upper Hudson River at Schuylerville, 1972-2001.

Indian River

Water quality of the Indian River at Indian Lake was assessed as slightly impacted in 2001 and 2002, representing a decline in water quality compared to 1993, when it was assessed as non-impacted. Species richness and EPT richness illustrate this change (Figure 11-6). Present macroinvertebrate communities are sparse, with high numbers of fingernail clams. Mid-summer rafting releases from Lake Abanakee, which began in 1997, are being investigated as a possible cause of the decline.

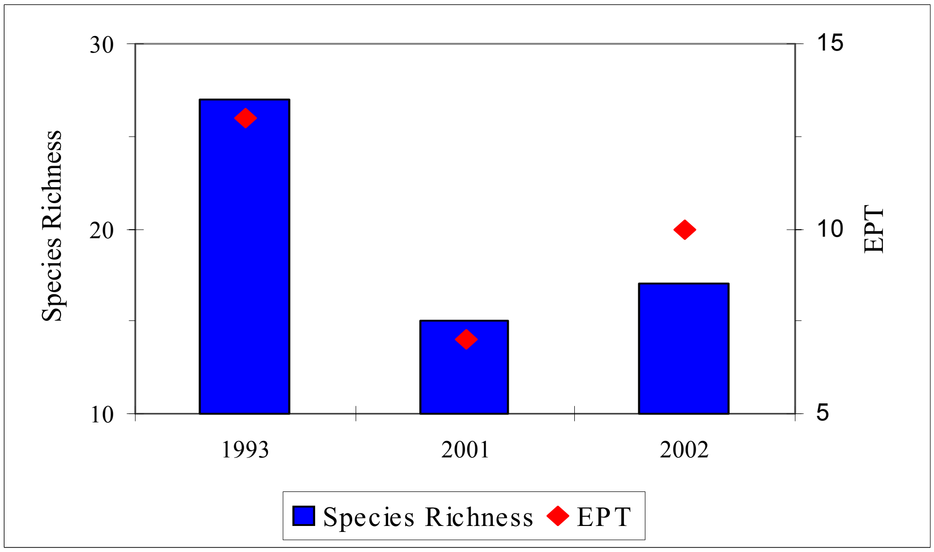


Figure 11-6. Declining species richness and EPT richness (clean-water mayflies, stoneflies, and caddisflies) in the Indian River, 1993-2001.

Jessup River

The current water quality assessment for the Jessup River is slightly impacted, although this may mostly represent effects of upstream wetlands. The fauna sampled in 2001 was dominated by filter-feeding caddisflies, but also contained mayflies and stoneflies. No prior data were available for the stream.

Kayaderosseras Creek

Current water quality in Kayaderosseras Creek is mostly assessed as non-impacted, with a small reach of slight impact. A 1997 sampling of 4 sites from Porter Corners to Ballston Spa found possible slight impacts near the headwaters and near the mouth. The headwater location at Porter Corners was determined to be due to headwater effect, and the assessment was upgraded to non-impacted. The site near the mouth at Ballston Spa was re-sampled in 2001, and was assessed as non-impacted. All four sites show some indications of nutrient enrichment, and the stream was described as being potentially vulnerable to additional nonpoint sources, as these would likely to result in substantial changes in the stream ecosystem. Sampling in 2002 at a site in Ballston Spa showed slight impact from nutrient enrichment.

Kennyetto Creek

Water quality at Vail Mills was assessed as slightly impacted in 2001 sampling. ISD showed greatest affinity to natural communities and secondary affinities to nonpoint source nutrient enrichment. Low-flow conditions in 2001 may be primarily responsible for the assessment. Previous assessments in 1993 and 1994 showed non-impacted water quality. Sampling upstream at Hagedorns Mills in 2001 indicated non-impacted water quality.

Kunjamuk River

A site on the Kunjamuk River at Long Level was sampled for macroinvertebrates in 2001. The metrics denoted slightly impacted water, although this likely reflects wetland effects in a headwater situation, and the assessment is upgraded to non-impacted. The fauna was sparse, but contained clean-water mayflies, stoneflies, and caddisflies.

Lake Durant tributary, unnamed

This stream was sampled at the Lake Durant Campground near Blue Mountain Lake. The macroinvertebrate sampled was dominated by clean-water mayflies, stoneflies, and caddisflies. The site was field-assessed as non-impacted, and the sample was not retained.

Little Hoosic River

Non-impacted water quality continues to be assessed for this tributary of the Hoosic River, based on 2002 sampling. Previous sampling in 2001 indicated slight impact from nonpoint source nutrient enrichment, although sampling in 1994 and all previous samplings showed no impact. The impact measured in 2001 may be flow-related. Continued monitoring is recommended at this site.

Mayfield Creek

Macroinvertebrate sampling at Riceville in 2001 yielded an assessment of non-impacted water quality for this tributary of Great Sacandaga Lake. The fauna was dominated by clean-water mayflies and caddisflies, and all metrics were within the range of very good water quality.

Mill Brook

This small tributary of Schroon Lake was sampled at Adirondack in 2001, and was assessed as non-impacted. Two metrics were within the range of slight impact, and the headwater correction factor was applied to these. The stream habitat of boulders was not conducive to a diverse fauna.

Mill Creek

This Hudson River tributary in Wevertown was assessed as non-impacted in 2001 macroinvertebrate sampling. The fauna was dominated by clean-water caddisflies and mayflies, and all metrics were within the range of very good water quality. No prior data were available for the stream.

Mill Stream

A remote site on this Piseco Lake tributary was sampled in the vicinity of Piseco in 2001. A very sparse fauna was found, dominated by clean-water stoneflies. The original metrics placed the assessment as slightly impacted. When these were corrected for headwater conditions, the final assessment was non-impacted.

Minerva Stream

Water quality is assessed as non-impacted for this Trout Brook tributary, based on macroinvertebrate sampling at Olmstedville in 2001. The fauna included many clean-water mayflies and stoneflies, but was dominated by filter-feeding caddisflies. No prior data were available for the stream.

Moses Kill

Water quality is assessed as slightly impacted for the Moses Kill, based on macroinvertebrate sampling near Lick Springs in 2001. The fauna was dominated by filter-feeding caddisflies, reflecting nutrient enrichment and impoundment effects. No prior data were available for the stream.

North Creek

Based on macroinvertebrate sampling in 2001, water quality is assessed as non-impacted. The fauna was dominated by mayflies and caddisflies, and all metrics were within the range of non-impacted water quality. No prior data were available for the stream.

Owl Kill

Non-impacted water quality was assessed for the Owl Kill, based on sampling at White Creek in 1993 (field-assessment only) and 2001. The fauna was diverse, and indicated light nutrient enrichment.

Paradox Creek

This small tributary of Paradox Lake was sampled for macroinvertebrates in 2001. The metrics initially indicated slightly impacted water quality, although this likely reflected headwater condition and less-than-ideal habitat. The stream was very shallow, with large rocks. Overall water quality is corrected to non-impacted.

Patterson Brook

Non-impacted water quality was indicated for this tributary of the Upper Hudson River, based on sampling at Warrensburg in 2001. The fauna was dominated by clean-water mayflies, stoneflies, and caddisflies. No prior data were available for the stream.

Paul Creek

Water quality for this tributary of Great Sacandaga Lake is assessed as non-impacted, based on macroinvertebrate sampling at Day Center in 2001. The fauna included clean-water mayflies and stoneflies, but was dominated by filter-feeding caddisflies. ISD indicated that nonpoint source nutrient enrichment was a factor. No prior data were available for the stream.

Sacandaga River

Non-impacted water quality is indicated at Auger Falls, based on a 2001 macroinvertebrate sample. At Hope, water quality was assessed as slightly impacted in 2001 sampling. Species richness was low and aquatic worms dominated the sample, indicating possible organic wastes. This site had been assessed as non-impacted in 1993. Further sampling is recommended to determine if the 2001 assessment was anomalous.

Sampling at Hadley just above the confluence with the Hudson River in 2001 yielded an assessment of slight impact. The assessment for this site in 1994 was moderately impacted. These assessments mostly reflect impoundment effects and variable reservoir releases, as the site experiences great diurnal fluctuation in flows. Daytime flows are high, while nighttime flows are negligible, with little or no water being released from the dam.

The East Branch of the Sacandaga River was assessed as non-impacted in 2001, based on macroinvertebrate sampling at Griffin. The fauna included many clean-water mayflies, stoneflies, and caddisflies.

The West Branch of the Sacandaga River was sampled upstream at Arietta and near the mouth at Blackbridge in 2001. The Arietta sample appeared to be limited by headwater conditions. Applying the correction factor resulted in an assessment of non-impacted water quality. The Blackbridge site was also assessed as non-impacted.

Schroon River

The upstream site at Schroon Falls was assessed as slightly impacted in 2001. Although the fauna contained many clean-water mayflies, stoneflies, and caddisflies, species richness was low, possibly due to the substrate of boulders embedded in sand. A similarly reduced fauna was found at the downstream Warrensburg site. Previous sampling assessed the Schroon Falls site as non-impacted in 1994. The Warrensburg site was assessed as non-impacted in 1994, slightly impacted in 1993, and non-impacted in 1987 and 1988 . Further sampling of these sites is recommended to determine if the decline is genuine.

Snook Kill

A site at Dimmick Corners was sampled for macroinvertebrates in 2001. Non-impacted water quality was assessed, although the fauna also reflected light effects of nonpoint source nutrient enrichment. The fauna included clean-water mayflies and stoneflies, but was dominated by filter-feeding caddisflies.

Spring Run

This Saratoga Springs stream was sampled at five sites in 2001 and 2002, and water quality ranged from slightly impacted to severely impacted. Severe impacts caused by sewage inputs were documented closest to the stream source. Very high conductance readings were recorded in the stream in the 2002 sampling.

Thirteenth Brook

Water quality was clearly assessed as non-impacted for this stream, based on macroinvertebrate sampling at North River in 2001. The fauna was dominated by clean-water mayflies. No prior data were available for the stream.

Towns Creek

Non-impacted water quality was assessed for Towns Creek in 2001. The site was a short distance downstream of the outlet of Lake Luzerne, and impoundment effect was the primary faunal determinant. Filter-feeding caddisflies dominated the fauna, although clean-water mayflies and stoneflies were also present. An impoundment correction factor was applied to the initial assessment of slight impact, resulting in a final assessment of non-impacted.

Trout Brook

Water quality was clearly assessed as non-impacted for this stream, based on macroinvertebrate sampling at Pottersville in 2001. The fauna was dominated by clean-water mayflies, with many species of stoneflies and caddisflies. No prior data were available for the stream.

VanderWhacker Brook

This small tributary of the Boreas River was sampled north of Aiden Lair in 2001. The macroinvertebrate sample was field-assessed as non-impacted, and was not retained. The fauna contained a diversity of clean-water species of mayflies, stoneflies, and caddisflies.

Walloomsac River

Water quality of the Walloomsac River currently ranges from non-impacted to slightly impacted, exhibiting no change compared to assessments of 1991. The downstream site at North Hoosick was assessed as non-impacted in 2001. Although the fauna indicated some effects of nutrient enrichment and siltation, all metrics were within the range of non-impacted water quality. Previous sampling at the Cottrell Road site in Walloomsac yielded assessments of slightly impacted, based on the 1993 and 1994 kick sampling. Most indices were borderline non-impacted. Community types suggested silt was the primary influence on the fauna.

West Stony Creek

Based on sampling near the confluence with the Sacandaga River at Benson in 2001, water quality was assessed as non-impacted. There was an abundance of clean-water mayflies, stoneflies, and caddisflies. The North Branch of West Stony Creek, sampled at Upper Benson in 2001, was also assessed as non-impacted.

White Creek

This tributary of the Batten Kill exhibited non-impacted water quality, based on macroinvertebrate sampling above Hanks Road bridge near Salem in 1999 and 2001. The fauna contained many species of clean-water mayflies, stoneflies, and caddisflies. An intensive study of White Creek by Hudson Basin River Watch in 2001 found elevated levels of nitrogen and fecal coliforms at most sites.

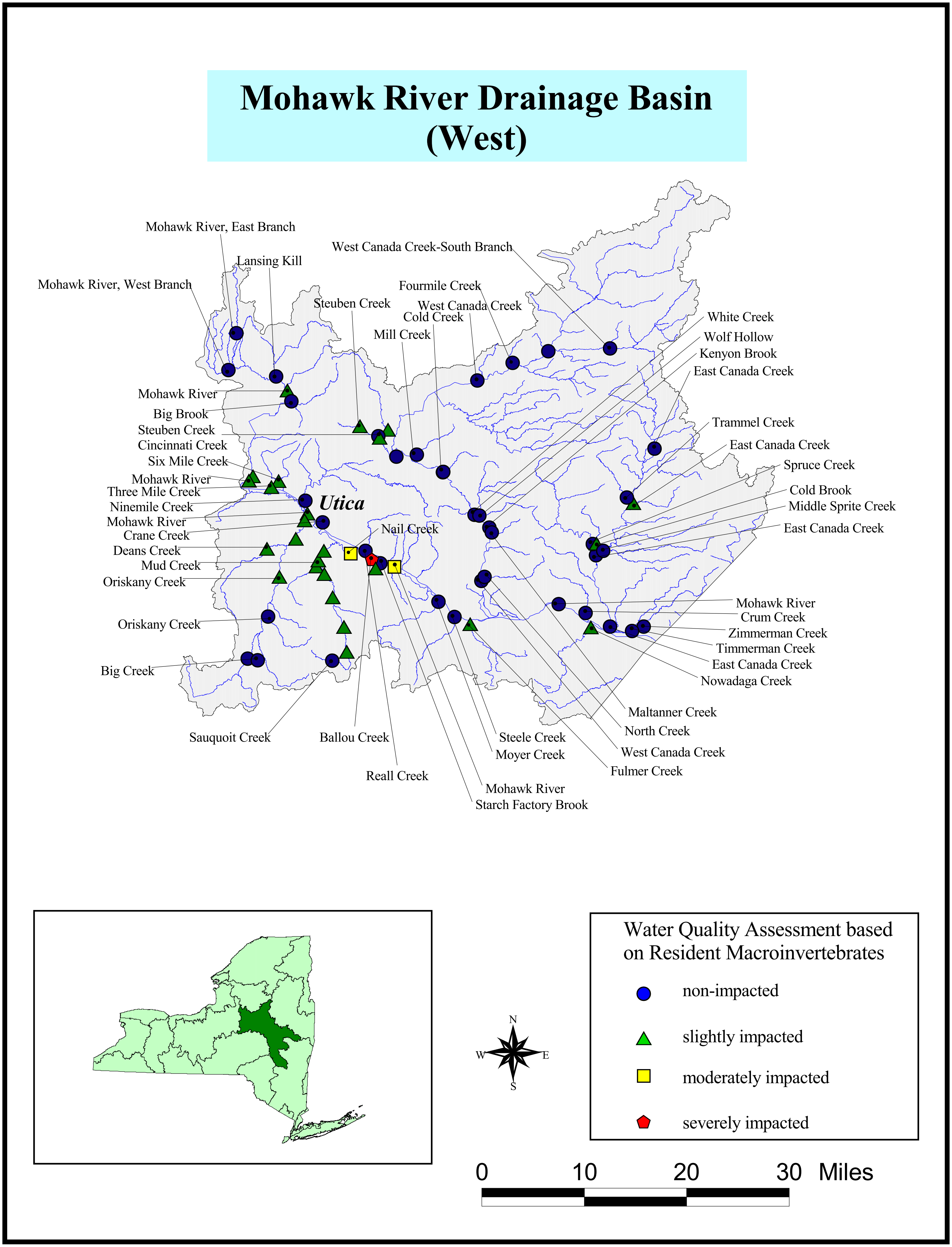
Wolf Pond Outlet

Non-impacted water quality was assessed for this stream near Newcomb, based on macroinvertebrate sampling in 2001. Although the fauna exhibited some impoundment effects, metrics placed the final assessment as non-impacted. No prior data were available for the stream.

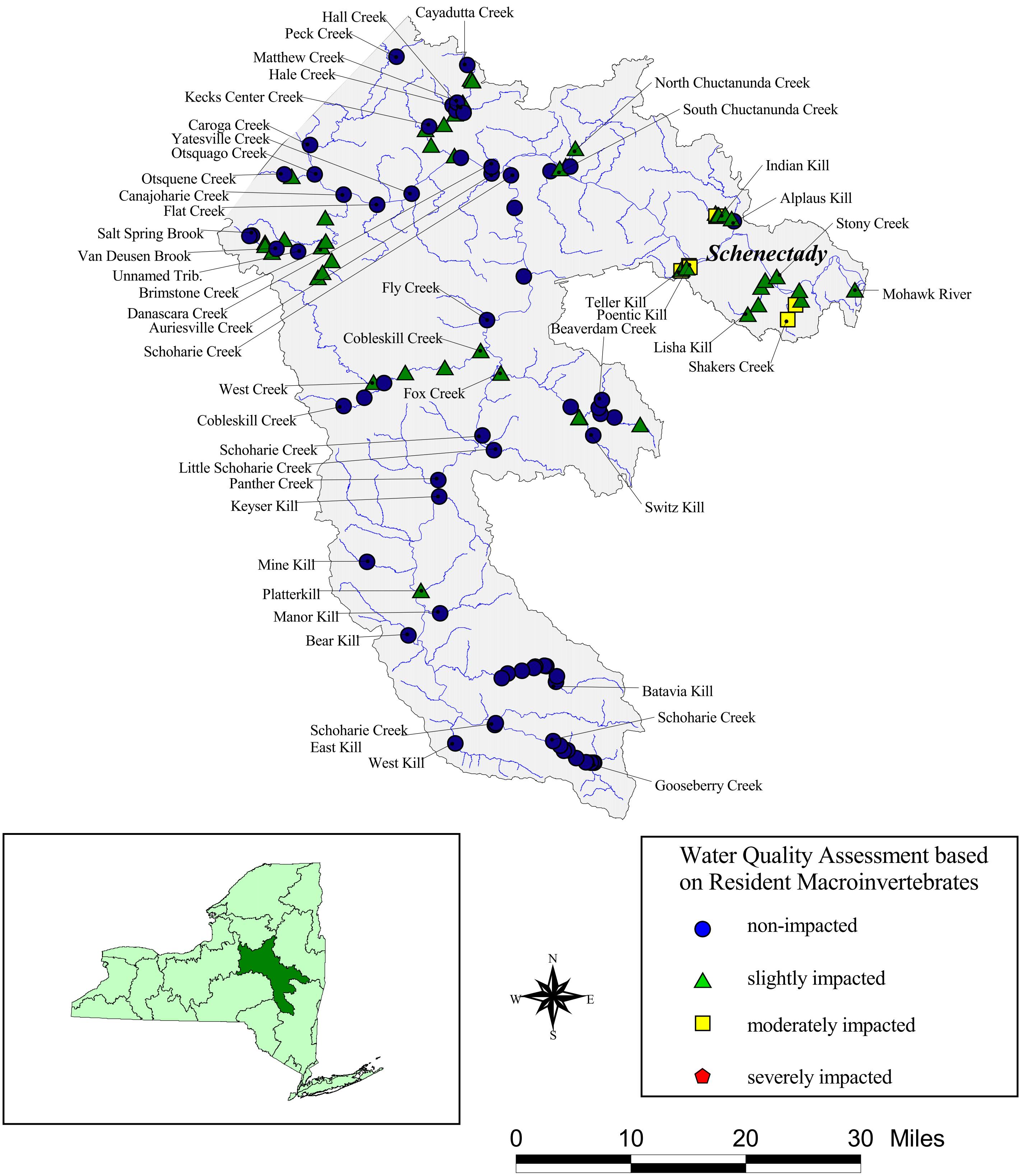
Literature cited

Burian, S. K., M. A. Novak, R. W. Bode, and L. E. Abele. 1997. New record of *Brachycercus maculatus* Berner (Ephemeroptera: Caenidae) from New York and a key to larvae of the Northeastern species. The Great Lakes Entomologist (30(3): 85-88.


Figure 11-7. Sampling the Indian River downstream of Lake Abanakee, 2002.


Mohawk River Drainage Basin (West)
Mohawk River, East Branch
Lansing Kill
Mohawk River, West Branch
West Canada Creek-South Branch
Fourmile Creek
Steuben Creek
West Canada Creek
Cold Creek
Mill Creek
White Creek
Wolf Hollow
Kenyon Brook
East Canada Creek
Mohawk River
Big Brook
Steuben Creek
Cincinnati Creek
Six Mile Creek
Mohawk River
Three Mile Creek
Ninemile Creek
Mohawk River
Crane Creek
Deans Creek
Mud Creek
Oriskany Creek
Oriskany Creek
Big Creek
Utica
Nail Creek
Trammel Creek
East Canada Creek
Spruce Creek
Cold Brook
Middle Sprite Creek
East Canada Creek
Mohawk River
Crum Creek
Zimmerman Creek
Timmerman Creek
East Canada Creek
Nowadaga Creek
Maltanner Creek
North Creek
West Canada Creek
Fulmer Creek
Sauquoit Creek
Ballou Creek
Reall Creek
Steele Creek
Moyer Creek
Mohawk River
Starch Factory Brook
N
W
E
S
Water Quality Assessment based on Resident Macroinvertebrates
non-impacted
slightly impacted
moderately impacted
severely impacted
0
10
20
30 Miles

Mohawk River Drainage Basin (East)



MOHAWK RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED
ALPLAUS KILL (ALPL)		
01	Glenville, above Glenridge Rd. bridge	00 01
AURIES CREEK (AURI)		
01	Auriesville, at Rte 5S bridge	00
AVA BROOK (AVAB)		
01	West Branch, River Rd. bridge	00
BALLOU CREEK (BALU)		
01	Utica, downstream of CSO outlet	01
BATAVIA KILL (BATV)		
01	Hensonville, Rte 40	89
03	Hensonville, Silver Lake trib, Rte 65 bridge	89
04	Windham, Rte 296 bridge	89
05	Windham, Lake Heloise trib, Rte 23	89
07	Windham, Mitchell Hollow trib, Rte 23	89
08	Windham, Rte 79 bridge	89
10	Below Windham, Rte 12 bridge	89 99 00
12	Below Windham, North Settlement trib, Rte 23	89
13	Below Windham, Rte 17 bridge	89
14	Prattsville, Rte 23A bridge; above mouth	01
BEAR KILL (BEAR)		
01	Grand Gorge, above Rte 30 bridge	97 98
02	Below Grand Gorge, below Cottone Rd., off Rte 23	97 00
BEAVERDAM CREEK (BVRC)		
01	Berne, above Rte 254 bridge	00
05	Beaverdam Creek, Berne, below Rte 156 bridge	92
BIG BROOK (BIGB)		
01	Frenchville, above Rte 46 bridge	00
BIG CREEK (BICK)		
01	Deansboro, California Rd.	00
BRADT HOLLOW CREEK (FOX)		
06	Berne, below Rte 9 bridge	92
07	Berne, above mouth	92
BRIMSTONE CREEK (BRIM)		
01	Sharon Springs, above Rte 10 bridge; above STP	95
01A	Sharon Springs, above STP discharge	96
02A	Below Sharon Springs, above Greene Rd. culvert	96
02	Staleyville, below Rte 10 bridge,	96
03	Ames, West Ames Rd. bridge	95 96 00

MOHAWK RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED									
CANAJOHARIE CREEK (CAJO)											
A	Below Salt Springville, below Dugway Rd. bridge							95			
01	Below Salt Springville, above Mill Rd. bridge							95			
02	Sprout Brook, above Van Deusenville Rd. bridge					93	94	95		00	
02A	Buel, above South Buel Rd. bridge						94	95			
03	Ames, above Rte 10 bridge at Cornerstone Bapt.Church							95			
04	Marshville, above McEwan Rd. bridge					93	94	95			
05	Canajoharie, above Montgomery Rd. bridge									00	01
CAROGA CREEK (CARO)											
01	St. Johnsville, above Rte 5 bridge		89						96	00	
CAYADUTTA CREEK (CAYA)											
A	Gloversville, above West State St. Ext. bridge								96		
B	Gloversville, above confluence w/ West Branch								96		
C	Gloversville, above Broad St. bridge								96		
D	Gloversville, above Main St. bridge								96		
E	Johnstown, below Townsend Ave. bridge								96		
F	Johnstown, above West Main St. bridge								96		
01	Below Johnstown, above Union Ave. Ext. bridge	86	89		92				96		
02	Sammonsville, above Rte 334 bridge	86	89	90	92			95	96	00	
03	Berryville, above Rte 334 bridge	86	89		92				96		
04	Fonda, above Rte 5 bridge	86			92				96		
CINCINNATI CREEK (CINC)											
01	Prospect, below Rte 365			90						00	
1A	Barneveld, at Park St. bridge										01
02	Mapledale, above Rte 28 bridge									00	
COBLESKILL CREEK (COBL)											
01	Richmondville, below Mill St. bridge								96		
02	Below Richmondville, above Podpadic Rd. bridge								96	00	
04	Above Cobleskill, above Rte 7&10 bridge								96		
05	Cobleskill, above Rte 7 bridge								96		
06	Bramanville, above "Animal Shelter" road bridge								96		
07	Central Bridge, above Rte 30A bridge								96	00	
COLD BROOK (COLB)											
01	Shedd Corners, Co Rte 164, Nash Rd.									00	
COLD CREEK (CLDB)											
01	Poland, Mill St.									00	
CRANE CREEK (CRNE)											
01	Marcy, below Old River Rd. culvert									00	

MOHAWK RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED							
CRUM CREEK (CRCR)									
01	Manheim Center, above Rte 5 bridge							00	
DANASCARA CREEK (DANA)									
01	Tribes Hill, Mohawk Rd. bridge							00	
DEANS CREEK (DEAN)									
01	Westmoreland, Rte 233							00	
EAST CANADA CREEK (CANE)									
01	Oregon, above Piseco Rd. bridge						96		
02	Stratford, above Rte 29A bridge						96		
03	Dolgeville, above Rte 29 bridge						96	00	
04	Ingham Mills, below Rte 150 bridge						96		
05	East Creek, Rte 5			89		95	96		
EAST KILL (EAST)									
01	Jewett Center, below Rte 23A bridge							00	
FLAT CREEK (FLAT)									
01	Sprakers, below Rte 5S bridge							00	
FLY CREEK (FLYM)									
01	Sloansville, above Rte 30A bridge							00	
FOUR-MILE CREEK (FOUR)									
01	Wilmurt Corners, Attwood Rd.							00	
FOX CREEK (FOX)									
01	East Berne, above Rte 443				92				
03	Berne, above Chrysler Ln Bridge				92				
04	Berne, below Rte 443 bridge, below waterfall				92				
07A	Berne, above Bradt Hollow Creek mouth				92				
07B	Berne, below Bradt Hollow Creek mouth				92				
08	West Berne, below Rte 443				92			00	
10	Schoharie, below Rte 30 bridge - at Fox Creek Park							00	01
FULMER CREEK (FULM)									
01	Above Mohawk, above Casey Rd. intersection with Rte 168			89					
02	Mohawk, above Main St. bridge			89				00	
GOOSEBERRY CREEK (SCHO)									
01	Tannersville, above STP	75	86						
01A	Tannersville, at STP			89					
02	Tannersville, Below STP	75	86	89					
02A	Below Tannersville, Bloomer Rd.		86	89				00	
03	Below Tannersville, above Schoharie Creek confluence	75	86	89					

MOHAWK RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED
HALE CREEK (HALE)		
01	Johnstown, below North Chase St. bridge	00
HALL CREEK (HALL)		
01	Johnstown, below Johnstown Ave bridge	89
02	Johnstown, above Pleasant Ave bridge	89 00
INDIAN KILL (INDK)		
01	Mayfair, below footbridge @Hickory Lane	00
02	Mayfair, above Bigwood Rd. bridge	00
03	Mayfair, below Rte 50 bridge	00
04	Glenville, below Mayfair Plaza trib, off Mayfair Rd.	00
05	Glenridge, behind Woodlin Club	00
06	Glenville, above Maple Ave.	00
KECKS CENTER CREEK (KECK)		
01	Sammonsville, below Co. Rte 116 bridge	00
KENYON BROOK (KNYN)		
01	Middleville, Rte 28	00
KEYSER KILL (KEYS)		
01	Breakabeen, above Rte 30 bridge	00
LANSING KILL (LKIL)		
01	Hillside, above Webster Hill Rd.	00
LISHA KILL (LISH)		
01	Colonie, at Colonie Riding & Racing Stable; Morris Rd.	96
02	Colonie, above Consaul Rd. bridge	96 02
03	Niskayuna, above Rte 7	96 00
04	Niskayuna, above Rosendale Rd. bridge	96 01
LITTLE SCHOHARIE CREEK (LSCH)		
01	Middleburgh, below Rte 145 bridge	00
MALTANNER CREEK (MALT)		
01	Middleville, Rte 169	00
MANOR KILL (MANR)		
01	West Conesville, above Pangman Rd. bridge	00
MATTHEW CREEK (MATT)		
01	Johnstown, above O'Neil Ave. bridge	89 95 00
MIDDLE SPRITE CREEK (SPRT)		
01	Dolgeville, above Lotville Rd. bridge	00
MILL CREEK (MILM)		
01	Gravesville, above Rte 242 bridge	00

MOHAWK RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED									
MINE KILL (MINE)											
01	North Blenheim, above Rte 13 bridge									00	
MOHAWK RIVER (MOHK)											
A	North Western, above River Rd. bridge				89	90	95			00	01
01	Rome, Floyd Ave bridge	72	78			90	95			00	
01A	Rome, above E. Bloomfield St. bridge						95			00	
02	Below Rome, canal, Rte 49	72	78								
03	Oriskany, Chaminade Rd. bridge	72	78	86	89		95			00	
04	Above Utica, Mohawk St. bridge	72	78	86							
05	Above Utica, Barnes Ave bridge	72									
06	W. Schuyler, Dyke Rd. bridge	72	78	86	89	90		96		00	
07	Above Frankfort	72									
08	Above Frankfort	72	78								
09	Above Ilion, unnumbered white buoy	72	78								
10	Below Herkimer (canal)	72									
11	Below Herkimer (river)	72									
12	Above Little Falls, Buoy 479	72	78								
13	Little Falls, green Buoy 459, below Lock 17	72		86		90	95			00	
14	Below Little Falls, Buoy 447	72	78								
15	St. Johnsville, Buoy 415	72	78								
16	Above Fort Plain, Buoy 383	72	78								
17	Below Fort Plain, below Lock 15	72									
18	Below Canajoharie, Buoy 321	72	78								
19	Above Fonda, above Cayadutta Ck mouth	72		86							
19A	Fonda, green Buoy 277, below Rte 30A bridge				89	90	95			00	
20	Auriesville, Buoy 255	72	78	86							
21	Above Amsterdam, Buoy 225	72			89						
22	Below Amsterdam, Buoy 201A	72	78	86							
23	Above Rotterdam, Buoy 168	72	78	86							
24	Above Scotia, Buoy 127	72	78	86	89						
25	Schenectady, Buoy 83	72	78	86							
26	Below Schenectady, Buoy 53	72	78	86							
27	Mohawk View, Buoy 35	72	78								
28	Crescent, Buoy 9	72	78								
29	Cohoes, above Rte 32 and RR bridges	72	78		89						
29A	Waterford, Button Park					90	95		98	00	
30	Cohoes/Van Schaick Island	72									
MOHAWK RIVER, EAST BRANCH (MHKE)											
01	Ava, below Co. Rte. 67 bridge									00	
MOHAWK RIVER, WEST BRANCH (MHKW)											
01	West Branch, above Rte 26 bridge									00	

MOHAWK RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED					
MOYER CREEK (MOYR)							
01	Frankfort, Main St.					00	
MUD CREEK (MUD)							
02	New Hartford, above Clinton St. bridge			95			
03	Whitesboro, above Henderson St. bridge			95	96	00	
NAIL CREEK (NAIL)							
01	Utica, Haak Rd.					00	01
NINEMILE CREEK (NMIL)							
01	Marcy, River Rd. bridge		90			00	01
NORTH CHUCTANUNDA CREEK (NCHU)							
02	Above Amsterdam, below Crescent Ave. bridge				96		
2A	Amsterdam, above Willow St. bridge					00	
03	Amsterdam, below Rte. 5 bridge				96		
NORTH CREEK (NRCR)							
01	Kast Bridge, West End Rd., Co. Rte 7					00	
NOWADAGA CREEK (NOWA)							
01	Indian Castle, below Rt 5S bridge					00	
ORISKANY CREEK (ORSK)							
01	Above Oriskany Falls, Rte 12B	72	90				
02	Below Oriskany Falls, above Van Hyning Rd. bridge	72	90			00	
03	Above Clinton, above Page Rd. bridge	72	90				
04	Kirkland, above Rte 5 bridge	72	90				
05	Colemans Mills, above Old Valley Rd. bridge	72	90			00	
06	Oriskany, above Utica St. bridge				96		01
OTSQUAGO CREEK (OTSQ)							
01	Valley Brook, above Spring St. bridge				96	00	
02	Fort Plain, East State St.						01
OTSQUENE CREEK (OTSN)							
01	Valley Brook, above Rte 80 bridge					00	
PANTHER CREEK (PANT)							
01	Breakabeen, Rte 30 bridge					00	
PECK CREEK (PECK)							
01	North Bush, below North Bush Rd. bridge					00	
PLATTERKILL (PLTR)							
01	Gilboa, Co. Rte 17 crossing					00	

MOHAWK RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED												
POENTIC KILL (POEN)														
01	Rotterdam Square area, above junction with Teller Kill				88	89								02
02	Rotterdam Square area, Campbell Rd. above culverts opp. BJs/OffMax			87	88	89						00		02
03	Rotterdam Square area, behind Orlev Provisions			87										
03A	Rotterdam Square area, below east mall entrance bridge				88	89								02
04	Rotterdam Square area, below mall			87	88	89								
04	Rotterdam Square area, below regulatory gates													02
REALL CREEK (REAL)														
00	Deerfield, off North Genesee St.												01	
01	Deerfield, above Firehouse Rd. bridge											00		
SALT SPRING BROOK (CAJO)														
00	Below Salt Springville, below Dugway Rd. bridge								95					
SAUQUOIT CREEK (SAUQ)														
01	Greens Crossing, above Greens Crossing Rd. bridge								95					
02	Clayville, @ Main St. bridge								95					
03	Sauquoit, above Pinnacle Rd. bridge								95					
04	Washington Mills, above Rte 8 bridge						90		95					
05	New Hartford, Rte. 26; below double dam								95					
06	Whitesboro, end of Greenman Ave						90		95			00		
SCHOHARIE CREEK (SCHO)														
04	Below Tannersville, above Gooseberry Ck confluence	75	86			89								
05	Hunter, above Rte. 214 bridge	75	86			89			95					
06	Above Hunter, above Rte. 23A bridge					89								
06A	Above Hunter, above Hunter Mt. water diversion								95					
07	Hunter, below Rte 83 bridge					89			95					
09	Hunter, below Bridge St. bridge					89			95					
10	below Hunter, above Deming Rd. bridge					89			95		99	00		
11	Jewett Center, above confluence with East Kill					89								
14	Middleburgh, below Rte 30 bridge					89								
16	Burtonsville, above Braman Corners Rd. bridge					89	90		95			00		
17	Mill Point, above Rte 161 bridge							93						
18	Fort Hunter, above Thruway bridge							93					01	
SHAKERS CREEK (SHAK)														
01	Colonie, below Rte155									96				
02	Colonie, below Old Niskayuna Rd. culvert									96				
03	Latham, above Mill Rd. bridge									96		00		
04	Latham, above River Rd. bridge									96				

MOHAWK RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED							
SHANTY HOLLOW BROOK (SHAN)									
01	Hunter Mt. Ski area, above holding pond			90					
02	Hunter Mt. Ski area, below culvert outlet			90					
03	Hunter, below Co. Rte 83 bridge			90					
04	Hunter, above confluence with Schoharie Ck		89	90					
SIX MILE CREEK									
01	Rome, below Rickmyer Rd. bridge					95	96	00	
SOUTH CHUCTANUNDA CREEK (SCHU)									
01	South Amsterdam, at Snooks Corners Rd. bridge						96	00	
01A	South Amsterdam, below RR bridge			90					
SPRUCE CREEK (SPRC)									
01	Shedd Corners, below Co. Rte 164 bridge							00	
STARCH FACTORY CREEK (STCH)									
00	Utica, in Proctor Park; off foot path								01
01	Utica, Off Broad St., behind Post Office							00	
STEELE CREEK (STLE)									
01	Ilion, Clark St. @ dead end & Power station							00	
STEUBEN CREEK (STEU)									
01	Barneveld, above McDonald Rd. bridge			90				00	
02	Barneveld, below Boon Hollow Rd. bridge							00	
STONY CREEK (STCR)									
01	Vischer Ferry, below Riverview Rd. bridge (firehouse)							00	
SWITZ KILL (SWTZ)									
01	Berne, above Ravine Rd., Drezelo farm				92			00	
TELLER KILL (POEN)									
01A	Rotterdam Square area, above junction with Poentic Kill	88							
THREE MILE CREEK (THRE)									
01	Rome, below Rte 365							00	
TIMMERMAN CREEK (TIMM)									
01	St. Johnsville, above Rte 5 bridge							00	
TRAMMEL CREEK (TRAM)									
01	Stratford, above Bingham Hill Rd. bridge							00	
VAN DEUSEN BROOK (VAND)									
01	Van Deusenville, above Barringer Rd. bridge					95			
02	Van Deusenville, below Mill Rd. bridge					95			

MOHAWK RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED					
WARNERS LAKE OUTLET (FOX)							
02	East Berne, Rte 443			92			
WEST CANADA CREEK (CANW)							
01	Nobleboro, Haskell Rd., above Rte 8		90				
02	East of Hinkley Res, Harvey Bridge Rd.					00	
03	Poland, Mill St.					00	
04	Kast Bridge, above North Creek Rd. bridge	89	90		95		01
WEST CANADA CREEK, SOUTH BRANCH (CANS)							
01	East of Morehouseville, Mountain Home Rd.					00	
WEST CREEK (WECR)							
03	Warnerville, above Patrick Rd. bridge					00	
WEST KILL (WKIL)							
01	West Kill, Rte 42 bridge					00	
WHITE CREEK (WHTE)							
01	Below Newport, Rte 28					00	
WOLF HOLLOW (WOLH)							
01	Welch Corners, Rte 28					00	
YATESVILLE CREEK (YVIL)							
01	Randall, above Co. Rte 105 bridge					00	
ZIMMERMAN CREEK (ZIMM)							
01	St. Johnsville, North Division St. bridge					00	
UNNAMED TRIBUTARY TO CANAJOHARIE CREEK (CAJO)							
02B	Buel, South Buel Rd. bridge				95		

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE MOHAWK RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Alplaus Kill, Glenville	non-impacted	no prior data
Auriesville Creek, Auriesville	non-impacted	no prior data
Ava Brook, West Branch	non-impacted	no prior data
Ballou Creek, Utica	severely impacted	no prior data
Batavia Kill, below Windham	non-impacted	no change
Batavia Kill, Prattsville	non-impacted	no prior data
Bear Kill, Grand Gorge	non-impacted	no prior data
Bear Kill, below Grand Gorge	non-impacted	no prior data
Beaverdam Creek, Berne	non-impacted	no prior data
Big Brook, Frenchville	non-impacted	no prior data
Big Creek, Deansboro	non-impacted	no prior data
Brimstone Creek, Sharon Springs,0.25 mi. above STP discharge	slightly impacted	no prior data
Brimstone Creek, Sharon Springs, 200 m above STP discharge	slightly impacted	no prior data
Brimstone Cr., below Sharon Springs	slightly impacted	no prior data
Brimstone Creek, Staleyville	slightly impacted	no prior data
Brimstone Creek, Ames	slightly impacted	no prior data
Canajoharie Creek, below Salt Springville	non-impacted	no prior data
Canajoharie Creek, below Salt Springville	non-impacted	no prior data
Canajoharie Creek, Sprout Brook	slightly impacted	no prior data
Canajoharie Creek, Buel	slightly impacted	no prior data
Canajoharie Creek, Ames	slightly impacted	no prior data
Canajoharie Creek, Marshville	slightly impacted	no prior data
Canajoharie Creek, Canajoharie	non-impacted	no prior data
Caroga Creek, St. Johnsville	non-impacted	no change
Cayadutta Creek, Gloversville, above West State St. Ext.	non-impacted	no prior data
Cayadutta Creek, Gloversville, above confluence with West Branch	slightly impacted	no prior data
Cayadutta Creek, West Branch, Gloversville, above Broad St.	slightly impacted	no prior data
Cayadutta Creek, Gloversville, above Main St.	slightly impacted	no prior data
Cayadutta Creek, Johnstown, below Townsend Ave.	slightly impacted	no prior data
Cayadutta Creek, Johnstown, above West Main St.	slightly impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE MOHAWK RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Cayadutta Creek, below Johnstown	slightly impacted	no change
Cayadutta Creek, Sammonsville	slightly impacted	no change
Cayadutta Creek, Berryville	slightly impacted	no change
Cayadutta Creek, Fonda	slightly impacted	no change
Cincinnati Creek, Prospect	slightly impacted	no change
Cincinnati Creek, Barneveld	slightly impacted	no prior data
Cincinnati Creek, Mapledale	non-impacted	no prior data
Cobleskill Creek, Richmondville	non-impacted	no prior data
Cobleskill Creek, below Richmondville	non-impacted	no prior data
Cobleskill Creek, above Cobleskill	non-impacted	no prior data
Cobleskill Creek, Cobleskill	slightly impacted	no prior data
Cobleskill Creek, Bramanville	slightly impacted	no prior data
Cobleskill Creek, Central Bridge	slightly impacted	no prior data
Cold Brook, Shedd Corners	slightly impacted	no prior data
Cold Creek, Poland	non-impacted	no prior data
Crane Creek, Marcy	non-impacted	no prior data
Crum Creek, Manheim Center	non-impacted	no prior data
Danascara Creek, Tribes Hill	non-impacted	no prior data
Deans Creek, Westmoreland	slightly impacted	no prior data
East Canada Creek, Oregon	non-impacted	no prior data
East Canada Creek, Stratford	non-impacted	no prior data
East Canada Creek, Dolgeville	non-impacted	no prior data
East Canada Creek, Ingham Mills	non-impacted	no prior data
East Canada Creek, East Creek	non-impacted	no change
East Kill, Jewett Center	non-impacted	no prior data
Flat Creek, Sprakers	non-impacted	no prior data
Fly Creek, Sloanville	non-impacted	no prior data
Four-Mile Creek, Wilmurt Corners	non-impacted	no prior data
Fox Creek, West Berne	non-impacted	**IMPROVED**
Fox Creek, Schoharie	slightly impacted	no prior data
Fulmer Creek, Mohawk	slightly impacted	no change
Gooseberry Creek, below Tannersville	non-impacted	no change
Hale Creek, Johnstown	non-impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE MOHAWK RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Hall Creek, Johnstown	non-impacted	**IMPROVED**
Indian Kill, Mayfair, @Hickory Lane	slightly impacted	no prior data
Indian Kill, Mayfair, above Bigwood Rd	moderately impacted	no prior data
Indian Kill, Mayfair, below Rte 50	slightly impacted	no prior data
Indian Kill, Glenville, off Mayfair Rd	slightly impacted	no prior data
Indian Kill, Glenridge	slightly impacted	no prior data
Indian Kill, Glenville, at Maple Ave	slightly impacted	no prior data
Kecks Center Creek, Sammonsville	non-impacted	no prior data
Kenyon Brook, Middleville	non-impacted	no prior data
Keyser Kill, Breakabeen	non-impacted	no prior data
Lansing Kill, Hillside	non-impacted	no prior data
Lisha Kill, Colonie, Morris Rd	slightly impacted	no prior data
Lisha Kill, Colonie, above Consaul Rd.	slightly impacted	no prior data
Lisha Kill, Niskayuna, above Rt. 7	slightly impacted	no prior data
Lisha Kill, Niskayuna, above Rosendale Rd	slightly impacted	no prior data
Little Schoharie, Middleburgh	non-impacted	no prior data
Maltanner Creek, Middleville	non-impacted	no prior data
Manor Kill, West Conesville	non-impacted	no prior data
Matthew Creek, Johnstown	non-impacted	**IMPROVED**
Middle Sprite Creek, Dolgeville	non-impacted	no prior data
Mill Creek, Gravesville	non-impacted	no prior data
Mine Kill, North Blenheim	non-impacted	no prior data
Mohawk River, North Western	slightly impacted	**DECLINED**
Mohawk River, Rome, below Floyd Ave	slightly impacted	no change
Mohawk River, Rome, above East Bloomfield St.	slightly impacted	no prior data
Mohawk River, Oriskany	moderately impacted	**DECLINED**
Mohawk River, West Schuyler	moderately impacted	no change
Mohawk River, Little Falls	slightly impacted	no change
Mohawk River, Fonda	non-impacted	**IMPROVED**
Mohawk River, Waterford	slightly impacted	no change
Mohawk River, East Branch, Ava	non-impacted	no prior data
Mohawk River, West Branch, West Branch	non-impacted	no prior data
Moyer Creek, Frankfort	non-impacted	no prior data
Mud Creek, New Hartford	slightly impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE MOHAWK RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Mud Creek, Whitesboro	slightly impacted	no prior data
Nail Creek, Utica	moderately impacted	no prior data
Ninemile Creek, Marcy	non-impacted	no change
North Chuctanunda Creek, above Amsterdam	slightly impacted	no prior data
North Chuctanunda Creek, Amsterdam, above Willow St	non-impacted	no prior data
North Chuctanunda Creek, Amsterdam, below Rte. 5S	slightly impacted	no prior data
North Creek, Kast Bridge	non-impacted	no prior data
Nowadaga Creek, Indian Castle	slightly impacted	no prior data
Oriskany Creek, below Oriskany Falls	non-impacted	**IMPROVED**
Oriskany Creek, Colemans Mills	slightly impacted	**DECLINED**
Oriskany Creek, Oriskany	slightly impacted	no prior data
Otsquago Creek, Valley Brook	non-impacted	no prior data
Otsquago Creek, Fort Plain	non-impacted	no prior data
Otsquene Creek, Valley Brook	non-impacted	no prior data
Panther Creek, Breakabeen	non-impacted	no prior data
Peck Creek, North Bush	non-impacted	no prior data
Platterkill, Gilboa	slightly impacted	no prior data
Poentic Kill, Rotterdam Square area, above junction with Teller Kill	slightly impacted	no change
Poentic Kill, Rotterdam Square area, Campbell Rd	slightly impacted	no change
Poentic Kill, Rotterdam Square area, below east mall entrance	moderately impacted	**DECLINED**
Poentic Kill, Rotterdam Square area, below regulatory gates	slightly impacted	no change
Reall Creek, Deerfield, N. Genesee St.	slightly impacted	no prior data
Reall Creek, Deerfield, Firehouse Road	slightly impacted	no prior data
Salt Spring Brook, below Salt Springville	non-impacted	no prior data
Sauquoit Creek, Greens Crossing	slightly impacted	no prior data
Sauquoit Creek, Clayville	non-impacted	no prior data
Sauquoit Creek, Sauquoit	slightly impacted	no prior data
Sauquoit Creek, Washington Mills	slightly impacted	no change
Sauquoit Creek, New Hartford	slightly impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE MOHAWK RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Sauquoit Creek, Whitesboro	slightly impacted	no change
Schoharie Creek, above Hunter, above Rte. 214	non-impacted	no change
Schoharie Creek, above Hunter, above Hunter Mt. water diversion	non-impacted	no prior data
Schoharie Creek, Hunter, below Rte. 83 bridge	non-impacted	no change
Schoharie Creek, Hunter, below below Bridge St.	non-impacted	no change
Schoharie Creek, below Hunter	non-impacted	no change
Schoharie Creek, Burtonsville	non-impacted	no change
Schoharie Creek, Mill Point	non-impacted	no prior data
Schoharie Creek, Fort Hunter	non-impacted	no prior data
Shakers Creek, Colonie, below Rt.155	moderately impacted	no prior data
Shakers Creek, Colonie, below Old Niskayuna Rd	moderately impacted	no prior data
Shakers Creek, Latham, above Mill Rd.	slightly impacted	no prior data
Shakers Creek, Latham, above River Rd.	slightly impacted	no prior data
Six Mile Creek, Rome	slightly impacted	no prior data
South Chuctanunda Creek, South Amsterdam	non-impacted	**IMPROVED**
Spruce Creek, Shedd Corners	non-impacted	no prior data
Starch Factory Creek, Utica, in Proctor Park	slightly impacted	no prior data
Starch Factory Creek, Utica, Off Broad St	non-impacted	no prior data
Steele Creek, Ilion	non-impacted	no prior data
Steuben Creek, above Barneveld	slightly impacted	no change
Steuben Creek, Barneveld	non-impacted	no prior data
Stony Creek, Vischers Ferry	slightly impacted	no prior data
Switz Kill, Berne	non-impacted	no change
Three Mile Creek, Rome	slightly impacted	no prior data
Timmerman Creek, St. Johnsville	non-impacted	no prior data
Trammel Creek, Stratford	non-impacted	no prior data
Van Deusen Brook, Van Deusenville, above Barringer Rd	slightly impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE MOHAWK RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Van Deusen Br., Van Deusenville, Mill Rd.	non-impacted	no prior data
West Canada Creek, east of Hinkley Reservoir	non-impacted	no prior data
West Canada Creek, Poland	non-impacted	no prior data
West Canada Creek, Kast Bridge	non-impacted	no prior data
West Canada Creek, South Branch, east of Morehouseville	non-impacted	no prior data
West Creek, Warnerville	slightly impacted	no prior data
West Kill, West Kill	non-impacted	no prior data
White Creek, below Newport	non-impacted	no prior data
Wolf Hollow, Welch Corners	non-impacted	no prior data
Yatesville Creek, Randall	non-impacted	no prior data
Zimmerman Creek, St. Johnsville	non-impacted	no prior data
Unnamed tributary to Canajoharie Creek, Buel	non-impacted	no prior data

REPORTS OF MACROINVERTEBRATE SURVEYS WITHIN THE MOHAWK RIVER WATERSHED

STREAM	YEAR OF SURVEY	REPORT
Batavia Kill	1989	SBU,1990
Brimstone Creek	1996	SBU,1997
Canajoharie Creek	1995	SBU,1996
Cayadutta Creek	1973	AVON
Cayadutta Creek	1980	EPA,1983
Cayadutta Creek	1986	SBU,1986
Cobleskill Creek	1996	SBU,1997
East Canada Creek	1996	SBU,1997
Fox Creek	1992	SBU,1993
Gooseberry Creek	1975	DOH
Gooseberry Creek	1975	AVON
Gooseberry Creek	1986	SBU,1986
Hale Creek	1976-1977	AVON
Indian Kill	1998-1999	EST
Indian Kill	2000	SBU,2001
Lisha Kill	1996	SBU,1996
Mohawk River	1972	DOH
Mohawk River	1978	KAPL,1980
Mohawk River	1986	SBU,1988
Oriskany Creek	1972	DOH
Oriskany Creek	1990	SBU,1990
Poentic Kill	1987	SBU,1988
Poentic Kill	1988	SBU,1989
Poentic Kill	1989	SBU,1989
Poentic Kill	2001	SBU,2002
Sauquoit Creek	1995	SBU,1995
Schoharie Creek	1972	AVON
Schoharie Creek	1989	SBU,1990
Schoharie Creek	1995	SBU,1995
Schoharie Creek	2002	HBRW
Shanty Hollow Brook	1990	SBU,990
Watershed Streams	1989-1990	RIBS,1992

AVON	Avon Pollution Investigations Unit, Div. of Fish & Wildlife, NYS DEC
DOH	New York State Department of Health
EPA	United States Environmental Protection Agency
EST	Environmental Study Team
HBRW	Hudson Basin River Watch, Rapid Watershed Assessment Program
KAPL	Knolls Atomic Power Laboratory

RIBS	Rotating Intensive Basin System, Statewide Waters Assessment Section, NYS DEC
SBU	Stream Biomonitoring Unit, Division of Water, NYS DEC

Alplaus Kill

Water quality at Freemans Bridge was assessed as non-impacted, based on macroinvertebrate sampling in 2000 and 2001. The 2000 assessment was based on a field assessment. The 2001 assessment was based on a laboratory-processed sample. Impact Source Determination indicated that nutrient enrichment was present, although the fauna remained healthy and diverse.

Auries Creek

Non-impacted water quality is assessed for this tributary of the Mohawk River at Auriesville. The 2000 sampling field-assessed water quality as excellent, and the sample was not processed. No prior data were available for the stream.

Ava Brook

Water quality was assessed as non-impacted for this tributary of the West Branch Mohawk River, based on macroinvertebrate sampling at West Branch in 2000. The site was field-assessed as non-impacted, and the sample was not processed. No prior data were available for the stream.

Ballou Creek

Severely impacted water quality was assessed for Ballou Creek in Utica, based on 2001 macroinvertebrate sampling. The fauna consisted almost entirely of pollution-tolerant worms and midges. Municipal/industrial inputs were denoted as the source of impact, and Combined Sewer Overflows (CSOs) are likely involved. Poor habitat was also a factor at this site, but very poor water quality was definitely indicated.

Batavia Kill

Current water quality in the Batavia Kill is assessed as non-impacted. Macroinvertebrate sampling was conducted at sites below Windham and at Prattsville, in 1999, 2000, and 2001. All samplings found diverse faunas of mayflies, stoneflies, and caddisflies. Water quality in the Batavia Kill was also previously assessed as non-impacted. Sections of the stream have undergone restoration efforts following extensive damage from the flood of January, 1996.

Bear Kill

Water quality was assessed as non-impacted for two sites on this Schoharie Reservoir tributary. Sites were sampled in Grand Gorge in 1997 and 1998, and below the NYC DEP Grand Gorge Wastewater Treatment Plant in 1997 and 2000. Clean-water mayflies, stoneflies, and caddisflies were present at both sites.

Beaverdam Creek

This stream in Berne was assessed as non-impacted in 2000 macroinvertebrate sampling. The site was previously assessed as non-impacted in 1992. The 2000 sample contained mayflies, stoneflies, and caddisflies. It was field-assessed as non-impacted, and was not processed.

Big Brook

Water quality was assessed as non-impacted for this Mohawk River tributary, based on macroinvertebrate sampling at Frenchville in 2000. The sample contained mayflies, stoneflies, and caddisflies. It was field-assessed as non-impacted, and was not processed. No prior data were available for the stream.

Big Creek

This tributary of Oriskany Creek was assessed as non-impacted in 2000. The site was field-assessed, and the macroinvertebrate sample was not processed. Anglers at this site reported a wild brown trout population in the stream.

Brimstone Creek

Water quality in Brimstone Creek is assessed as slightly impacted, primarily by minor nutrient enrichment, in the reach sampled. The most recent sampling was conducted in 2000 at Ames. Mayflies, stoneflies, and caddisflies were represented at the site. Four sites from Sharon Springs to Ames were sampled in 1996, and water quality at all sites was assessed as slightly impacted. Factors possibly affecting the fauna were the upstream sulfur springs, the discharge of the Sharon Springs (V) Sewage Treatment Facility, and agricultural nonpoint sources. The sewage treatment facility was upgraded in 1996.

Canajoharie Creek

Most of Canajoharie Creek is currently assessed as slightly impacted by agricultural nonpoint nutrient enrichment, from Sprout Brook to Marshville. An upstream location below Salt Springville was assessed as non-impacted in 1995, with the initial assessment of slight impact upgraded due to headwater effects. At a downstream location in the village of Canajoharie, non-impacted water quality was assessed in 2000 and 2001. The 2000 assessment was based on a field assessment. The 2001 assessment was based on a laboratory-processed sample. Both samplings found diverse faunas of mayflies, stoneflies, and caddisflies.

Caroga Creek

Water quality of this Mohawk River tributary was determined to be non-impacted, based on macroinvertebrate sampling at St. Johnsville in 1996 and 2000. No change was indicated compared to the assessment of 1989.

Cayadutta Creek

Current water quality in most of Cayadutta Creek is considered slightly impacted, with the exception of non-impacted water quality upstream of Gloversville. Ten sites from Gloversville to Fonda were sampled for macroinvertebrates in 1996. Water quality declined as the stream passed through Gloversville, due to multiple urban nonpoint sources. The discharge of the Gloversville-Johnstown Wastewater Treatment Facility had minimal impact on water quality. The site at Sammonsville was also sampled in 2000, and was determined to be slightly impacted. The macroinvertebrate community at the Sammonsville site was well-balanced and dominated by mayflies, with stoneflies and caddisflies also present. This site previously was assessed as slightly impacted in 1992 (Figure 12-1), reflecting greatly improved conditions following the upgrade of the wastewater treatment facility.

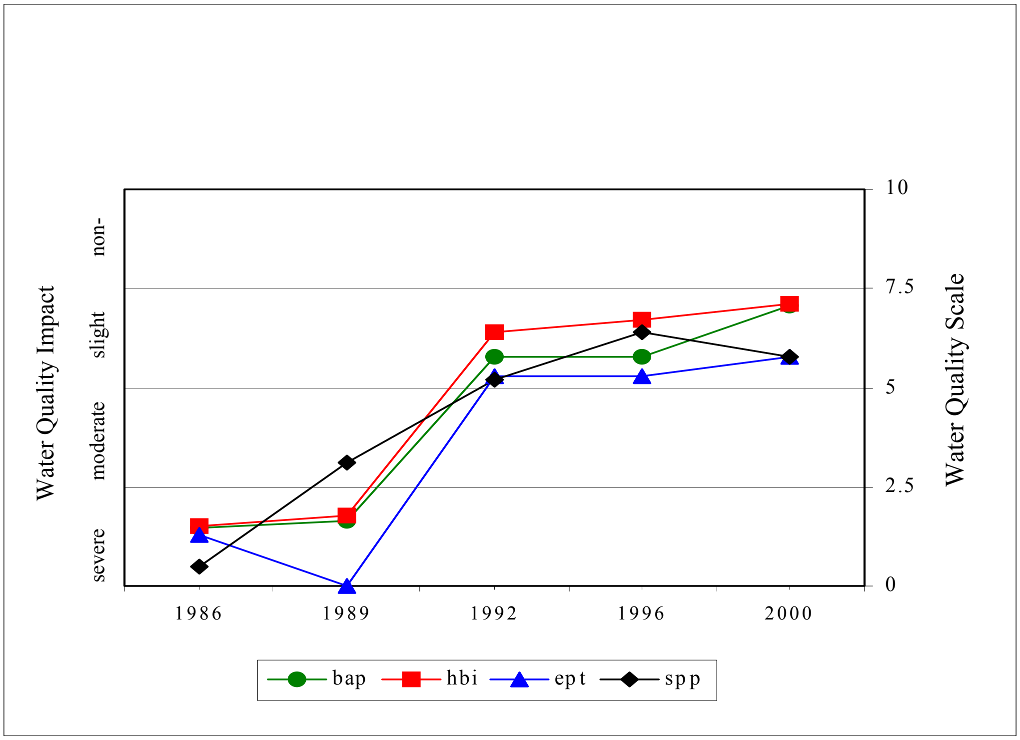


Figure 12-1. Water quality in Cayadutta Creek downstream of the Johnstown-Gloversville Wastewater Treatment Facility, 1986-2000. SPP= species richness, HBI= Hilsenhoff biotic index, EPT= richness of mayflies, stoneflies, and caddisflies, BAP= Biological Assessment Profile.

Cincinnati Creek

Most of Cincinnati Creek is assessed as slightly impacted by nonpoint source nutrient enrichment. Sites at Prospect and Barneveld were determined to be slightly impacted, based on macroinvertebrate sampling in 2000 and 2001, respectively. Sampling downstream at Mapledale in 2000 indicated non-impacted conditions, although some enrichment was still evident. All sites had ample mayflies, stoneflies, and caddisflies.

Cobleskill Creek

Most of Cobleskill Creek is assessed as slightly impacted. Sites at Richmondville and Warnerville were assessed as non-impacted in 1996 sampling. In the 1996 survey of six sites, slight impact was attributed to the discharges of the Richmondville (V) Sewage Treatment Plant and the Cobleskill (V) Water Pollution Control Plant. The macroinvertebrate sample from a site at Central Bridge in 2000 also yielded an assessment of slightly impacted, but the fauna was heavily dominated by mayflies, and no major water quality problems were indicated.

Cold Brook

Slightly impacted water quality was assessed for this tributary of East Canada Creek, based on 2000 macroinvertebrate sampling at Shedd Corners. The assessment was borderline non-impacted, and no major impacts were indicated. Nonpoint source nutrient enrichment likely was a stressor.

Cold Creek

Water quality of this West Canada Creek tributary is assessed as slightly impacted, based on macroinvertebrate sampling at Poland in 2000. Clean-water mayflies, stoneflies, and caddisflies were present, and no major water quality problems were indicated. No prior data were available for the stream.

Crane Creek

Based on 2000 macroinvertebrate sampling at Marcy, non-impacted water quality was indicated for this tributary of the Mohawk River. Mayflies, stoneflies, and caddisflies were well-represented. No prior data were available for the stream.

Crum Creek

Water quality of this tributary of the Mohawk River was assessed as non-impacted at Manheim Center, based on 2000 macroinvertebrate sampling. All indices were within the range of very good water quality. No prior data were available for the stream.

Danascara Creek

Non-impacted water quality was determined for this tributary of the Mohawk River, based on macroinvertebrate sampling at Tribes Hill in 2000. No prior data were available for the stream.

Deans Creek

Slightly impacted water quality was assessed for this tributary of Oriskany Creek, based on 2000 macroinvertebrate sampling at Westmoreland. Nonpoint nutrient enrichment was indicated as the likely source of impact. No prior data were available for the stream.

East Canada Creek

Water quality in East Canada Creek is currently assessed as non-impacted. Five sites from Oregon to East Creek were sampled for macroinvertebrates in 1996. Macroinvertebrate communities at Stratford and Ingham Mills differed from expected natural communities, but the impacts were considered to be minor. The assessment of slight impact at Stratford was upgraded to non-impacted after being determined to be anomalous, based on conflicting metrics, lack of any known discharges, and a high ISD similarity to natural communities. The Ingham Mills impact represents impoundment effects. The East Creek site (near Little Falls) was assessed as slightly impacted in 1995, but was assessed as non-impacted in 1996. Continued monitoring of this site is recommended.

East Kill

Non-impacted water quality was determined for this Schoharie Creek tributary, based on macroinvertebrate sampling at Jewett Center in 2000. The site was field-assessed, and the sample was not processed. No prior data were available for the stream.

Flat Creek

Non-impacted water quality was determined for this Mohawk River tributary, based on macroinvertebrate sampling at Sprakers in 2000. The site was field-assessed, and the sample was not processed. No prior data were available for the stream.

Fly Creek

Water quality was assessed as non-impacted for this Schoharie Creek tributary, based on macroinvertebrate sampling near Sloansville in 2000. The site was field-assessed, and the sample was not processed. No prior data were available for the stream.

Four Mile Creek

This stream is a tributary of West Canada Creek. Non-impacted water quality was determined for a site at Wilmurt Corners, based on macroinvertebrate sampling in 2000. The site was field-assessed, and the sample was not processed. No prior data were available for the stream.

Fox Creek

Improved water quality in Fox Creek at West Berne was documented in 2000, compared to a survey of the stream in 1992. The 1992 survey found high numbers of aquatic worms at this site, indicating probable organic wastes in the stream. A follow-up investigation by the Albany County Health Department in 1992 revealed raw sewage entering Fox Creek from several homes. These problems were subsequently corrected by the homeowners. The macroinvertebrate sampling in 2000 at West Berne showed the fauna to be dominated by clean-water mayflies, with only 1% aquatic worms. A downstream site at Schoharie was assessed as slightly impacted, based on macroinvertebrate sampling in 2000 and 2001. Nutrient enrichment and siltation are the likely stressors.

Fulmer Creek

Slight impact from nonpoint source nutrient enrichment was assessed for a Fulmer Creek site at Mohawk near the mouth, based on 2000 macroinvertebrate sampling. The fauna was dominated by midges and mayflies. Similar conditions were documented for this site in 1989.

Gooseberry Creek

Non-impacted water quality was assessed for Gooseberry Creek downstream of the NYC DEP Tannersville (V) Wastewater Treatment Facility discharge, based on 2000 macroinvertebrate sampling. The fauna included many mayflies, stoneflies, and caddisflies, similar to conditions documented for this site in 1989. The site downstream of the discharge had been assessed as moderately impacted in 1986, the impact attributed to chlorine toxicity during periods when the dechlorination process was not activated. The problem was subsequently addressed. The treatment facility received a major upgrade in 1996, and excellent downstream water quality has been maintained since.

Hale Creek

Non-impacted water quality is assessed for this stream, based on 2000 macroinvertebrate sampling in Johnstown just upstream of the confluence with Cayadutta Creek. Clean-water mayflies, stoneflies, and caddisflies were abundant. The sample was field-assessed, and was not processed.

Hall Creek

Water quality was assessed as non-impacted, based on macroinvertebrate sampling at Pleasant Avenue in Johnstown in 2000. This represents a possible improvement compared to 1989 conditions. However, the sample was not processed, and further monitoring is necessary.

Indian Kill

Water quality in the Indian Kill ranges from slightly impacted to moderately impacted, mostly due to nonpoint source nutrient enrichment Six sites were sampled for macroinvertebrates in 2000, following an earlier survey by the Environmental Study Team of Schenectady. The discharge from the Mayfair Plaza had a negative impact on the stream, although downstream water quality was still within the range of slightly impacted. The South Branch of the Indian Kill exhibited combined effects of poor water quality and poor habitat. Nonpoint source runoff and septic inputs were likely stressors in this tributary.

Kecks Center Creek

Non-impacted water quality was assessed for this stream in Sammonsville, based on 2000 macroinvertebrate sampling. The sample was field-assessed, and was not laboratory-processed. No prior data were available for the stream.

Kenyon Brook

Water quality of this West Canada Creek tributary was assessed as non-impacted, based on macroinvertebrate sampling at Middleville in 2000. The sample was field-assessed, and was not laboratory-processed. No prior data were available for the stream.

Keyser Kill

Non-impacted water quality was assessed for this Schoharie Creek tributary, based on 2000 macroinvertebrate sampling at Breakabeen. Mayflies, stoneflies, and caddisflies were numerous, and the fauna was well-balanced. No prior data were available for the stream.

Lansing Kill

This tributary of the Mohawk River was sampled at Hillside in 2000. Based on field examination of the kick sample, water quality was assessed as non-impacted. The macroinvertebrate fauna included many clean-water mayflies, stoneflies, and caddisflies, including the giant stonefly *Pteronarcys*.

Little Schoharie Creek

Water quality was assessed as non-impacted, based on macroinvertebrate sampling at Middleburgh in 2000. The sample was field-assessed, and was not processed. No prior data were available for the stream.

Lisha Kill

Water quality in the Lisha Kill is assessed as slightly impacted at all sites. Four sites from Colonie to Niskayuna were sampled in 1996, and additional sampling at Niskayuna was conducted in 2000, 2001, and 2002. Nonpoint nutrient enrichment is the likely cause of impact.

Maltanner Creek

Water quality was assessed as non-impacted for this West Canada Creek tributary, based on macroinvertebrate sampling at Middleville in 2000. The sample was field-assessed, and was not processed. No prior data were available for the stream.

Manor Kill

Non-impacted water quality was assessed for this tributary of Schoharie Creek, based on 2000 macroinvertebrate sampling at West Conesville. Mayflies, stoneflies, and caddisflies were numerous, and the fauna was well-balanced. No prior data were available for the stream.

Matthew Creek

Water quality was assessed as non-impacted, based on macroinvertebrate sampling at O'Neil Avenue in Johnstown in 2000. Clean-water mayflies, stoneflies, and caddisflies were numerous. This represents an apparent improvement compared to slight impact documented for the stream in 1989 and 1995. However, the 2000 sample was not laboratory-processed, and further monitoring is necessary to verify this possible trend.

Middle Sprite Creek

Non-impacted water quality was assessed for this tributary of East Canada Creek, based on 2000 macroinvertebrate sampling at Dolgeville. Mayflies, stoneflies, and caddisflies were numerous, and the fauna was well-balanced. No prior data were available for the stream.

Mill Creek

Water quality was assessed as non-impacted for this tributary of West Canada Creek, based on macroinvertebrate sampling at Gravesville in 2000. The sample was field-assessed, and was not processed. No prior data were available for the stream.

Mine Kill

Non-impacted water quality was assessed for a site at North Blenheim, based on 2000 macroinvertebrate sampling. Mayflies, stoneflies, and caddisflies were numerous, and the fauna was well-balanced. No prior data were available for the stream.

Mohawk River

Macroinvertebrate sampling was conducted at Northwestern in 2000 and 2001. In the 2000 sampling, the sample was field-assessed as non-impacted, and was not laboratory-processed. The 2001 sample was processed, and yielded an assessment of slight impact, likely from nonpoint nutrient enrichment. This represents an apparent decline from non-impacted conditions documented in 1989, 1990, and 1995. Continued monitoring is recommended to verify this trend.

Slightly impacted water quality was assessed for the Mohawk River at Rome, based on 2000 kick sampling and multiplate sampling. Metric values were similar to those obtained from this site in 1990. Non-impacted conditions were documented for this site in 1995, but were based on only one successful multiplate retrieval.

Water quality in the Mohawk River downstream of Rome (sampled at Chaminade Road, Oriskany) was assessed as moderately impacted, representing a decline compared to 1989 water quality, based on multiplate sampling in 2000. Current water quality is similar to that assessed in 1978 and 1986. (Figure 12-2)

Water quality downstream of the Utica municipal and industrial discharges is still considered moderately impacted. Combined sewer overflows (CSOs) remain a problem. Both kick sampling and multiplate sampling were conducted at the West Schuyler site in 2000. Kick sample results indicated moderate impact from municipal and/or industrial discharges. Multiplate sampling produced mixed results, with the final assessment showing slight impact, bordering on moderate impact. Combining both samplings, overall water quality is rated as moderately impacted, but showing indications toward improvement. Zebra mussels collected from this site in 2001 carried very high levels of PCBs and PAHs.

Slight impact was documented for the Mohawk River at Little Falls, based on 2000 multiplate sampling. This site was similarly assessed as slightly impacted in

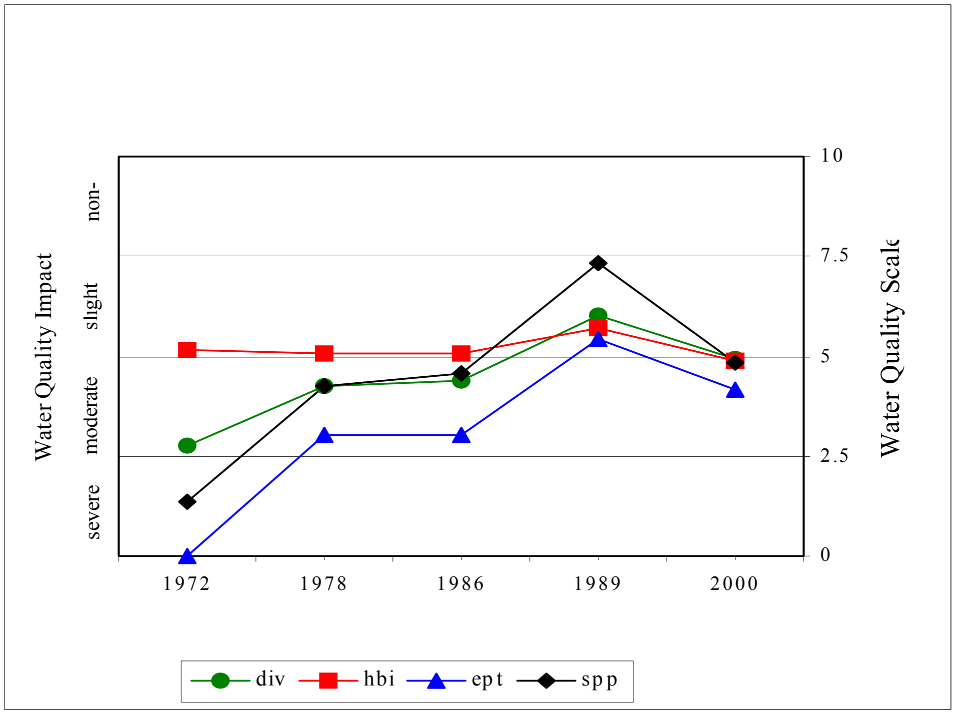


Figure 12-2. Water quality in the Mohawk River below Rome, 1972-2000. All indices are shown. SPP= species richness, HBI= Hilsenhoff biotic index, EPT= richness of mayflies, stoneflies, and caddisflies, PMA- Percent Model Affinity.

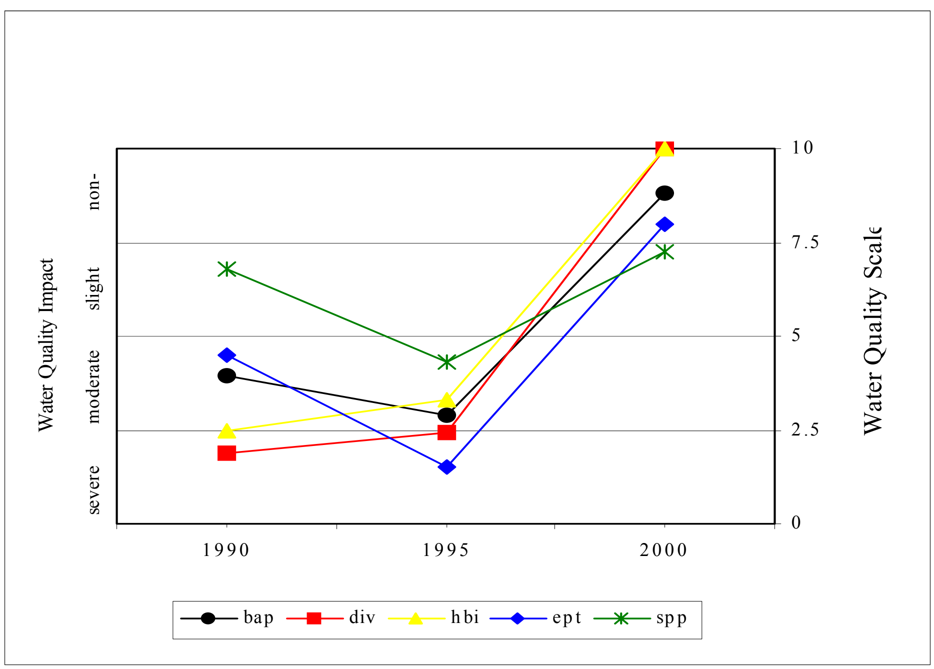


Figure 12-3. Water quality in the Mohawk River at Fonda, 1990-2000, showing all indices. SPP= species richness, HBI= Hilsenhoff biotic index, EPT= richness of mayflies, stoneflies, and caddisflies, PMA- Percent Model Affinity, BAP= Biological Assessment Profile value.

1990 and 1995.

Water quality at Fonda was assessed as non-impacted, based on 2000 multiplate sampling. This represents a substantial improvement, compared to moderately impacted conditions at this site documented in 1990 and 1995 (Figure 12-3). Multiplate samples that were dominated by sewage-tolerant worms in 1990 and 1995 were dominated by midges and mayflies in 2000. One possible reason for improvement is greatly improved water quality in Cayadutta Creek, which joins the Mohawk River upstream of the Fonda sampling site, following the major 1991 upgrade of the Gloversville-Johnstown Wastewater Treatment Facility.

At Waterford, water quality was assessed as slightly impacted, based on 2000 multiplate sampling. Water quality at this site was also assessed as slightly impacted in 1990. Current conditions reflect continuing improvement within the category, as exhibited by the EPT index (Figure 12-4)).

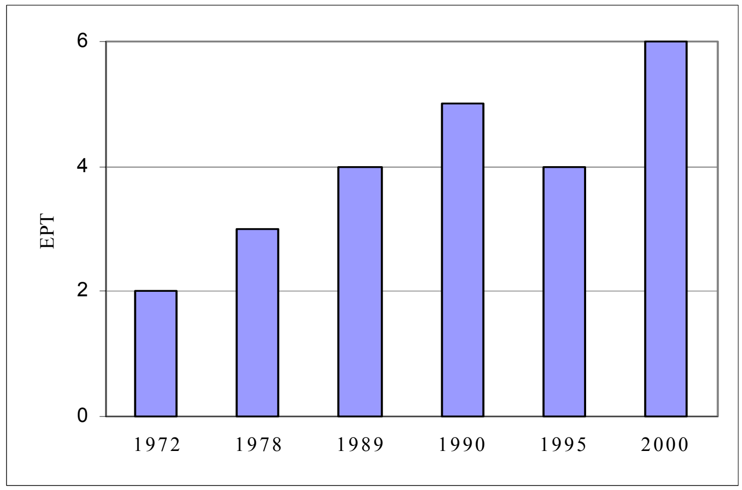


Figure 12-4. EPT trends (sensitive mayflies, stoneflies, and caddisflies) in the Mohawk River at Waterford, 1972-2000.

Both the East Branch and West Branch of the Mohawk River were assessed as non-impacted. Sites were sampled at Ava and West Branch in 2000, were field-assessed as non-impacted, and the samples were not processed. No prior data were available for these sites.

<u>Moyer Creek</u>

Water quality was assessed as non-impacted for this Mohawk River tributary, based on macroinvertebrate sampling at Frankfort in 2000. The sample was field-assessed, and was not processed. No prior data were available for the stream.

<u>Mud Creek</u>

Based on 2000 macroinvertebrate sampling at Whitesboro, water quality was assessed as slightly impacted for this tributary of Sauquoit Creek. Nonpoint source nutrient enrichment is the likely source of impact. The site was previously assessed as slightly impacted in 1995, and as non-impacted in 1996.

<u>Nail Creek</u>

Current water quality of Nail Creek in Utica is assessed as moderately impacted, based on sampling in 2001, with the fauna consisting mostly of pollution-tolerant worms and midges. The site was assessed as severely impacted in 2000. Impact Source Determination denoted municipal and/or industrial discharges as the likely source of impact. A strong sewage smell was noted at the site. This stream travels underground for a large distance upstream of the sampling site, and combined sewer overflows are discharged into it.

Ninemile Creek

Current water quality of Ninemile Creek is assessed as non-impacted. The site at Marcy was sampled in 2000 and 2001. The 2001 sampling resulted in an assessment of non-impacted, although nutrient enrichment was indicated to be present. The 2000 sampling indicated slightly impacted water quality, from nonpoint source nutrient enrichment. Water quality in 1990 was determined to be non-impacted.

North Chuctanunda Creek

Water quality is assessed as slightly impacted for this stream, based on macroinvertebrate sampling at Amsterdam in 1996. The site sampled at the Route 5 bridge in Amsterdam showed pronounced effects of urban runoff, while the upstream site reflected minor nonpoint source nutrient enrichment. The stream was more recently sampled in 2000 at Willow Street in Amsterdam. The sample was field-assessed as non-impacted, but was not processed, and is therefore considered less definitive than the numerical results from 1996.

North Creek

Non-impacted water quality was assessed for this tributary of West Canada Creek, based on 2000 macroinvertebrate sampling at Kast Bridge. The fauna was equally dominated by mayflies, caddisflies, and midges. Minor nutrient enrichment was evident, but indices were within the range of non-impact.

Nowadaga Creek

Based on 2000 macroinvertebrate sampling at Indian Castle, water quality was assessed as slightly impacted. No sources were indicated by the fauna, although diatoms and other algae at the site pointed to nutrient enrichment.

Oriskany Creek

Current water quality in Oriskany Creek ranges from non-impacted to slightly impacted. Upstream water quality at Oriskany Falls was assessed as non-impacted in 2000 sampling, representing possible improvement compared to 1990, although this should be verified by further sampling. Water quality at Colemans Mills was assessed as slightly impacted, by nonpoint nutrient enrichment and siltation, in 2000, representing a possible decline, although this also should be verified by further sampling. Sampling in 2001 at Oriskany resulted in an assessment of slightly impacted, by nonpoint nutrient enrichment.

Otsquago Creek

Water quality was assessed as non-impacted at Fort Plain, based on macroinvertebrate sampling in 2001. Non-impacted water quality was also assessed at Valley Brook in 2000, although this assessment was based on a field assessment. The Valley Brook site was previously assessed as slightly impacted in 1996. Nonpoint source nutrient enrichment continues to be a concern in the stream.

Otsquene Creek

Water quality was assessed as non-impacted for this tributary of Otsquago Creek, based on macroinvertebrate sampling at Valley Brook in 2000. The sample was field-assessed, and was not processed. No prior data were available for the stream.

Panther Creek

This tributary of Schoharie Creek is assessed as non-impacted, based on macroinvertebrate sampling north of Breakabeen in 2000. The sample was field-assessed, and was not processed. No prior data were available for the stream.

Peck Creek

Non-impacted water quality was assessed for this tributary of Caroga Creek in macroinvertebrate sampling at North Bush in 2000. The sample was field-assessed, and was not processed. No prior data were available for the stream.

Platter Kill

Water quality at Gilboa was assessed as slightly impacted, based on 2000 macroinvertebrate sampling. Although mayflies, stoneflies, and caddisflies were present, the number of individuals was very low, insufficient to obtain a 100-organism subsample. The stream water at this site was very turbid, and this may have been responsible for the very low macroinvertebrate biomass.

Poentic Kill

Current water quality in the Poentic Kill remains slightly to moderately impacted. A 2002 study by Jessica Bennett in cooperation with the Stream Biomonitoring Unit sampled 4 Poentic Kill sites for macroinvertebrates, repeating a 1989 study. Mayflies, stoneflies, and caddisflies were present, but species richness was low, similar to the 1989 results. ISD showed possible influences of organic wastes and nutrient enrichment.

Reall Creek

Water quality of this stream in Deerfield is assessed as slightly impacted, based on macroinvertebrate sampling in 2000 and 2001. The fauna was diverse, but dominated by facultative midges. ISD indicated possible effects of organic wastes, although no sources are known. Clean-water mayflies, stoneflies, and caddisflies were found at this site. Caddisflies analyzed in 2001 contained the PAH chrysene at amounts exceeding the level of concern.

Salt Spring Brook

Water quality was assessed as non-impacted for this tributary of Canajoharie Creek, based on macroinvertebrate sampling in 1995. Some metrics indicated slight impact, but these were considered to be caused by headwater effect, and a correction factor was applied. Clean-water organisms were numerous in the sample.

Sauquoit Creek

Slightly impacted water quality was assessed for all sites on Sauquoit Creek from Clayville to Whitesboro in 1995; the Greens Crossing site was assessed as non-impacted. Sampling at Whitesboro in 2000 confirmed the assessment of slight impact. Nonpoint nutrient enrichment is the likely source of impact. Very high levels of PCBs (57 µg/g, compared to the level of concern of 0.2 µg/g) were documented in crayfish from the stream in Chadwicks in 2000.

Schoharie Creek

Current water quality in Schoharie Creek is considered non-impacted. Non-impacted water quality was documented at 5 sites from below Tannersville to below Hunter in replicated macroinvertebrate sampling in 1995. The site below Hunter was sampled for macroinvertebrates again in 1999, and was assessed as slightly impacted, but was re-sampled in 2000, and was field-assessed as non-impacted. Continued monitoring is recommended for this site.

Water quality from Burtonsville to Fort Hunter is considered non-impacted, based on macroinvertebrate sampling in 2000 and 2001. The fauna included many species of clean-water mayflies and caddisflies.

Shakers Creek

Slightly impacted water quality was assessed for Shakers Creek in Latham, based on 2000 macroinvertebrate sampling. Impact Source Determination pointed to municipal/industrial sources, with a likely toxic element. Sampling of this stream in 1996 documented elevated levels of PAHs, and suggested airport runoff as the probable source of impact. The portion of the stream directly below the airport was assessed as moderately impacted by complex stressors. The reach upstream of the airport was assessed as moderately impacted, but this was determined to be due to impoundment effect from Ann Lee Pond.

Sixmile Creek

Water quality was assessed as slightly impacted, based on macroinvertebrate sampling at Rome in 1995, 1996, and 2000. Impact Source Determination indicated nonpoint source nutrient enrichment and siltation, although clean-water mayflies, stoneflies, and caddisflies were present. No data prior to 1995 were available for determining water quality trends for the stream.

South Chuctanunda Creek

Water quality was assessed as non-impacted in South Amsterdam, based on 2000 macroinvertebrate sampling. The fauna was dominated by clean-water mayflies and caddisflies. This represents an apparent improvement compared to slightly impacted conditions documented in 1990 and 1995. Further monitoring of the stream is recommended to determine if this trend is genuine.

Spruce Creek

Water quality is assessed as non-impacted for this tributary of East Canada Creek, based on macroinvertebrate sampling at Shedd Corners in 2000. The sample was field-assessed, and not processed further. No prior data were available for the stream.

Starch Factory Creek

Water quality is assessed as slightly impacted for this stream. Macroinvertebrate sampling was conducted in 2000 and 2001. Sampling in 2001 in Proctor Park resulted in an assessment of slightly impacted due to toxic effects from unknown sources. Sampling in 2000 below Broad Street resulted in an initial assessment of non-impacted, later corrected to slightly impacted. Although stoneflies and mayflies were present, the fauna was heavily dominated by midges, and their diversity inflated the richness metric. High siltation and embeddedness were noted in the stream, and likely affect the fauna, and Combined Sewer Overflows (CSOs) may also be a factor.

Steele Creek

Water quality is assessed as non-impacted, based on macroinvertebrate sampling at Ilion in 2000. The sample was field-assessed, and not processed further. No prior data were available for the stream.

Steuben Creek

Slightly impacted water quality was assessed for Steuben Creek based on 2000 sampling at a site upstream of Barneveld. Nonpoint nutrient enrichment was indicated as the source of impact. The creek was similarly assessed in 1990. A site below Barneveld was assessed as non-impacted in 2000 sampling.

Stony Creek

Slightly impacted water quality was assessed for a site at Vischer Ferry, based on 2000 macroinvertebrate sampling. Nonpoint nutrient enrichment was the likely source of impact. No prior data were available for the stream.

Switz Kill

Water quality in Berne was assessed as non-impacted, based on 2000 macroinvertebrate sampling. Clean-water mayflies, stoneflies, and caddisflies were well-represented. The creek was similarly assessed in 1992.

Three Mile Creek

Based on 2000 macroinvertebrate sampling in Rome, water quality was assessed as slightly impacted. Impact Source Determination indicated municipal/industrial inputs and impoundment effects as the causes of impact. Griffiss Air Force Base, although closed in 1995, remains is a possible contributor to water quality impacts.

Timmerman Creek

Water quality at St. Johnsville was assessed as non-impacted, based on 2000 macroinvertebrate sampling. A diverse fauna was present, with many mayflies, stoneflies, and caddisflies. No prior data were available for the stream.

Trammel Creek

Water quality is assessed as non-impacted for this tributary of East Canada Creek, based on macroinvertebrate sampling at Stratford in 2000. The sample was field-assessed, and not processed further. No prior data were available for the stream.

Van Deusen Brook

Two sites on this small tributary of Canajoharie Creek were sampled for macroinvertebrates in 1995. The upstream site was assessed as slightly impacted by nonpoint source nutrient enrichment. The downstream site, below the confluence of another tributary, was assessed as non-impacted. Both sites had mayflies, stoneflies, and caddisflies, but were dominated by algal-feeding riffle beetles, which are often abundant in stream reaches with elevated nutrient levels.

West Canada Creek

Non-impacted water quality is assessed for all sites on West Canada Creek. Sites above Hinkley Reservoir and at Poland were field-assessed as non-impacted in the 2000 sampling. Sampling in Kast Bridge in 2001 yielded an assessment of non-impacted, based on a laboratory-processed sample. The stream was previously assessed as non-impacted in 1989, 1990, and 1995. A site on the South Branch of West Canada Creek east of Morehouseville was field-assessed as non-impacted in 2000.

West Creek

Slightly impacted water quality was assessed for this tributary of Cobleskill Creek, based on 2000 macroinvertebrate sampling in Warnerville. Impact Source Determination denoted nonpoint nutrient enrichment as the likely source of impact. This site had been assessed as non-impacted in 1996, although abundant filamentous algae, noted in 1996, indicated the presence of enriched conditions at that time as well.

West Kill

Water quality is assessed as non-impacted for this tributary of Schoharie Creek, based on macroinvertebrate sampling in the village of West Kill in 2000. The sample was field-assessed, and not processed further. No prior data were available for the stream.

White Creek

Non-impacted water quality is assessed for this tributary of West Canada Creek, based on macroinvertebrate sampling below Newport in 2000. The sample was field-assessed, and not processed further. No prior data were available for the stream.

Wolf Hollow Creek

Water quality is assessed as non-impacted for this small tributary of West Canada Creek, based on 2000 macroinvertebrate sampling in Welch Corners. Water quality was initially assessed as slightly impacted, but this assessment was upgraded to non-impacted, due to the headwater nature of the stream. The fauna was dominated by intolerant taxa, but diversity was low, as is typical of headwater streams (see Appendix section on headwater streams). No water quality problems were indicated for this stream.

Yatesville Creek

Non-impacted water quality is assessed for this Mohawk River tributary, based on macroinvertebrate sampling at Randall in 2000. The sample was field-assessed, and not processed further. No prior data were available for the stream.

Zimmerman Creek

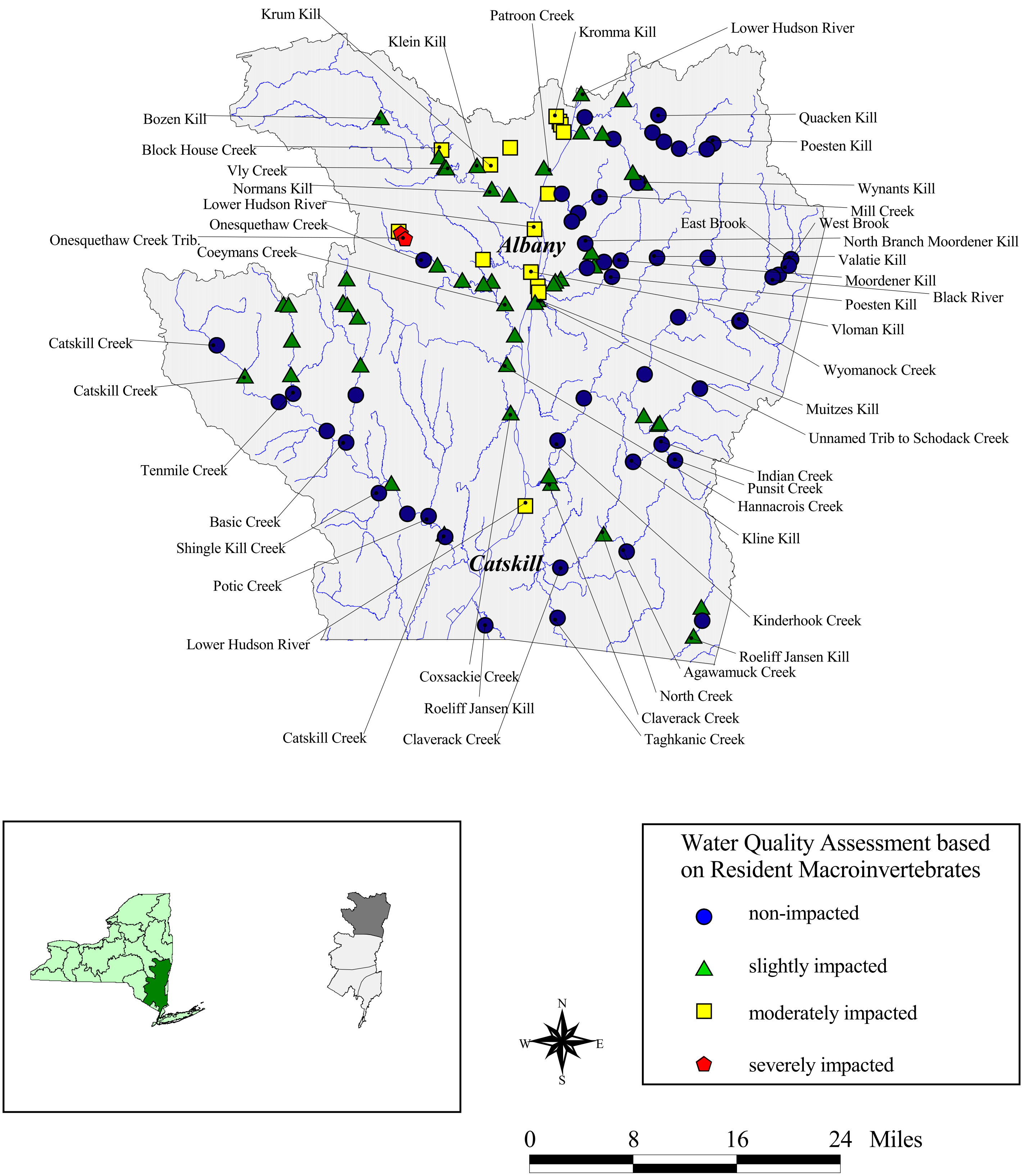
Water quality is assessed as non-impacted for this Mohawk River tributary, based on macroinvertebrate sampling near St. Johnsville in 2000. The sample was field-assessed, and not processed further. No prior data were available for the stream.

Unnamed tributary to Canajoharie Creek

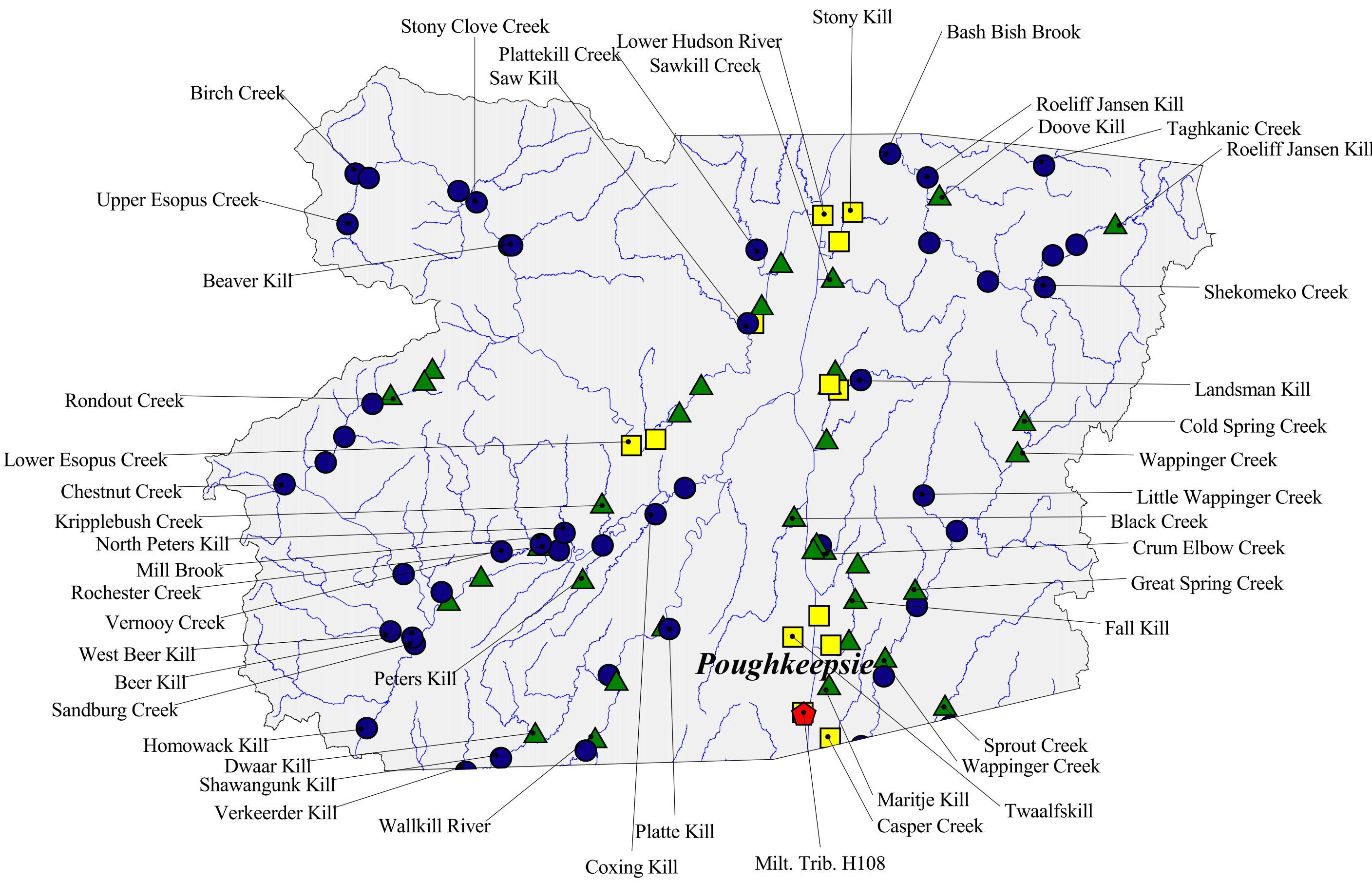
This small stream in Buel, sometimes referred to as "Tri-County Creek", was sampled in 1995, and was assessed as non-impacted. The metrics reflected the headwater condition, and the correction factor was applied, resulting in the non-impacted assessment. Mayflies, stoneflies, and caddisflies were well-represented in the sample, and no impairments were indicated.

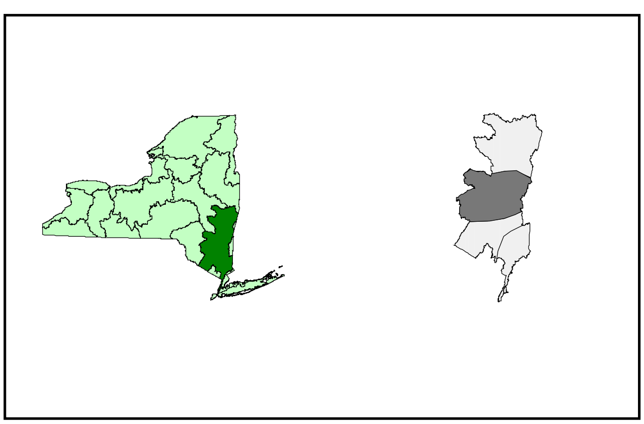
Figure 12-5. Sampling the Lisha Kill at Niskayuna, October 18, 2002, the 30th anniversary of the Clean Water Act, designated as National Monitoring Day.

Lower Hudson River Drainage Basin (North)



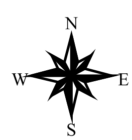
Lower Hudson River Drainage Basin (Central)



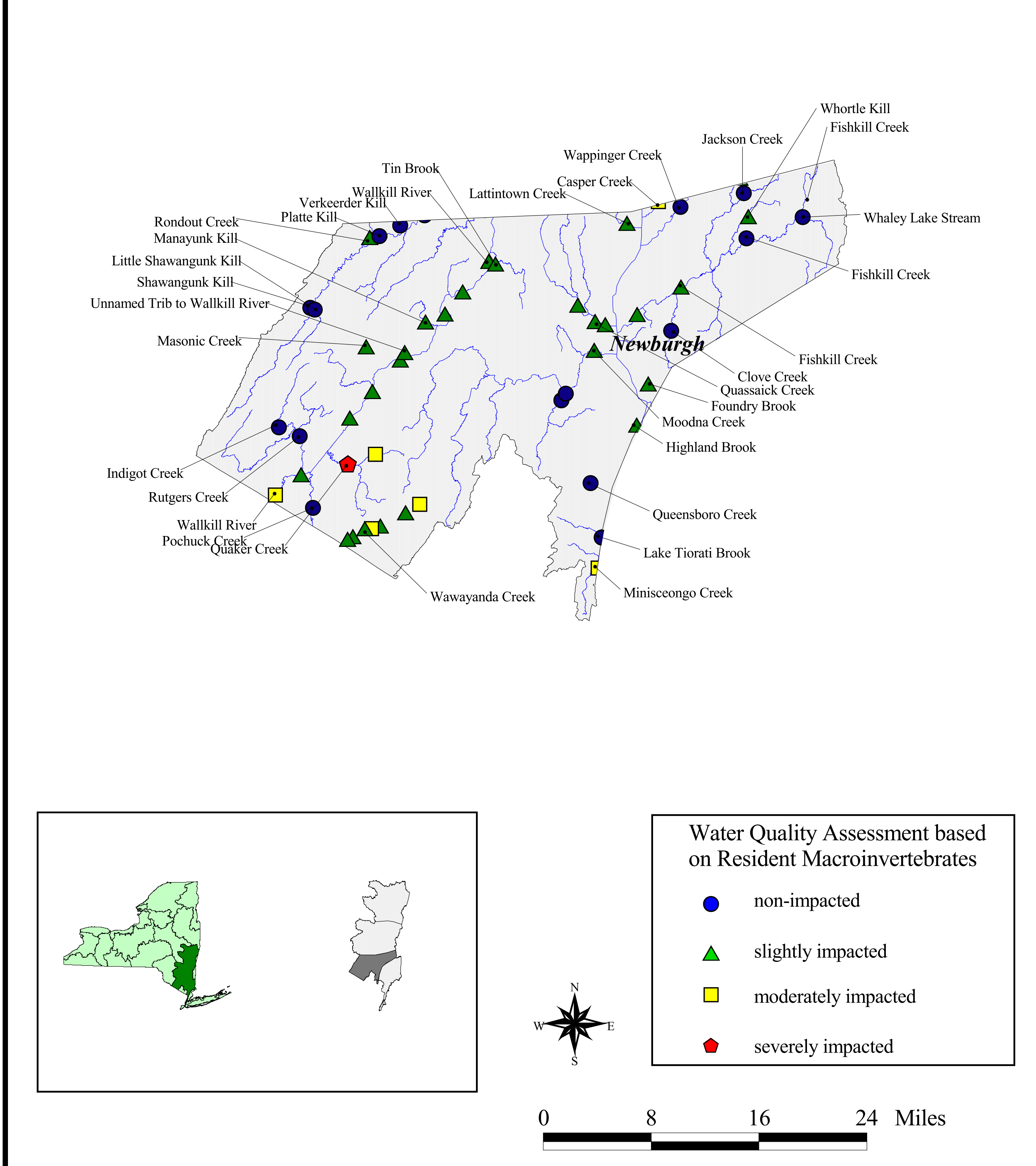


Water Quality Assessment based on Resident Macroinvertebrates

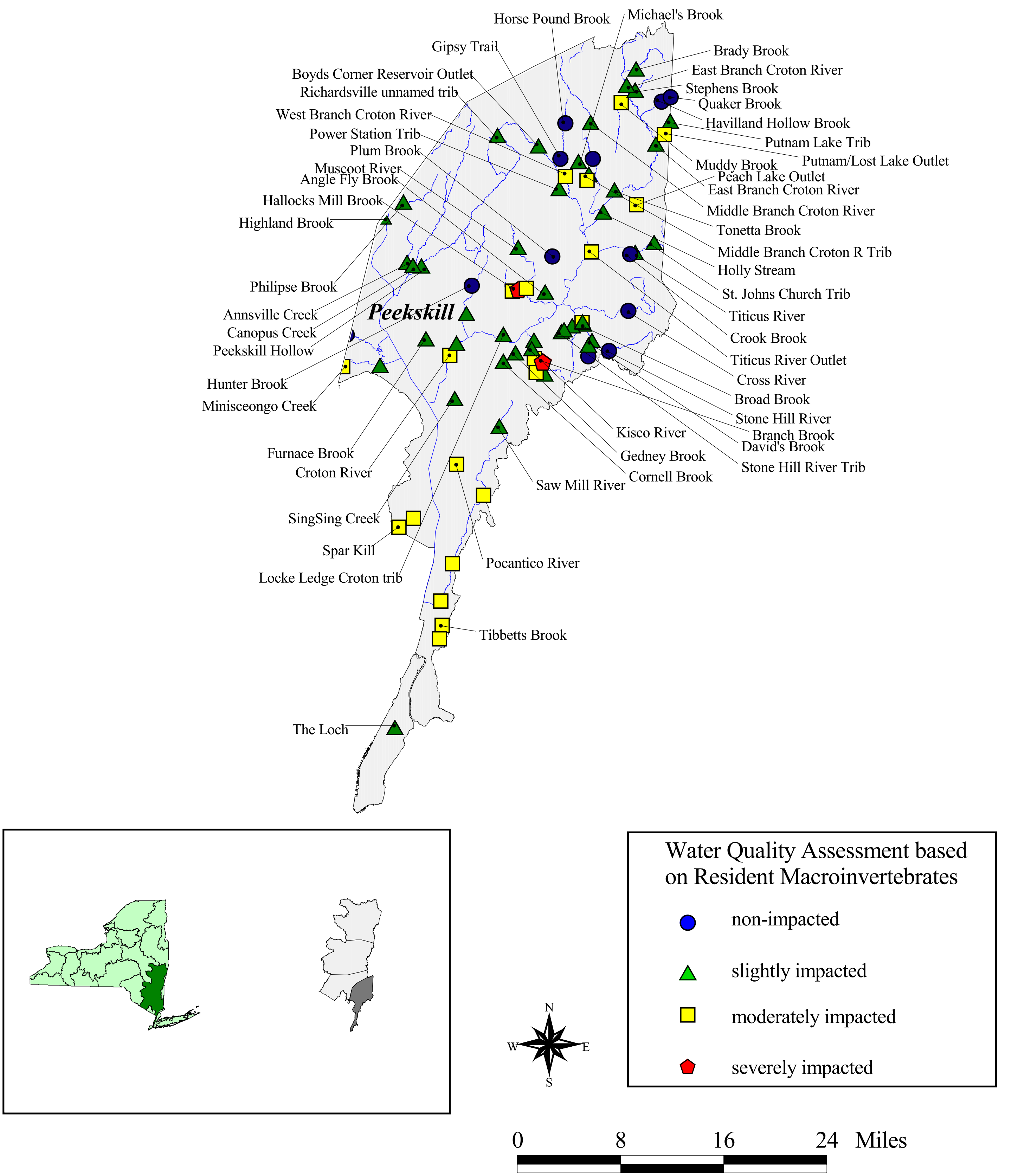
- non-impacted
- slightly impacted
- moderately impacted
- severely impacted



Lower Hudson River Drainage Basin (South)



Lower Hudson River Drainage Basin (Primarily Croton)



LOWER HUDSON RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED
AGAWAMUCK CREEK (AGAW)		
01	Above Philmont, above Stevers Crossing Rd bridge	02
ANGLE FLY BROOK (AFLY)		
01	Somers, above Rt. 35 bridge	98 00
ANNSVILLE CREEK (ANNS)		
01	Annsville, below Rte 9 bridge, above Westchester Lake	02
BASH BISH BROOK (BASH)		
01	Copake Falls, below Valley View Rd bridge	02
BASIC CREEK (BASC)		
01	Ford Corners, below culvert at Richardson farm	95
02	Westerlo, below culvert under May Rd.	95
03	Westerlo, below Co Rte 1 bridge	95
04	Westerlo, below Lobdell Mill Rd. bridge	95
05	South Westerlo, at Rte 405 bridge	95
06	West Greenville, above Rte 81 bridge	95
07	Freehold, above Co. Rte 67 bridge	95
BEAVER KILL (BEVE)		
01	Mt Tremper, below CR 40 bridge	02
BEER KILL (BEER)		
01	Ellenville, below Rte 209 bridge	02
BIRCH CREEK (BRCH)		
01	Big Indian, above Lasher Rd. bridge	95 99
BLACK CREEK (BLKH)		
01	Esopus, above Rte 9W bridge	02
BLACK RIVER (BLAG)		
01	Garfield, below CR 28 bridge	02
BLOCKHOUSE CREEK (BLOK)		
01	Westmere, above culvert under State Farm Rd	93
BOYDS CORNER RESERVOIR OUTLET (BOYD)		
01	Carmel, below Rte. 301 bridge	00
BOZEN KILL (BOZN)		
02	Altamont, below Rte 158 bridge	93 97
BRADY BROOK (BRAD)		
01	Pawling, above Rte. 22	00

LOWER HUDSON RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED
BRANCH BROOK (KISC)		
B	Mount Kisco, Lexington Avenue	01 02
BROAD BROOK (BVRD)		
B	Bedford Hills, above confluence with Beaver Dam Brook	01 02
BROWNS CREEK (QKER)		
01	Florida, off Rt. 94	94 95
CANOPUS CREEK (CNOP)		
01	Annsville, Sprout Brook Rd	02
CASPER CREEK (CASP)		
01	Knapps Corner, above Camelot Rd bridge	02
CATSKILL CREEK (CATS)		
01	Livingstonville, off Rt.145 at DEC fishing access;below Rt.19A	97
02	Preston Hollow, off Rt. 145; below West Winds Diner	97
03	Oak Hill, below Rt. 22 bridge	97
04	East Durham, below Co. Rt. 67A bridge	97
05	Cairo, below Lakes Mills bridge;off Warren Stein Rd	97
06	South Cairo, off Co. Rt. 23B; above Ira Vail Rd. bridge	97
07	Leeds, above Rt. 23B bridge	97 98 02
08	Leeds, below Rt.23B bridge;off Gilfeather Park Rd.	97
CHESTNUT CREEK (CHES)		
01	Grahamsville, below Rte 42 bridge	98 02
CLAVERACK CREEK (CLAV)		
01	Claverack, above Rte 9H bridge (NAWQA site)	97
02	Stockport, above Co. Rt. 25 bridge	98 02
CLOVE CREEK (CLVC)		
01	Fishkill, Mill Road pull-off	02
COEYMANS CREEK (COEY)		
01A	Feura Bush, Rte 55	84
02	Jericho Bridge, Rte 53	84 87
03	South Albany, Elm St	84
06	Bethlehem Heights, Rte 396	84 87 98
09	Selkirk, Old Ravena Rd bridge	87 98
10	Coeymans, above Route 144 bridge	87 98 02
COLD SPRING CREEK (CLDS)		
01	McIntyre, below Homan Rd	02
CORNELL BROOK (CORN)		
01	Millwood, above bridge @ Cornell Woods develop, Rte 100	00

LOWER HUDSON RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED					
COXING KILL (COXI)							
01	High Falls, above School Hill Rd bridge						02
COXSACKIE CREEK (COXS)							
01	Otter Hook, off Co.Rt. 61;above Sickle Creek confluence		98				
CROOK BROOK (CROK)							
01	Salem Center, Turkey Hill Rd				00		
CROSS RIVER (CROS)							
01	Cross River, below bridge in Ward Pound Ridge Reservation				00	01	02
CROTON RIVER (CROT)							
00	Croton, below outlet					01	
01	Croton, above Old Quaker Rd. bridge		98				
CROTON RIVER, EAST BRANCH (EBCR)							
00	Patterson, below Rt. 311 bridge					01	
01	Putnam Lake, below CR 65bridge		98	99		01	
CROTON RIVER, MIDDLE BRANCH (MBCR)							
01	Maynard Corners, below Rt. 311 bridge		98				
02	Carmel, Rte 57				00		
CROTON RIVER, WEST BRANCH (WBCR)							
01	Carmel, below Rte. 6 outlet				00		
CRUM ELBOW CREEK (CRUM)							
01	Hyde Park, below Market St. bridge; at USGS gage	95					
02	Hyde Park, off Howard Blvd.; downstream of Station 1	95					
02A	Hyde Park, immediately east of Rt. 9; edge of pond	95					
03	Hyde Park, below Rt. 9 bridge	95					
04	Hyde Park, off Co.Rt. 41; at coach house service road bridge	95	98				02
DAVID’S BROOK (DAVE)							
01	Bedford Center, off Clinton Rd						02
03	Bedford Center, below Harris Rd					01	02
DOOVE KILL (DOVE)							
01	Manorton, above CR 19 bridge						02
DWAAR KILL (DWAA)							
01	Dwaarkill, below Red Mills Rd bridge						02
DWAAR KILL (DWAR)							
01	Near Wallkill, above Bates Rd bridge						02

LOWER HUDSON RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED									
EAST BROOK (EABR)											
01	Stephentown, above Rte 22 bridge										02
ESOPUS CREEK, UPPER (USOP)											
01	Oliverea, below McKinley Hollow Rd. bridge				95					00	
02	Big Indian, below Co. Rt. 47 bridge				95	96				00	
03	Shandaken, above Rt. 28 bridge				95					00	
04	above Phoenicia, DOT access off Rt. 28				95	96				00	
05	Mount Pleasant, above confluence with Beaver Kill				95					00	
06	Boiceville, at Rte 28A bridge			93	95	96				00	
ESOPUS CREEK, LOWER (ESOP)											
01	Above Marbletown,below Lomontville Road bridge			93							
02	Marbletown, below ford at Fording Place Rd.			93							
03	Below Marbletown, behind property of 624 Creekside Rd.			93							
04	Hurley, below Rte 29A bridge			93					99		
05	Below Kingston, at STP, Fording Place Rd.			93							
06	Lake Katrina, below Leggs Mill Road bridge			93			97				
07	Glenerie, off Rt. 9, above Glasco Turnpike bridge		91	93				98	99		02
FALL KILL (FKIL)											
02	Hyde Park, at Haviland Rd. bridge						97				
03	Poughkeepsie, above East Dorsey Rd.(Co.Rt.40) bridge						97				
04	Poughkeepsie, below Smith St. bridge						97		99		
05	Poughkeepsie, below Garden St. bridge						97	98	99		02
FISHKILL CREEK (FISH)											
01	Clove Valley, above Dorn Road bridge		91								
03	Hopewell Junction, below Augusta Drive		91								
05	Fishkill, above Rte 9 bridge		91						99		
07	Beacon, above Main Street bridge		91				97	98	99		02
FOUNDRY BROOK (FDRY)											
01	Cold Spring, below Rte 9D bridge										02
FURNACE BROOK (FURN)											
01	Crugers, Furnace Dock Rd at pulloff										02
GEDNEY BROOK (GEDY)											
01	Millwood, 7 Bridges Rd.									00	
GIPSY TRAIL (GIPS)											
01	Carmel, below Gipsy Trail Rd. bridge									00	
GREAT SPRING CREEK (GRSP)											
01	Pleasant Valley, above CR 73										02
GUILDERSLEEVE BROOK (GILD)											
01A	East Fishkill, above Limekiln Rd	89									

LOWER HUDSON RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED								
GUILDERSLEEVE BROOK (GILD) cont'd.										
01	East Fishkill, below Limekiln Rd	87								
02	East Fishkill, bridge near IBM Building 30	87	89							
03	East Fishkill, above main IBM discharge	87	89							
05	East Fishkill, below main IBM discharge	87	89							
06	East Fishkill, Lake Ave		89							
HALLOCKS MILL BROOK (HLKS)										
01	Amawalk, below Greenwood St. bridge						98			
02	Yorktown, above Pinesbridge Rd bridge, below STP							99	00	
HANNACROIS CREEK (CROI)										
01	Ravena, above New Baltimore Rd. bridge						98			
HAVILLAND HOLLOW BROOK (HAVI)										
01	Brewster, below Brimstone Rd. bridge								00	
HIGHLAND BROOK (HIGH)										
01	Highland Falls, below Main St bridge									02
HOLLY STREAM (HOLY)										
01	Brewster, above Rte. 202 bridge								00	
HOMOWACK KILL (HOMW)										
01	Phillipsport, below closed bridge on Doolittle Rd									02
HORSE POUND BROOK (HORS)										
01	Lake Carmel, above gage								00	
HUDSON RIVER, LOWER (LHUD)										
01	Troy, Buoy 79, below Troy Dam	73	77	83	91		97			02
02	Troy, below Green Island bridge	73								
03	Above Albany, below I-90 bridge	73		83						
04	Glenmont, below Rte 9 bridge	73			91	92	97			
05	Van Wies Point, Buoy 63	73		83						
06	Castleton, Buoy 55	73	77	83	91		97			02
07	Below Castleton, Buoy 48	73		83						
08	Below New Baltimore, Buoy 39	73		83						
09	Coxsackie, Buoy 15	73		83						
10	Above Hudson, Buoy 83	73		83	91		97			02
11	Below Hudson, Buoy 76	73		83						
12	Below Catskill, Buoy 65	73		83						
13	Below Cementon, Buoy 47	73		83						
14	Saugerties, Buoy 39	73	77	83	91		97			02
15	Above Kingston, Buoy 22	73		83						
16	Below Kingston, Buoy 16	73		83						
17	Indian Kill, Esopus Isl N. Shoal buoy	73	77	83						
18	Poughkeepsie, Buoy 2	73			91		97	98		

LOWER HUDSON RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED								
HUDSON RIVER, LOWER (LHUD) cont'd.										
19	Below Poughkeepsie, Buoy B	73	83							
20	Below Milton, Diamond Reef buoy	73	83							
21	New Hamburg, Buoy 40	73								
22	Below Beacon, Buoy 36	73								
23	Below West Point, Buoy 25	73								
24	Peekskill, Buoy 19	73								
25	Below Verplanck Point, Buoy 16	73								
26	Below Croton Point, Buoy 5	73								
HUNTER BROOK (HUNT)										
00	Yorktown, Strang Blvd.								01	
01	Yorktown, Old Crompond Road					98		00	01	
02	Yorktown, Hunter Brook Rd.					98				02
INDIAN CREEK (DIAN)										
01	Chatham, below Rte 203 bridge									02
INDIGOT CREEK (IDGO)										
01	Millsburg, above Millsburg Rd									02
JACKSON CREEK (JCKS)										
01	LaGrangeville, above Rte 33 bridge									02
KINDERHOOK CREEK (KIND)										
01	Garfield, below Presbyterian Hill Road			91	97			00		02
02	West Lebanon, Rte 20 Fishing access							00		
03	Brainard, Rte 20; below bridge							00		
06	Chatham, Spangler Rd. bridge							00		
08	Kinderhook, below Rte 9H bridge, thru cornfield						99	00		
09	Stuyvesant, above bridge; below falls @Town Park							00		
10	Rossman, below Van Buren Rd. and Rt. 25 intersection			91	97	98	99	00		02
KISCO RIVER (KISC)										
A	Mt. Kisco, above Radio Circle cul-de-sac							00	01	02
00	Mt. Kisco, above Byram Lake Rd. bridge						99			02
01	Mt. Kisco, below Rt. 133 bridge					98	99			
2A	Mt. Kisco, above Cross River Rd. bridge								01	
02	Mt. Kisco, above Nitra Yeshiva Rd bridge						99	00	01	02
KLEIN KILL (KLEN)										
01	Linlithgo, Wire Rd bridge									02
KLINE KILL (KLIN)										
01	Chatham, above Merwin Rd bridge									02
KRIPPLEBUSH CREEK (KRIP)										
01	Kripplebush, above Rte 209 bridge									02

LOWER HUDSON RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED									
KROMMA KILL (KROM)											
A	Watervliet, opposite AlTech landfill	87									
01	Watervliet, Grenada Terrace, above Spring St. bridge	87	91					99			
02	Watervliet, Lincoln St., above main discharge	87	91								
03	Watervliet, above Route 32 bridge	87	91			97	98	99			02
KRUM KILL (KRUM)											
01	Albany, below Russel Rd. bridge				93	97					
LAKE TIORATI BROOK (TIOR)											
01	Stony Point, above Rte 210 bridge @Cedar Flats Rd										02
LANDSMAN KILL (LAND)											
02	Rhinebeck, above Violet Hill Road bridge			92							
03	Rhinebeck, below Route 9 bridge			92			98				
04	Staatsburg, above Mill Road			92			98				02
LATTINTOWN CREEK (LATT)											
01	Marlboro, Prospect St bridge										02
LITTLE SHAWANGUNK KILL (LGUN)											
01	Maple Glen, above Timothy Collard Rd bridge										02
LITTLE WAPPINGER CREEK (LWAP)											
01	Salt Point, above Halstead Rd										02
MANAYUNK KILL (MANY)											
01	Kaisertown, below VanAmburg & Kaisertown Rd bridge										02
MARITJE KILL (MARI)											
01	Hyde Park, CR 40A bridge										02
MASONIC CREEK (MASO)											
01	Middletown, intersection of Mud Mills Rd/ Silver Lake Scotchtown Rd										02
MICHAEL'S BROOK (MICH)											
00	Carmel, above Fair St									01	
01	Carmel, below Kelly Rd. bridge								00	01	02
MILL BROOK (MIBK)											
01	Mill Hook, above bridge in Roundout Valley Resort										02

LOWER HUDSON RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED									
MILL CREEK (MILL)											
00	Best, above Best Rd bridge									01	
01	East Greenbush, above Michaels Road bridge		88	89				99		01	
02	East Greenbush, Rte. 4; above bridge. Access Mother's Bar									01	
04	East Greenbush, above Barrack Rd (Rt. 151) Walk from cemetery									01	
05	Rensselaer, above South St. RR bridge							99		01	02
MINISCEONGO CREEK (MNGO)											
00	Thiells, @ Thiells Mt. Ivy Rd bridge at golf course										02
01	West Haverstraw, at Sampsondale Ave. bridge						98				
MONHAGEN BROOK (MONH)											
00	Middletown, above conduit, California Ave	86									
01	Middletown, above STP discharge	86			92						
02	Middletown, below Dolsontown Rd bridge	86			92						
03	Middletown, above McVeigh Road bridge	86			92						
04	Middletown, above Golf Links Road bridge	86			92						
MOODNA CREEK (MOOD)											
01	Cornwall, above Route 9W bridge				92	97	98				02
MOORDENER KILL (MORD)											
01	East Schodack, below Nassau Lake Rd bridge							99			
02	Schodack, above Rte. 150 bridge; near Curtis Trailer Park							99			
03	Schodack, Rte 150 @ gravel pit		88	89				99			
06	Schodack, below Rte 150 bridge, near I-90							99			
07	Brookview, below Brookview Station Rd. bridge					97	98	99			02
08	Castleton, @ Fire pump station							99			
09	Castleton, Rte. 150, downstream of spillway							99			
MOORDENER KILL, NORTH BRANCH (MORD)											
05	Schodack, above Kraft Rd bridge							99			02
MUDDY BROOK (MDDY)											
01	Towners, Cornwall Hill Rd., near Kessman Landfill						98		00		
MUITZES KILL (MUIT)											
01	Castleton, above Rt. 9J; behind Agway						98				
MUSCOOT RIVER (MUSC)											
01	Baldwin Place, below Mahopac Ave. bridge						98		00		
02	Yorktown, Rt. 35; outlet of Amawalk Reservoir								00		

LOWER HUDSON RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED
NORMANS KILL (NORM)		
04	Westmere, above State Farm Rd bridge	93
05	Voorheesville, below Normans Kill Rd	93
09	Albany, Albany Municipal Golf Course; opp 14th hole	93
10	Delmar, above Delaware Ave bridge	91 92 93 97 98 02
NORTH CREEK (NORC)		
01	Mellenville, below Rte 217 bridge	02
NORTH LAKE OUTLET (NRTH)		
01	North Lake Campground, 15 m above STP discharge	90
02	North Lake Campground, 15 m below STP discharge	90
03	North Lake Campground, 150 m below STP discharge	90
04	North Lake Campground, 300 m below STP discharge	90
NORTH PETERS KILL (NPET)		
01	Whitfield, below Canyon Lake Rd bridge	02
ONESQUETHAW CREEK (ONES)		
02	below Clarksville, above Rt. 32 bridge	98
03	below Clarksville, above Onesquethaw Creek Rd. bridge	98
04	Spawn Hollow; Hollyhock Santuary off Rarick Rd.;above Audubon parking lot	98
05	South Bethlehem, below Rt. 53 bridge	84 87 98
PATROON CREEK (PATS)		
04	Albany, above I-90 pond, Central Ave.	94 99 00
05A	Albany, below Tivoli Lake	91
06	Albany, Pleasant Street	93 94 97 98 99 00 02
07	Albany, at mouth	91
PEACH LAKE OUTLET (PEAC)		
01	Brewster, above Cobb Rd. bridge	00 01 02
PEEKSKILL HOLLOW (PEEK)		
01	Van Cortlandtville, below Pump House Rd. bridge	98
PETERS KILL (PETK)		
01	St. Josen, above Rock Hill Rd bridge	02
PHILIPSE BROOK (PHLP)		
01	Garrison, below Rte 9D bridge	02
PLATTE KILL (PKIL) (Ulster County)		
01	Jenkinstown, above Rte 208 bridge	02
PLATTE KILL (PLAK) (Sullivan County)		
01	Burlingham, below CR 61	02

LOWER HUDSON RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED									
PLATTEKILL CREEK (PLCK) (Ulster County)											
01	Mt. Marion, above Glasco Turnpike Bridge										02
PLUM BROOK (PLUM)											
00	Lake Lincolndale, end of Brookside Avenue									01	
01	Lincolndale, Krystal Drive								00	01	
POCANTICO RIVER (POCA)											
01	Sleepy Hollow Manor, Dell St										02
POCHUCK CREEK (POCH)											
01	Newport, below Newport Bridge Rd bridge										02
POESTEN KILL (POST)											
01	Above East Poestenkill, Route 40		92							01	
02	East Poestenkill, above bridge @inters of Co Rt 40 & 44									01	
03	Barberville, Route 79		92							01	
05	Poestenkill, above Rte 351 bridge							99		01	
06	above Poestenkill, above Garfield Rd bridge									01	
08	above Eagle Mills, below Co Rt 134 bridge									01	
09	Troy, above Country Club Rd bridge									01	
10	Troy, above Spring Ave. bridge						98			01	02
POTIC CREEK (POTC)											
01	Near Leeds, above Shady Lane Rd bridge										02
PUNSIT CREEK (PUNS)											
01	Spencertown, above Rte 203 bridge before Beale Rd										02
PUTNAM LAKE OUTLET (POUT)											
01	Putnam Lake, above Lake Shore Drive bridge								00	01	02
QUACKEN KILL (QUAC)											
01	Below Brunswick, above Dearstyne Rd bridge										02
QUAKER BROOK (QUAK)											
01	Brewster, above Rte 68 bridge								00		
QUAKER CREEK (QKER)											
02	Florida, Pumpkin Swamp Rd., at Jessup Switch Rd. bridge			94	95						
03	Snufftown, below Rt. 6 bridge			94	95						
QUASSAICK CREEK (QUAS)											
01	Newburgh, above Brookside Rd bridge	87									
02	Newburgh, below Walsh Rd bridge	87						99			
03	Newburgh, above River Rd bridge	87	92			97	98	99			02
04S	Newburgh, below River Rd bridge, south side	87									
04N	Newburgh, below River Rd bridge, north side	87									

LOWER HUDSON RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED								
QUEENSBORO CREEK (QBRC)										
01	near Bear Mountain, above Seven Lakes Drive bridge									02
RHINEBECK KILL (RHIN)										
01	Weys Corners, below Rte 9G bridge				92					
03	Rhinebeck, below Hog Bridge, Montgomery St. ext.				92					
04A	Rhinebeck, above Rte 308				92					
04B	Rhinebeck, below Rte 308				92					
ROCHESTER CREEK (ROCH)										
01	Mill Hook, above Mettacahonts Rd bridge									02
ROELIFF JANSEN KILL (ROLF)										
A	Below Hillsdale, below Rte 22 bridge					93	94	97		
B	Below Hillsdale, above Black Grocery Rd bridge							97		
D	Below Hillsdale, below Overlook Rd bridge					93	94	97		
01	Above Ancram, below Wiltsie Bridge Rd bridge			91	92					
02	Below Ancram, above Hall Hill Rd bridge			91	92					
03	Gallatinville, below Mill Hill Rd bridge			91	92					
04	Jackson Corners, below Academy Hill Rd bridge				92					
05	Elizaville, below Rte 2 bridge				92					
06	Above Blue Store, below Buckwheat Ln bridge				92					
07	above Linlithgo, above Dales Bridge Rd bridge			91	92			97	98	02
RONDOUT CREEK (ROND)										
A	above Peekamoose, above confluence with Rondout	89								
01	above Peekamoose, headwaters, above Pickett Brook	89								
02	above Peekamoose,above Caretaker's Lodge	89								
03	Peekamoose, opposite Caretaker's Lodge	89	90							02
04	Peekamoose, above Buttermilk Creek		90							
05	Bull Run, above Bearhole Brook		90							02
07	Sundown, at Mountain Rd.bridge		90							02
07A	Sundown, below East Mt. Rd. bridge			91	92					02
08	Lackawack, above Sportsmen Rd bridge									02
08A	Wawarsing, below Port Ben Rd									02
09	Kerhonkson, above Rt 44									02
10	Accord, above Rochester Ck confluence									02
11	Alligerville, above bridge									02
12	Rosendale, above Rte 213 bridge			91	92			97	98	02
RUTGERS CREEK (RUTG)										
01	Johnson, above Ridgebury Rd bridge									02
SALT KILL (SALT)										
01	Cohoes, Rte 32				92					

LOWER HUDSON RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED								
SANDBURG CREEK (SBRG)										
01	Ellenville, below Canal St									02
SAWKILL CREEK (SAWK)										
01	Annandale-on-Hudson, below falls	91				98				
SAW KILL (SKIL)										
01	Sawkill, below Sawkill Rd bridge				97					
SAW MILL RIVER (SAW)										
01	Pleasantville, above Bedford Rd bridge		92							
03	Elmsford, below Rte 119 bridge		92							
04	Nepera Park, at Tompkins Ave		92				99			
05	Yonkers, Center St.; 1 block north of USGS gaging station		92			98	99			02
SHAWANGUNK KILL (GUNK)										
A	Maple Glen, @Meyer Rd closed bridge									02
00	Pine Bush, just below Hardenburg Rd bridge									02
01	Ganahgote, below Co. Rt. 9 bridge			94	97					02
SHEKOMEKO CREEK (SHEK)										
01	Pine Plains, @bridge on farm road off Rudd Rd									02
SHINGLE KILL CREEK (SHIN)										
01	Cairo, @CR 23B bridge									02
SINGSING CREEK (SNGS)										
01	Ossining, below Rte 9 bridge									02
SPAR KILL (SPAR)										
00	Sparkill, belowbelow Washington Ave bridge @ Tappen Mem Park						99			02
01	Sparkill, below Valentine St. bridge					98	99			02
SPROUT CREEK (SPRO)										
01	Freedom Plains, above Todd Hill Rd									02
02	Swartoutville, above Rte 82 bridge									02
STEPHENS BROOK (SEPH)										
01	Pawlings, above Rte. 22 bridge							00		
STONE HILL RIVER (BVRD)										
01	Bedford Center, above Old Post Rd.								01	02
02	Bedford Center, above Cantitoe Rd bridge								01	02
03	Bedford Hills, above Beaver Dam Rd. bridge							00	01	02
04	Bedford Hills, below confluence with Broad Bk								01	02

LOWER HUDSON RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED							
STONY CLOVE CREEK (STOC)									
01	Phoenicia, above Rte 214 bridge								02
STONY KILL (STNY)									
A	above Tivoli, above Rte. 9 bridge						99		
01	Tivoli, below Kidd Lane bridge			91		98	99		02
STONY KILL (STON)									
00	East Chatham, Rte 295, where stream is close to road		90						
01	Chatham, above Hartigan Rd bridge	89							
01A	Chatham, above Columbia Corp. discharge	89	90						
02A	Chatham, below Columbia Corp. discharge- above Sta. 2	89							
02	Chatham, below Columbia Corp. discharge	89							
TACKAWASICK CREEK (TACK)									
01	Hoag Corners, above CR 21 bridge								02
TAGHKANIC CREEK (TAGH)									
01	New Forge, above New Forge Rd bridge								02
02	below Linlithgo Mills, above Water Rd bridge								02
TENMILE CREEK (TMIL)									
01	Rensselaerville, above bridge; Huyck preserve				97				
01A	Rensselaerville, below bridge; rd. opposite from town park				97				
02	below Rensselaerville, below McColloch Cross Rd. bridge				97				
03	Medusa, below Rt. 351 bridge				97				
04	Oak Hill, above Saybrook Valley Rd. bridge				97				
TIN BROOK (TINW)									
01	Walden, above Rte 52 bridge								02
TITICUS RIVER (TICU)									
01	Salem Center, above June Rd bridge							00	
02	Purdys, above above Rte 116 bridge							00	
TONETTA BROOK (TONE)									
01	Brewster, County Rte. 56, 100 m below Rte. 6					98	99	00	
TWAALFSKILL CREEK (TWLF)									
01	Highland, above Van Wagner Rd bridge								02
VALATIE KILL (VLAT)									
04	Nassau, below Mead Rd bridge				97				
VERKEERDER KILL (VERK)									
01	Ulsterville, just above Ulsterville Rd bridge								02
VERNOOY KILL (NOOY)									
01	Wawarsing, @Rte 209 bridge								02

LOWER HUDSON RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED								
VLOCKIE KILL (VLOK)										
01	Castleton, above Rte 9J bridge									02
VLOMAN KILL (VLOM)										
01	Selkirk, below Rt. 144 bridge							98		
VLY CREEK (VLY4)										
01	below Voorheesville, below covered bridge on private rd. off Normans Kill Rd			93						
WALLKILL RIVER (WALK)										
01	Liberty Corners,off Oil City Rd. on farm road				94					
02	Pine Island, at Pine Island Rd. bridge				94					
03	Pellets Island, at bridge				94					
04	New Hampton, at Echo Lake Rd. bridge				94					
05	Crystal Run, above Scotchtown Rd. bridge				94					
06	above Montgomery, below Rt. 211 bridge				94					
07	Montgomery, below Rt. 17K bridge				94					
08	Walden, below Oak St. bridge				94				99	
09	Galeville, above bridge				94					
10	Gardiner, Lazy River campground-above Shawangunk confl.				94					
11	above New Paltz, Libertyville Rd., above Rt. 299 bridge		91		94			98	99	02
WAPPINGER CREEK (WAPP)										
01	Stanfordville, above Depot Lane bridge									02
02	Salt Point, Hibernia Rd		91							02
03	Timothy Heights, behind Town Hall									02
04	Manchester Bridge, below Rte. 55 bridge									02
04A	Poughkeepsie, above De Garmo Rd bridge		91							
05	Poughkeepsie, above Jackson Rd. bridge						97	98		02
WAWAYANDA CREEK (WAWA)										
A	below Wickham Lake, above State School Rd bridge	89								
00	Wisner, below Wisner Rd bridge	89								
01	Warwick, above River St bridge	89			94	95				
03	below Warwick, below Pelton Road	89			94	95				
04	below Warwick, below Sanfordville Rd bridge	89			94	95				
06	above New Milford, at Covered Bridge Rd	89			94	95				02
07	New Milford, below Ryerson Rd bridge	89			94	95	97			02
WEST BEER KILL (WBER)										
01	Ellenville, above where Old Greenfield Rd goes under Rt 52									02
WEST BROOK (WSBK)										
01	Stephentown, above Rte 43 bridge									02

LOWER HUDSON RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED						
WHALEY LAKE STREAM (WHAL)								
01	Poughquag, CR 7, above bridge							02
WHORTLE KILL (WHRT)								
01	Hopewell Junction, below Rte 82							02
WOODBURY CREEK (WOOD)								
01	Highland Mills, above sewage outfall pipe	87						
02	Quaker Meeting House, Rte 32 below outfall pipe	87						
03	Mountainville, Star Expansion Rd., off Rt. 32	87						
04	Mountainville, above Moodna Ck confluence	87						
WYNANTS KILL (WYNT)								
01	West Sand Lake, Rte 143, opp. Werger Rd						01	
02	West Sand Lake, Rte 43 @ 43 Mall, below bridge						01	
03	Snyders Corners, above Stop 13 Rd bridge						01	
05	Wynantskill, below Rte 136, access at Creek Lane		95				01	
07	Troy, below Winter St. br., below old wood dam				99		01	
10	Troy, below Rte 4 bridge				99		01	02
WYOMANOCK CREEK (WYOM)								
01	West Lebanon, below Adams Crossing Rd bridge							02
UNNAMED CROTON TRIB AT LOCKE LEDGE (LOCK)								
01	Croton Heights, above Rte 118 bridge					00		
UNNAMED MIDDLE BRANCH CROTON RIVER TRIBUTARY (CENT)								
01	Carmel, Rte. 6; below Centennial Links golf course; above culvert					00	01	
UNNAMED MILTON TRIB (MILT)								
01	Milton, above Brooklyn Bottling Co. discharge						01	02
02	Milton, above Watson Ave.; corner of Dock Rd.						01	02
UNNAMED MUITZES KILL TRIB (SDAK)								
01	Castleton, above Rte 9J bridge							02
UNNAMED ONESQUETHAW CREEK TRIB (NESQ)								
01	Clarksville, above Stove Pipe Rd. culvert			96				
02	Clarksville, below Upper Flat Rock Rd. culvert			96				
03	Clarksville, at Helderburg Siding Co., 160 North Rd.			96				
UNNAMED POWER STATION TRIB (POWR)								
01	Crafts, Drewville Rd.					00		
UNNAMED PUTNAM LAKE TRIB (PNAM)								
01	Putnam Lake, north of Lakeshore at Harmon					00		
UNNAMED RICHARDSVILLE TRIB (RICH)								
01	Richardsville, below Richardsville Rd.					00		

LOWER HUDSON RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED				
UNNAMED ST. JOHNS CHURCH TRIB (STJO)						
01	North Salem, St. Johns Church Rd.			00		
UNNAMED STONE HILL RIVER TRIB (BEDF)						
A	Bedford Hills, Haines Rd; above Sawmill River Pkwy entrance				01	
00	Bedford Hills, opposite police station				01	02
01	Bedford Hills, above Railroad Ave bridge	98	99	00	01	02
UNNAMED WALLKILL RIVER TRIB (UNWK)						
01	Michigan Corners, Stony Ford Rd @bridge					02

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE LOWER HUDSON RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Agawamuck Creek, above Philmont	non-impacted	no prior data
Angle Fly Brook, Somers	slightly impacted	no prior data
Annsville Creek, Annsville	slightly impacted	no prior data
Bash Bish Brook, Copake Falls	non-impacted	no prior data
Basic Creek, Ford Corners	slightly impacted	no prior data
Basic Creek, Westerlo, May Rd.	slightly impacted	no prior data
Basic Creek, Westerlo, below CR 1	slightly impacted	no prior data
Basic Creek, below Westerlo	slightly impacted	no prior data
Basic Creek, South Westerlo	slightly impacted	no prior data
Basic Creek, West Greenville	non-impacted	no prior data
Basic Creek, Freehold	non-impacted	no prior data
Beaver Kill, Mt Tremper	non-impacted	no prior data
Beer Kill, Ellenville	non-impacted	no prior data
Birch Creek, Big Indian	non-impacted	no prior data
Black Creek, Esopus	slightly impacted	no prior data
Black River, Garfield	non-impacted	no prior data
Block House Creek, Westmere	moderately impacted	no prior data
Boyds Corner Reservoir Outlet, Carmel	slightly impacted	no prior data
Bozen Kill, Altamont	slightly impacted	no prior data
Brady Brook, Pawling	slightly impacted	no prior data
Branch Br., Mt. Kisco, Lexington Ave	severely impacted	no prior data
Broad Brook, Bedford Hills	moderately impacted	no prior data
Browns Creek, Florida	non-impacted	no prior data
Canopus Creek, Annsville	slightly impacted	no prior data
Casper Creek, Knapps Corner	moderately impacted	no prior data
Catskill Creek, Livingstonville	non-impacted	no prior data
Catskill Creek, Preston Hollow	slightly impacted	no prior data
Catskill Creek, Oak Hill	non-impacted	no prior data
Catskill Creek, East Durham	non-impacted	no prior data
Catskill Creek, Cairo	slightly impacted	no prior data
Catskill Creek, South Cairo	non-impacted	no prior data
Catskill Creek, Leeds, above Rt. 23B	slightly impacted	no prior data
Catskill Creek, Leeds, off Gilfeather Park Rd	slightly impacted	no prior data
Chestnut Creek, Grahamsville	non-impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE LOWER HUDSON RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Claverack Creek, Claverack	non-impacted	no prior data
Claverack Creek, Stockport	slightly impacted	no prior data
Clove Creek, Fishkill	non-impacted	no prior data
Coeymans Creek, Bethlehem Heights	slightly impacted	**DECLINED**
Coeymans Creek, Selkirk	slightly impacted	no change
Coeymans Creek, Coeymans	slightly impacted	no change
Cold Spring Creek, McIntyre	slightly impacted	no prior data
Cornell Brook, Millwood	slightly impacted	no prior data
Coxing Kill, High Falls	non-impacted	no prior data
Coxsackie Creek, Otter Hook	slightly impacted	no prior data
Crook Brook, Salem Center	non-impacted	no prior data
Cross River, Cross River	non-impacted	no prior data
Croton River, Croton, below outlet	slightly impacted	no prior data
Croton River, Croton, above Old Quaker Rd	moderately impacted	no prior data
Croton River, East Branch, Patterson	slightly impacted	no prior data
Croton River, East Branch, Putnam Lake	slightly impacted	no prior data
Middle Branch Croton River, Maynard Corners	slightly impacted	no prior data
Middle Branch Croton River, Carmel	non-impacted	no prior data
Croton River, West Branch, Carmel	moderately impacted	no prior data
Crum Elbow Creek, Hyde Park, below Market St.	slightly impacted	no prior data
Crum Elbow Creek, Hyde Park, off Howard Blvd	non-impacted	no prior data
Crum Elbow Creek, Hyde Park, pond east of Rt. 9	non-impacted	no prior data
Crum Elbow Cr.,Hyde Park, below Rt. 9	slightly impacted	no prior data
Crum Elbow Creek, Hyde Park, off Co.Rt. 41	slightly impacted	no prior data
David's Br., Bedford Ctr, Clinton Rd	non-impacted	no prior data
David's Brook, Bedford Center, below Harris Rd	slightly impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE LOWER HUDSON RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Doove Kill, Manorton	slightly impacted	no prior data
Dwaar Kill, Dwaarkill	slightly impacted	no prior data
Dwaar Kill, near Wallkill	non-impacted	no prior data
East Brook, Stephentown	non-impacted	no prior data
Esopus Creek, Upper, Oliverea	non-impacted	no prior data
Esopus Creek, Upper, Big Indian	non-impacted	no prior data
Esopus Creek, Upper, Shandaken	non-impacted	no prior data
Esopus Creek, Upper, above Phoenicia	non-impacted	no prior data
Esopus Creek, Upper, Mount Pleasant	slightly impacted	no prior data
Esopus Creek, Upper, Boiceville	non-impacted	no prior data
Esopus Cr. Lower, above Marbletown	moderately impacted	no prior data
Esopus Creek, Lower, Marbletown	moderately impacted	no prior data
Esopus Creek, Lower, below Marbletown	slightly impacted	no prior data
Esopus Creek, Lower, Hurley	slightly impacted	no prior data
Esopus Creek, Lower, below Kingston	moderately impacted	no prior data
Esopus Creek, Lower, Lake Katrina	slightly impacted	no prior data
Esopus Creek, Lower, Glenerie	slightly impacted	no change
Fall Kill, Hyde Park, at Haviland Rd.	slightly impacted	no prior data
Fall Kill, Hyde Park, above East Dorsey Rd.	slightly impacted	no prior data
Fall Kill, Poughkeepsie, below Smith St.	slightly impacted	no prior data
Fall Kill, Poughkeepsie, below Garden St.	moderately impacted	no prior data
Fishkill Creek, Fishkill	slightly impacted	no change
Fishkill Creek, Beacon	slightly impacted	no change
Foundry Brook, Cold Spring	slightly impacted	no prior data
Furnace Brook, Crugers	slightly impacted	no prior data
Gedney Brook, Millwood	slightly impacted	no prior data
Gipsy Trail, Carmel	non-impacted	no prior data
Great Spring Creek, Pleasant Valley	slightly impacted	no prior data
Hallocks Mill Brook, Amawalk	moderately impacted	no prior data
Hallocks Mill Brook, Yorktown Heights	severely impacted	no prior data
Hannacrois Creek, Ravena	slightly impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE LOWER HUDSON RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Havilland Hollow Brook, Brewster	non-impacted	no prior data
Highland Brook, Highland Falls	slightly impacted	no prior data
Holly Stream, Brewster	slightly impacted	no prior data
Homowack Kill, Phillipsport	non-impacted	no prior data
Horse Pound Brook, Lake Carmel	non-impacted	no prior data
Hudson River, Lower, Troy	slightly impacted	no change
Hudson River, Lower, Glenmont	moderately impacted	no change
Hudson River, Lower, Castleton	moderately impacted	**DECLINED**
Hudson River, Lower, Hudson	moderately impacted	**DECLINED**
Hudson River, Lower, Saugerties	moderately impacted	no change
Hudson River, Lower, Poughkeepsie	moderately impacted	no change
Hunter Brook, Yorktown Heights	slightly impacted	no prior data
Hunter Brook, Yorktown, Old Crompond Road	slightly impacted	no prior data
Hunter Brook, Yorktown,Hunter Brook Rd.	slightly impacted	no prior data
Indian Creek, Chatham	non-impacted	no prior data
Indigot Creek, Millsburg	non-impacted	no prior data
Jackson Creek, LaGrangeville	non-impacted	no prior data
Kinderhook Creek, Garfield	non-impacted	no change
Kinderhook Creek, West Lebanon	non-impacted	no prior data
Kinderhook Creek, Brainard	non-impacted	no prior data
Kinderhook Creek, Chatham Center	non-impacted	no prior data
Kinderhook Creek, Kinderhook	non-impacted	no prior data
Kinderhook Creek, Stuyvesant Falls	non-impacted	no prior data
Kinderhook Creek, Rossman	slightly impacted	**DECLINED**
Kisco River, Mt. Kisco, above Radio Circle	moderately impacted	no prior data
Kisco River, Mt. Kisco, Byram Lake Rd	slightly impacted	no prior data
Kisco River, Mt. Kisco, below Rt. 133	moderately impacted	no prior data
Kisco River, Mt. Kisco, Cross River Rd	slightly impacted	no prior data
Kisco River, Mt. Kisco, Nitra Yeshiva Rd	slightly impacted	no prior data
Klein Kill, Linlithgo	slightly impacted	no prior data
Kline Kill, Chatham	non-impacted	no prior data
Kripplebush Creek, Kripplebush	slightly impacted	no prior data
Kromma Kill, Watervliet, above Spring St.	moderately impacted	**DECLINED**
Kromma Kill, Watervliet, upstream of Rt.32	moderately impacted	no change

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE LOWER HUDSON RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Krum Kill, Albany	moderately impacted	no prior data
Lake Tiorati Brook, Stony Point	non-impacted	no prior data
Landsman Kill, Rhinebeck	moderately impacted	**DECLINED**
Landsman Kill, Staatsburg, Mill Road	slightly impacted	no change
Lattintown Creek, Marlboro	slightly impacted	no prior data
Little Shawangunk Kill, Maple Glen	non-impacted	no prior data
Little Wappinger Creek, Salt Point	non-impacted	no prior data
Manayunk Kill, Kaisertown	slightly impacted	no prior data
Maritje Kill, Hyde Park	slightly impacted	no prior data
Masonic Creek, Middletown	slightly impacted	no prior data
Michael's Brook, Carmel, Fair St	slightly impacted	no prior data
Michael's Brook, Carmel, below Kelly Rd.	moderately impacted	no prior data
Mill Brook, Mill Hook	slightly impacted	no prior data
Mill Creek, Best	non-impacted	no prior data
Mill Creek, East Greenbush, above Michaels Rd.	non-impacted	no prior data
Mill Creek, East Greenbush, Rte. 4	non-impacted	no prior data
Mill Creek, East Greenbush, above Barrack Rd	non-impacted	no prior data
Mill Creek, Rensselaer	moderately impacted	no prior data
Minisceongo Creek, Thiells	moderately impacted	no prior data
Minisceongo Creek, West Haverstraw	slightly impacted	no prior data
Moodna Creek, Cornwall	slightly impacted	no change
Moordener Kill, East Schodack	non-impacted	no prior data
Moordener Kill, Schodack, Rte. 150, near Curtis Trailer Park	non-impacted	no prior data
Moordener Kill, Schodack Center	non-impacted	no prior data
Moordener Kill, Schodack, below Rte 150 bridge, near I-90	non-impacted	no prior data
Moordener Kill, Brookview	slightly impacted	no prior data
Moordener Kill, Castleton, @ Fire pump station	slightly impacted	no prior data
Moordener Kill, Castleton, Rte. 150	slightly impacted	no prior data
Moordener Kill, North Branch, Schodack, Kraft Rd	slightly impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE LOWER HUDSON RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Muddy Brook, Towners	moderately impacted	no prior data
Muitzes Kill, Castleton	slightly impacted	no prior data
Muscoot River, Baldwin Place	slightly impacted	no prior data
Muscoot River, Yorktown	moderately impacted	no prior data
Normans Kill, Westmere	slightly impacted	no prior data
Normans Kill, Voorheesville	slightly impacted	no prior data
Normans Kill, Albany, Albany Municipal Golf Course	slightly impacted	no prior data
Normans Kill, Delmar, Delaware Ave.	slightly impacted	no change
North Creek, Mellenville	slightly impacted	no prior data
North Peters Kill, Whitfield	non-impacted	no prior data
Onesquethaw Creek, below Clarksville, above Rt. 32	non-impacted	no prior data
Onesquethaw Creek, below Clarksville, above Onesquethaw Creek Rd.	slightly impacted	no prior data
Onesquethaw Creek, Spawn Hollow;	slightly impacted	no prior data
Onesquethaw Creek, South Bethlehem	slightly impacted	**DECLINED**
Patroon Creek, Albany, above I-90 pond	moderately impacted	no prior data
Patroon Creek, Albany, Pleasant St	slightly impacted	no prior data
Peach Lake Outlet, Brewster	moderately impacted	no prior data
Peekskill Hollow, Van Cortlandtville	slightly impacted	no prior data
Peters Kill, St. Josen	slightly impacted	no prior data
Philipse Brook, Garrison	slightly impacted	no prior data
Platte Kill, Jenkinstown	non-impacted	no prior data
Platte Kill, Burlingham	non-impacted	no prior data
Plattekill Creek, Mt. Marion	non-impacted	no prior data
Plum Brook, Lake Lincolndale	slightly impacted	no prior data
Plum Brook, Lincolndale	slightly impacted	no prior data
Pocantico River, Sleepy Hollow Manor	moderately impacted	no prior data
Pochuck Creek, Newport	non-impacted	no prior data
Poesten Kill, East Poestenkill, at SR 40 bridge	non-impacted	**IMPROVED**
Poesten Kill, East Poestenkill, intersection of Co Rt 40 & 44	non-impacted	no prior data
Poesten Kill, Barberville	non-impacted	no change

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE LOWER HUDSON RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Poesten Kill, Poestenkill	non-impacted	no prior data
Poesten Kill, above Poestenkill	non-impacted	no prior data
Poesten Kill, above Eagle Mills	non-impacted	no prior data
Poesten Kill, Troy Country Club	non-impacted	no prior data
Poesten Kill, Troy	slightly impacted	no prior data
Potic Creek, near Leeds	non-impacted	no prior data
Punsit Creek, Spencertown	non-impacted	no prior data
Putnam Lake Outlet, Putnam Lake	moderately impacted	no prior data
Quacken Kill, Brunswick	non-impacted	no prior data
Quaker Brook, Brewster	non-impacted	no prior data
Quaker Creek, Florida	moderately impacted	no prior data
Quaker Creek, Snufftown	severely impacted	no prior data
Quassaick Creek, Newburgh, above River Rd.	slightly impacted	no change
Quassaick Creek, Newburgh	slightly impacted	no change
Queensboro Creek, near Bear Mtn	non-impacted	no prior data
Rochester Creek, Mill Hook	non-impacted	no prior data
Roeliff Jansen Kill, below Hillsdale, below Rt. 22	slightly impacted	no prior data
Roeliff Jansen Kill, below Hillsdale, Black Grocery Rd	non-impacted	no prior data
Roeliff Jansen Kill, below Hillsdale, below Overlook Rd	slightly impacted	no prior data
Roeliff Jansen Kill, above Linlithgo	non-impacted	no change
Rondout Creek, Peekamoose	slightly impacted	no prior data
Rondout Creek, Bull Run	non-impacted	no prior data
Rondout Creek, Sundown, at Mountain Rd.	non-impacted	no prior data
Rondout Creek, Sundown, below East Mt. Rd.	non-impacted	no prior data
Rondout Creek, Lackawack	non-impacted	no prior data
Rondout Creek, Wawarsing	slightly impacted	no prior data
Rondout Creek, Kerhonkson	slightly impacted	no prior data
Rondout Creek, Accord	non-impacted	no prior data
Rondout Creek, Alligerville	non-impacted	no prior data
Rondout Creek, Rosendale	non-impacted	**IMPROVED**
Rutgers Creek, Johnson	non-impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE LOWER HUDSON RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Sandburg Creek, Ellenville	non-impacted	no prior data
Sawkill Creek, Annandale-on-Hudson	slightly impacted	no change
Saw Kill, Sawkill	non-impacted	no prior data
Saw Mill River, Nepera Park	moderately impacted	no change
Saw Mill River, Yonkers	moderately impacted	**IMPROVED**
Shawangunk Kill, Maple Glen	non-impacted	no prior data
Shawangunk Kill, Pine Bush	non-impacted	no prior data
Shawangunk Kill, Ganahgote	non-impacted	no prior data
Shekomeko Creek, Pine Plains	non-impacted	no prior data
Shingle Kill Creek, Cairo	non-impacted	no prior data
SingSing Creek, Ossining	slightly impacted	no prior data
Spar Kill, Sparkill, below Washington Ave	moderately impacted	no prior data
Spar Kill, Sparkill, below Valentine St	moderately impacted	no prior data
Sprout Creek, Freedom Plains	slightly impacted	no prior data
Sprout Creek, Swartoutville	slightly impacted	no prior data
Stephens Brook, Pawling	slightly impacted	no prior data
Stone Hill River, Bedford Center, Old Post Rd.	non-impacted	no prior data
Stone Hill River, Bedford Center, Cantitoe Rd	slightly impacted	no prior data
Stone Hill River, Bedford Hills, above Beaver Dam Rd.	slightly impacted	no prior data
Stone Hill River, Bedford Hills, below confluence with Broad Bk	slightly impacted	no prior data
Stony Clove Creek, Phoenicia	non-impacted	no prior data
Stony Kill, above Tivoli	moderately impacted	no prior data
Stony Kill, below Tivoli	moderately impacted	**DECLINED**
Tackawasick Creek, Hoag Corners	non-impacted	no prior data
Taghkanic Creek, New Forge	non-impacted	no prior data
Taghkanic Creek, below Linlithgo Mills	non-impacted	no prior data
Tenmile Creek, Rensselaerville, Huyck preserve	slightly impacted	no prior data
TenmileCreek,Rensselaerville,opposite from town park	slightly impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE LOWER HUDSON RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Tenmile Creek, below Rensselaerville	slightly impacted	no prior data
Tenmile Creek, Medusa	slightly impacted	no prior data
Tenmile Creek, Oak Hill	non-impacted	no prior data
Tin Brook, Walden	slightly impacted	no prior data
Titicus River, Salem Center	slightly impacted	no prior data
Titicus River, Purdys	moderately impacted	no prior data
Tonetta Brook, Brewster	slightly impacted	no prior data
Twaalfskill Creek, Highland	moderately impacted	no prior data
Valatie Kill, Nassau	non-impacted	no prior data
Verkeerder Kill, Ulsterville	non-impacted	no prior data
Vernooy Kill, Wawarsing	non-impacted	no prior data
Vlockie Kill, Castleton	moderately impacted	no prior data
Vloman Kill, Selkirk	moderately impacted	no prior data
Vly Creek, below Voorheesville	slightly impacted	no prior data
Wallkill River, Liberty Corners	moderately impacted	no prior data
Wallkill River, Pine Island	slightly impacted	no prior data
Wallkill River, Pellets Island	slightly impacted	no prior data
Wallkill River, New Hampton	slightly impacted	no prior data
Wallkill River, Crystal Run	slightly impacted	no prior data
Wallkill River, above Montgomery	slightly impacted	no prior data
Wallkill River, Montgomery	slightly impacted	no prior data
Wallkill River, Walden	slightly impacted	no prior data
Wallkill River, Galeville	slightly impacted	no prior data
Wallkill River, Gardiner	slightly impacted	no prior data
Wallkill River, above New Paltz	slightly impacted	no prior data
Wappinger Creek, Stanfordville	slightly impacted	no prior data
Wappinger Creek, Salt Point	non-impacted	no prior data
Wappinger Creek, Timothy Heights	non-impacted	no prior data
Wappinger Creek, Manchester Bridge	non-impacted	no prior data
Wappinger Creek, Poughkeepsie, Jackson Rd.	non-impacted	**IMPROVED**
Wawayanda Creek, Warwick	slightly impacted	no change

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE LOWER HUDSON RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Wawayanda Creek, below Warwick, Pelton Rd.	moderately impacted	**IMPROVED**
Wawayanda Creek, below Warwick, Sanfordville Rd.	slightly impacted	**IMPROVED**
Wawayanda Creek, above New Milford	slightly impacted	no change
Wawayanda Creek, New Milford	slightly impacted	**DECLINED**
West Beer Kill, Ellenville	non-impacted	no prior data
West Brook, Stephentown	non-impacted	no prior data
Whaley Lake Stream, Poughquag	non-impacted	no prior data
Whortle Kill, Hopewell Junction	slightly impacted	no prior data
Wynants Kill, West Sand Lake, opp. Werger Rd	slightly impacted	no prior data
Wynants Kill, West Sand Lake, Rte 43 @ 43 Mall	non-impacted	no prior data
Wynants Kill, Snyders Corners	slightly impacted	no prior data
Wynants Kill, Wynantskill	non-impacted	no prior data
Wynants Kill, Troy, below Winter St	slightly impacted	no prior data
Wynants Kill, Troy, below Rte 4	slightly impacted	no prior data
Wyomanock Creek, West Lebanon	non-impacted	no prior data
Unnamed Locke Ledge Croton Trib, Croton Heights	slightly impacted	no prior data
Unnamed Middle Branch Croton River Tributary, Carmel	slightly impacted	no prior data
Unnamed Milt Trib, Milton, above Brooklyn Bottling Co	moderately impacted	no prior data
Unnamed Milt Trib, Milton, above Watson Ave	severely impacted	no prior data
Unnamed Muitzes Kill trib, Castleton	slightly impacted	no prior data
Unnamed Onesquethaw Creek Tributary, Clarksville, above Stove Pipe Rd	moderately impacted	no prior data
Unnamed Onesquethaw Cr. tributary, Clarksville, below Upper Flat Rock Rd	severely impacted	no prior data
Unnamed Onesquethaw Creek Tributary, Clarksville, North Rd.	severely impacted	no prior data
Unnamed Power Station Trib, Crafts	slightly impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE LOWER HUDSON RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Unnamed Putnam Lake trib, Putnam Lake	slightly impacted	no prior data
Unnamed Richardsville trib, Richardsville	slightly impacted	no prior data
Unnamed St. Johns Church trib, North Salem	slightly impacted	no prior data
Unnamed Stone Hill River trib, Bedford Hills, Haines Rd	slightly impacted	no prior data
Unnamed Stone Hill River trib, Bedford Hills, opposite police station	slightly impacted	no prior data
Unnamed Stone Hill River trib, Bedford Hills, above Railroad Ave	slightly impacted	no prior data
Unnamed Wallkill R. trib, Michigan Corners, Stony Ford Road	slightly impacted	no prior data

REPORTS OF MACROINVERTEBRATE SURVEYS WITHIN THE LOWER HUDSON RIVER WATERSHED

STREAM	YEAR OF SURVEY	REPORT
Basic Creek	1995	SBU,1996
Bozen Kill	1974	AVON
Catskill Creek	1997	SBU,1998
Claverack Creek	1973	AVON
Coeymans Creek	1984	SBU,1985
Coeymans Creek	1987	SBU,1987
Crum Elbow Creek	1995	SBU,1995
Esopus Creek, Lower	1993	SBU,1993
Esopus Creek, Upper	1995	SBU,1995
Esopus Creek	1996	SBU,1996
Esopus Creek, Upper	2000	SBU,2001
Fall Kill	1997	SBU,1998
Fishkill Creek	1973	AVON
Fishkill Creek	1991	SBU,1991
Guildersleeve Brook	1987	SBU,1987
Guildersleeve Brook	1989	SBU,1989
Kinderhook Creek	2000	SBU,2001
Kisco River	1999	SBU,1999
Kromma Kill	1987	SBU,1987
Kromma Kill	1991	SBU,1991
Landsman Kill	1992	SBU,1993
Lower Hudson River	1973	DOH
Lower Hudson River	1983	DOH
Lower Hudson River	1984	DOH
Mill Creek	2001	SBU,2002
Monhagen Brook	1986	DOH,1986
Monhagen Brook	1992	SBU,1993
Moodna Brook	1972	AVON
Moordener Kill	1975	AVON
Moordener Kill	1999	SBU,2000
Normans Kill	1974	AVON
Normans Kill	1993	SBU,1993
North Lake Outlet	1990	SBU,1990
NYC water supply	1994-1998	DEP,2000
Onesquethaw Creek	1998	SBU,1998
Patroon Creek	1994	SBU,1995
Poesten Kill	2001	SBU,2002
Quassaick Creek	1987	SBU,1987
Rhinebeck Kill	1992	SBU,1993
Rhinebeck Township Streams	1986-1990	CAC
Roeliff-Jansen Kill	1992	SBU,1993
Rutgers Creek	2001	HBRW

Saw Mill River	1992	SBU,1993
Sparkill	2002	HBRW
Stone Hill River	2001	SBU,2002
Stony Kill	1989	SBU,1990
Stony Kill	1990	SBU,1991
Tenmile Creek	1997	SBU,1998
Vloman Kill	2001	HBRW
Wallkill River	1972	AVON
Wallkill River	1994	SBU,1995
Wappinger Creek	1973	AVON
Wappinger Creek	2002	SBU,2003
Wawayanda Creek	1989	SBU,1990
Wawayanda Creek	1994	SBU,1994
Wawayanda Creek	1995	SBU,1996
Wickers Creek	2001	SC Inc.
Woodbury Creek	1987	SBU,1987
Wynants Kill	2001	SBU,2002
Watershed Streams	1991-1992	RIBS,1994

AVON	Avon Pollution Investigations Unit, Div. of Fish & Wildlife, NYS DEC
CAC	Conservation Advisory Council, Town of Rhinebeck, NY
DEP	Department of Environmental Protection, Division of Drinking Water Quality Control
DOH	New York State Department of Health
HBRW	Hudson Basin River Watch, Rapid Watershed Assessment Program
RIBS	Rotating Intensive Basin System, Statewide Waters Assessment Section, NYS DEC
SBU	Stream Biomonitoring Unit, Division of Water, NYS DEC
SC Inc.	Sovereign Consulting Inc.

Agawamuck Creek

This tributary of Claverack Creek was sampled above Philmont for macroinvertebrates in 2002. The site was field-assessed as non-impacted, and the sample was processed to family-level. No prior data were available for the stream.

Angle Fly Brook

Water quality assessments for Angle Fly Brook have ranged from non-impacted to slightly impacted. The most recent assessment, in 2000, was of slight impact, although clean-water mayflies, stoneflies, and caddisflies were still present. Nonpoint source nutrient enrichment is the likely stressor. A 1998 macroinvertebrate sampling of the stream found excellent water quality.

Annsville Creek

This Hudson River tributary was sampled upstream of Westchester Lake in 2002. Although the macroinvertebrate fauna contained many stoneflies and hellgrammites, it was heavily dominated by filter-feeding caddisflies. ISD strongly indicated nonpoint source nutrient enrichment, and the metrics denoted slightly impacted water quality. No prior data were available for the stream.

Bash Bish Brook

This stream was sampled at Copake Falls, approximately one mile downstream of Bash Bish Falls, in 2002. Lower reaches of the stream near Copake were dry in 2002. The Copake Falls site was field-assessed as non-impacted, and the sample processed to family-level. No prior data were available for the stream.

Basic Creek

The water quality of Basic Creek ranges from non-impacted to slightly impacted, based on macroinvertebrate sampling at 7 sites in 1995. The reach from Fords Corners to South Westerlo was assessed as slightly impacted by nonpoint source nutrient enrichment. The reach from West Greenville to Freehold was assessed as non-impacted.

Beaver Kill

Non-impacted water quality was assessed for this site, based on macroinvertebrate sampling at Mt. Tremper in 2002. The site was field-assessed, and the sample was processed to family-level. No prior data were available for the stream.

Beer Kill

This tributary of Sandburg Creek was sampled for macroinvertebrates at Ellenville in 2002. Water quality was field-assessed as non-impacted, and the sample has not yet been processed. No prior data were available for the stream.

Birch Creek

This stream was sampled for macroinvertebrates in 1995 and 1999 at Big Indian, approximately 0.5 miles upstream of its confluence with Esopus Creek. Water quality was assessed as non-impacted, with many clean-water mayflies, stoneflies, and caddisflies. Macroinvertebrate biomass was very high, and heavy algal growth in the stream indicated elevated levels of nutrients.

Black Creek

This Hudson River tributary was sampled for macroinvertebrates at Esopus in 2002. Water quality was assessed as slightly impacted by nonpoint source nutrient enrichment. Clean-water mayflies, stoneflies, and hellgrammites were found, but the fauna was dominated by filter-feeding caddisflies. The stream had very low flow at the time of sampling, and this may have had a dampening effect on the fauna. No prior data were available for the stream.

Black River

Non-impacted water quality was assessed for this tributary of Kinderhook Creek, based on macroinvertebrate sampling near Garfield in 2002. The site was field-assessed, and the sample has not yet been processed. No prior data were available for the stream.

Blockhouse Creek

Water quality of this small tributary of the Normans Kill is assessed as moderately impacted, based on macroinvertebrate sampling in Westmere in 1993. The impact is likely due to complex stressors of unknown source. The stream was previously sampled by Preddice in 1974, and was assessed as having "fairly poor water quality" due to the discharge from a small sewage treatment plant. This plant no longer operates, but water quality remains poor.

Boyds Corner Reservoir Outlet

Slightly impacted water quality was indicated for this stream, based on macroinvertebrate sampling in 2000. The causes of impact were primarily impoundment effects and siltation. No prior data were available for the stream.

Bozen Kill

Macroinvertebrate sampling in Guilderland in 1997 resulted in an assessment of slight impact. The fauna was dominated by filter-feeding midges and caddisflies, and rocks were covered with dense growths of filamentous algae. Impact Source Determination indicated sewage and municipal/industrial inputs as the likely sources of impact. This site is downstream of the effluent discharge of the Altamont (V) Sewage Treatment Plant. Similar conditions were found at this site in 1993 sampling. A 1974 sampling of the Bozen Kill by the DEC Avon team found a more impacted macroinvertebrate community, dominated by tolerant black flies. The plant was upgraded in 1990, and the upgrade is likely responsible for the improved fauna.

Brady Brook

Water quality in Brady Brook is assessed as slightly impacted by nonpoint source nutrient enrichment. A site in Pawling was sampled for macroinvertebrates in 2000. Clean-water mayflies and stoneflies were present, but the fauna was dominated by tolerant black fly larvae.

Branch Brook

This tributary of the Kisco River was assessed as severely impacted in 2001 and 2002, even using criteria for slow sandy streams. The fauna was dominated by sewage-tolerant midges, worms, and snails. Waterfowl contribute to the organic loading in this stream.

Broad Brook

This tributary of the Stone Hill River in Bedford Hills was assessed as moderately impacted, likely by organic wastes. The site sampled in 2001 was a short distance downstream of the Taconic State Correctional Facility, which discharges wastes into the stream. Specific conductance in the stream was 1375 µmhos/cm.

Browns Creek

This stream is a primary tributary of Quaker Creek. Water quality was assessed as non-impacted in 1994 and 1995, based on macroinvertebrate sampling in the village of Florida. Some metrics were within the range of slight impact, but these were judged to be due to headwater effects and impoundment effects from Glenmere Lake. Clean-water caddisflies and mayflies dominated the samples.

Canopus Creek

This Hudson River tributary was sampled for macroinvertebrates at Annsville in 2002. The fauna was diverse and included many clean-water mayflies, stoneflies, and hellgrammites, but was heavily dominated by filter-feeding caddisflies. The metrics indicated slight impact from nonpoint source nutrient enrichment. Impoundment effects from an upstream pond were likely also involved.

Casper Creek

Moderately impacted water quality was assessed for this Hudson River tributary, based on macroinvertebrate sampling at Knapps Corners in 2002. The fauna had a very low diversity, and was dominated by filter-feeding caddisflies. ISD denoted nonpoint source nutrient enrichment as the primary stressor. Poor habitat may also have been a factor at this site, as the substrate was primarily gravel and silt. No prior data were available for the stream.

Catskill Creek

Current water quality in Catskill Creek ranges from non-impacted to slightly impacted. Macroinvertebrate sampling was conducted on Catskill Creek in 1997 at 8 sites from Livingstonville to Leeds. Water quality was assessed as slightly impacted at Preston Hollow and Cairo, and non-impacted at all other sites. Non-point sources contributing nutrients and silt to the stream were indicated at all sampling sites. The site at Leeds was sampled again in 1998 and 2002 and was assessed as slightly impacted. Raw sewage discharged into the stream at Leeds, downstream of the sampling site, was documented in the 1997 study.

Chestnut Creek

Non-impacted water quality is assessed for this tributary of Rondout Reservoir, based on macroinvertebrate sampling in 1998 and 2002. The 1998 sample was initially assessed as slightly impacted, but this was upgraded to non-impacted using a headwater correction factor. The 2002 sample was field-assessed as non-impacted, and the sample was processed to family level.

Claverack Creek

Current water quality in Claverack Creek ranges from non-impacted to slightly impacted. Based on 1997 macroinvertebrate sampling at Claverack, water quality was assessed as non-impacted. The sample appeared diverse and well-balanced. Macroinvertebrate sampling downstream at Stockport in 1998 indicated slight impact, likely from nonpoint sources.

Clove Creek

This tributary of Fishkill Creek was sampled south of Fishkill for macroinvertebrates in 2002. The site was field-assessed as non-impacted, and the sample was processed to family level. No prior data were available for the stream.

Coeymans Creek

Water quality in Coeymans Creek from Bethlehem Heights to Coeymans is assessed as slightly impacted, based on macroinvertebrate sampling in 1998. Probable stressors are nonpoint source nutrient enrichment, municipal/industrial inputs, and siltation. The Bethlehem Heights assessment represents an apparent decline in water quality compared to non-impacted conditions documented in 1987.

Cold Spring Creek

This tributary of Wappinger Creek was sampled for macroinvertebrates at McIntyre in 2002. Although the fauna contained many clean-water mayflies, stoneflies, and hellgrammites, it was dominated by filter-feeding caddisflies. Water quality was assessed as slightly impacted by nonpoint source nutrient enrichment. An unidentified white flocculent was abundant in the stream at the time of sampling. No prior data were available for the stream.

Cornell Brook

Water quality was assessed as slightly impacted for this stream, based on macroinvertebrate sampling in 2000. ISD denoted nonpoint source nutrient enrichment as the primary stressor. Impact was minor, as clean-water mayflies, stoneflies, and caddisflies were represented.

Coxing Kill

This tributary of Rondout Creek was sampled for macroinvertebrates in High Falls in 2002. Water quality was assessed as non-impacted, with many clean-water mayflies, stoneflies, caddisflies, and hellgrammites. No prior data were available for the stream.

Coxsackie Creek

Water quality in Coxsackie Creek was slightly impacted by nonpoint sources, based on macroinvertebrate sampling at Otter Hook in 1998. The fauna was heavily dominated by filter-feeding caddisflies. Substrate in the stream was predominantly bedrock.

Crook Brook

Macroinvertebrate sampling in Salem Center in 2000 determined water quality to be non-impacted. Minor effects of nonpoint source nutrient enrichment and siltation were also evident. A high diversity of clean-water mayflies was found.

Cross River

Excellent water quality is assessed for the Cross River. It was sampled at Ward Pound Ridge in 2000, 2001, and 2002. The habitat was excellent, and a diversity of clean-water mayflies, stoneflies, and caddisflies was found. Minor nonpoint source nutrient enrichment was indicated. The 2000 assessment was within the range of slight impact, but the 2001 assessment showed non-impacted conditions.

<u>Croton River</u>

Water quality directly below the reservoir is assessed as slightly impacted, based on macroinvertebrate sampling in 2001. Impoundment effects contributed to this assessment. The fauna was dominated by filter-feeding caddisflies and midges. Sampling one mile downstream at Quaker Bridge in 1998 yielded an assessment of moderate impact due to impoundment effects. Poor habitat at this site also contributed to the limited fauna.

The East Branch of the Croton River, sampled at Patterson and near Putnam Lake, was assessed as slightly impacted in 2001. Nonpoint source nutrient enrichment was the primary stressor. The Middle Branch of the Croton River, sampled near Carmel in 2000, was assessed as non-impacted. ISD also denoted minor effects of nonpoint source nutrient enrichment. The macroinvertebrate fauna contained many clean-water mayflies, stoneflies, and caddisflies. The West Branch of the Croton River, sampled at Carmel in 2000, was assessed as moderately impacted. The site was a short distance downstream of the reservoir release, and the assessment reflected impoundment effects rather than poor water quality.

<u>Crum Elbow Creek</u>

Water quality of Crum Elbow Creek in Hyde Park ranges from non-impacted to slightly impacted. Four sites were sampled for macroinvertebrates in 1995. Of these, one was non-impacted and the others were slightly impacted. The lower sites were affected mostly by impoundment effects from two ponds. The most downstream site was also sampled in 1998, and was similarly assessed as slightly impacted.

No major water quality problems are present in the stream.

<u>Davids Brook</u>

This tributary of the Stone Hill River is assessed as slightly impacted at the most downstream site, based on 2002 macroinvertebrate sampling. The fauna was dominated by filter-feeding caddisflies, largely reflecting impoundment effect from the ponded area upstream. Samples from the stream in June included abundant stoneflies, and an upstream site accessed by a horse path was assessed as non-impacted. Sandy stream criteria were used to evaluate the data from the upper site. High levels of simazine in the stream have been documented in recent studies by the USGS (Pat Phillips, USGS, pers. comm.).

<u>Doove Kill</u>

Slightly impacted water quality was assessed for this small tributary of the Roeliff Jansen Kill, based on macroinvertebrate sampling at Manorton in 2002. The fauna was dominated by filter-feeding caddisflies, and ISD denoted nonpoint source nutrient enrichment as the primary stressor. No prior data were available for the stream.

Dwaar Kill (tributary of Shawangunk Kill)

This stream was sampled for macroinvertebrates at Dwaarkill in 2002. The fauna had many sewage-tolerant worms, but also many mayflies, and water quality was assessed as slightly impacted by organic wastes. Numerous cattle seen upstream were the likely source. Water level was low at the time of sampling, likely exacerbating the situation.

Dwaar Kill (tributary of Wallkill River)

Water quality was assessed as non-impacted was assessed for this stream, based on macroinvertebrate sampling in 2002. The site was field-assessed, and the sample was processed to family level. No prior data were available for the stream.

East Brook

Non-impacted water quality was assessed for this tributary of Kinderhook Creek, based on macroinvertebrate sampling in 2002. The site was field-assessed, and the sample was processed to family level. No prior data were available for the stream.

Esopus Creek

Upper Esopus Creek water quality currently ranges from non-impacted to slightly impacted. Macroinvertebrate sampling was conducted at several sites in 1995, 1996, and 2000. Most sites have been assessed as non-impacted. The 2000 sampling found slight impact from siltation at Mount Pleasant. Diatom collections coordinated with this sampling showed impact from enrichment downstream of the Birch Creek confluence and siltation downstream of the Shandaken Portal. Increased turbidity of water released from the Shandaken Portal since 1996 continues to be a cause of concern in Esopus Creek. A previous macroinvertebrate survey of upper Esopus Creek in 1995 found non-impacted water quality at all sites.

Water quality in lower Esopus Creek ranges from slightly impacted to moderately impacted. Continuing monitoring has been conducted at Hurley and Glenerie. Both sites were assessed as slightly impacted in 1999. The Hurley site indicated possible effects of complex stressors, and the Glenerie site was likely impacted by nonpoint source nutrient enrichment. The Glenerie site was similarly assessed as slightly impacted in 1991. A site at Lake Katrine was assessed as slightly impacted in 1997 macroinvertebrate sampling. This impact was due in part to impoundment effects. The community was dominated by midges and fingernail clams. Macroinvertebrate sampling downstream of Kingston in 1993 found moderate impact that was apparently assignable to the discharge of the Ulster County Sewer Improvement Area. The slow-moving nature of the stream in this reach precluded drawing more definite conclusions about the impact.

Fall Kill

Water quality in the Fall Kill ranges from slightly impacted to moderately impacted, declining steadily downstream. Macroinvertebrate sampling was conducted in 1997 at 4 sites in the reach from Hyde Park to Poughkeepsie. Hyde Park received nutrient additions, and the Poughkeepsie sites were impacted by municipal/industrial sources, urban runoff, and trash deposition in the stream. Additional macroinvertebrate sampling in 1998 and 1999 also found moderately impacted water quality influenced by municipal/industrial sources. The 1999 study showed the zone of increased impact to begin where the stream entered the city of Poughkeepsie.

Fishkill Creek

Current water quality is assessed as slightly impacted from Fishkill to Beacon. Water quality at Beacon was assessed as slightly impacted in macroinvertebrate sampling in 1997, 1998, and 1999. The fauna was dominated by *Hydropsyche betteni*, a tolerant filter-feeding caddisfly, as in 1991 sampling. Impact Source Determination indicated both nonpoint nutrient enrichment, and possible toxic municipal/industrial inputs as the sources of impact.

Foundry Brook

This Hudson River tributary was sampled for macroinvertebrates in Cold Spring in 2002. Water quality was provisionally assessed as slightly impacted by nonpoint source nutrient enrichment. The unique stream habitat of bedrock, boulders, and plunge pools undoubtedly affected the fauna. Species richness was limited, and the dominant organism was Peltoperlidae, a clean-water stonefly. The site was judged to be a poor candidate for biological monitoring.

Furnace Brook

This Hudson River tributary was sampled for macroinvertebrates near Crugers in 2002. It was 0.1 miles downstream of Furnace Brook Lake, and impoundment effects apparently controlled the fauna. Water quality was assessed as slightly impacted, but is not thought to reflect water quality problems.

Gedney Brook

Water quality is assessed as slightly impacted, based on macroinvertebrate sampling at Millwood in 2000. The fauna was likely influenced by headwater effects and wetland effects, with only minor water quality impact. No prior data were available for the stream.

Gipsy Trail

Non-impacted water quality was documented for this stream in 2000 macroinvertebrate sampling near the mouth. The diverse fauna included many clean-water mayflies, stoneflies, caddisflies, riffle beetles, and hellgrammites.

Great Spring Creek

This small tributary of Wappinger Creek was sampled near Pleasant Valley in 2002. The fauna contained a few mayflies and stoneflies, but was dominated by algal-feeding riffle beetles. Water quality was assessed as slightly impacted by nonpoint source nutrient enrichment.

Hallocks Mill Brook

Severely impacted water quality was documented for this stream in 2000 macroinvertebrate sampling. The site was downstream of the Yorktown Heights Wastewater Treatment Facility, and the fauna clearly reflected impacts of organic wastes, exhibiting a reduced fauna of tolerant midges, worms, and leeches. Very high ammonia levels have also been documented at this site (DEC unpublished data). A site upstream of the sewage discharge was assessed as moderately impacted in 1998. ISD indicated the primary stressors to be toxicity and nutrient enrichment, pointing to urban runoff.

Hannacrois Creek

Macroinvertebrate sampling at Ravena in 1998 resulted in an assessment of slight impact, although very close to the range of non-impacted conditions. The fauna was diverse and well-balanced, and had highest affinity to natural communities. Lowered metrics may have been caused by the prevailing bedrock habitat.

Haviland Hollow Brook

Water quality for this stream was assessed as non-impacted, based on macroinvertebrate sampling at Brewster in 2000. The fauna was dominated by clean-water caddisflies and mayflies, and all metrics were within the range of non-impacted water quality.

Highland Brook

This Hudson River tributary was sampled for macroinvertebrates in Highland Falls in 2002. The streambed was highly embedded, and much refuse was present. The fauna was dominated by facultative midges and caddisflies, indicative of nonpoint source urban runoff, and water quality was assessed as slightly impacted. No prior data were available for the stream.

Holly Stream

Water quality for this stream is assessed as slightly impacted by nonpoint source nutrient enrichment. The site at Brewster was sampled in 2000 upstream of Route 202. The macroinvertebrate fauna was diverse but dominated by facultative midges.

Homowack Kill

Non-impacted water quality was assessed for this tributary of Sandburg Creek in the Rondout Creek watershed, based on macroinvertebrate sampling in 2002. The site was field-assessed, and the sample was processed to family level. No prior data were available for the stream.

Horsepound Brook

Water quality was assessed as non-impacted for this stream, based on macroinvertebrate sampling in 2000. The fauna was diverse and well balanced, and no water quality problems were indicated.

Hudson River

Multiplate sampling at Troy in 1997 and 2002 yielded an assessment of slightly impacted water quality at this site. Stoneflies were found in the samples in 1997 and 2002, a first record for the Lower Hudson River. Water quality had similarly been assessed as slightly impacted in 1977, 1983, and 1991, but the steady increase in EPT richness from 1977 to 2002 shows gradually improving water quality at this site (Figure 13-1.).

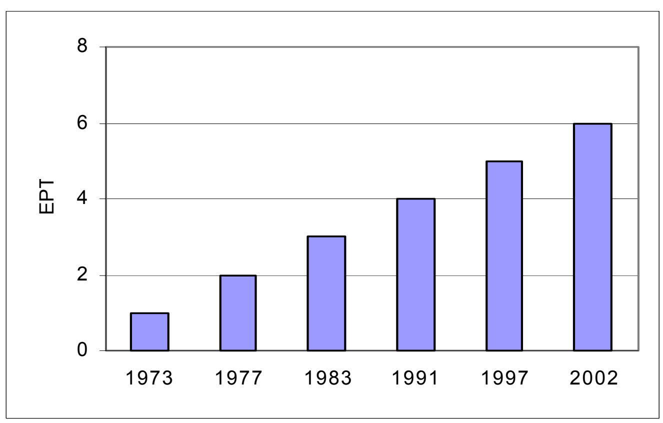


Figure 13-1. EPT trends (sensitive mayflies, stoneflies, and caddisflies) in the Hudson River at Troy, 1973-2002.

Water quality from Albany to Hudson showed an apparent decline from 1991 to 2002 (Figure 13-2). This reach was assessed as slightly impacted in 1991 multiplate sampling, and moderately impacted in the 1997 and 2002 multiplate samplings. This trend is unexplained. Ponar sampling at Glenmont in July, 1997, resulted in an assessment of moderate impact. Multiplate sampling at Castleton in 1997 and 2002 yielded assessments of moderately impacted water quality. Water quality had previously been assessed as slightly impacted in 1983 and 1991. Multiplate sampling at Hudson in 1997 and 2002 also indicated moderate impact. Water quality at this site had previously been assessed as slightly impacted in 1983 and 1991.

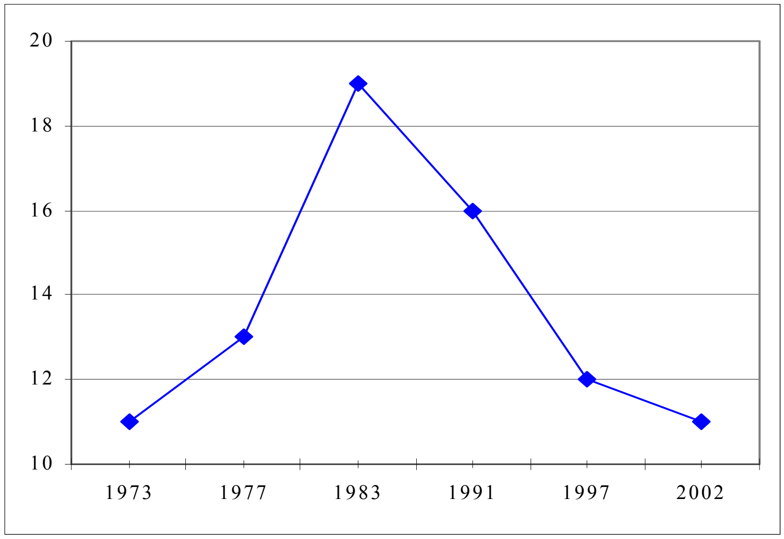


Figure 13-2. Species richness in the Hudson River below Albany, 1973-2002.

Multiplate sampling at Saugerties in 1997 and 2002 yielded assessments of moderately impacted water quality. Water quality had similarly been assessed as moderately impacted in 1991. Ponar sampling at Poughkeepsie in September, 1997, resulted in an assessment of moderate impact. Water quality indices initially indicated severe impact, but this was modified based on substrate particle size considerations. The sample was dominated by tolerant worms. No change in water quality was indicated compared to previous samplings.

Zebra mussels were first found in the Hudson River in 1991, and have caused a 57% reduction in the biomass of other benthic animals in the river (Strayer and Smith, 2001).

Figure 13-3. Zebra mussels have changed the Hudson River ecosystem.

Hunter Brook

All Hunter Brook sites are currently assessed as slightly impacted. Macroinvertebrate sampling was conducted at 1-3 sites in the Yorktown area from 1998 to 2002. Most sampling was done downstream of Old Crompond Road, where a variety of urban refuse, iron bacteria, and siltation are continuing problems. Most impacts are assignable to urban runoff and nutrient enrichment.

Indian Creek

Non-impacted water quality was assessed for Indian Creek in Chatham, based on macroinvertebrate sampling in 2002. The site was field-assessed, and the sample was processed to family level. No prior data were available for the stream.

Indigot Creek

Water quality was assessed as non-impacted for this tributary of Rutgers Creek, based on macroinvertebrate sampling in 2002. The site was field-assessed, and the sample was processed to family level. No prior data were available for the stream.

Jackson Creek

This small tributary of Sprout Creek was sampled for macroinvertebrates near Lagrangeville in 2002. Although the substrate was largely gravel, the fauna was dominated by clean-water mayflies, and water quality was assessed as non-impacted, based on the metrics. No prior data were available for the stream.

Kinderhook Creek

Water quality in Kinderhook Creek is considered non-impacted for most of its length. Seven sites were sampled for macroinvertebrates in 2000, from Garfield to Rossman. Based on macroinvertebrate communities all sites were assessed as non-impacted except the most downstream site at Rossman, which was slightly impacted. The impact was likely from nonpoint source nutrient enrichment. Water quality at Rossman was previously assessed as slightly impacted in 1997 and non-impacted in 1998 and 1999, based on macroinvertebrate sampling. Prior to this it was assessed as non-impacted in 1991.

In the 2000 survey, hellgrammites collected from Kinderhook Creek at Kinderhook and Stuyvesant contained body burdens of PCBs, presumably from the Valatie Kill. PCB levels were elevated, but were below provisional levels of concern.

The site at Garfield, although assessed as non-impacted, showed indications of nutrient enrichment. Analysis of diatom communities from this site in 2000 indicated definite nutrient enrichment (reported in the 2000 study), and ISD of the macroinvertebrate community also showed nutrient influences. Continued sampling of this site is recommended to monitor this situation.

Kisco River

Current water quality assessments for the Kisco River range from slightly impacted to moderately impacted. Moderate impact has been well documented at the Main Street, Mount Kisco site in 1999 and 2001. The mid-day dissolved oxygen level was 3.6 ppm in 1999, and the macroinvertebrate fauna of caddisflies and riffle beetles indicated municipal/industrial inputs. Sampling of the three tributaries in 2001 showed organic wastes contributed from Branch Brook, likely predominantly waterfowl wastes, and probable toxic stressors contributed from the unnamed tributary accessed from Radio Circle. The upstream main stem site at Byram Lake Road displayed only slight impact. The downstream site at Nitra-Yeshiva Road has been assessed as slightly impacted in all samplings. ISD for this site indicates nonpoint source nutrient enrichment as the primary stressor.

Klein Kill

Water quality was assessed as slightly impacted by nonpoint source nutrient enrichment for this stream, sampled for macroinvertebrates at Linlithgo in 2002. The fauna contained come clean-water mayflies, but was heavily dominated by filter-feeding caddisflies. No prior data were available for the stream.

Kline Kill

Non-impacted water quality was assessed for this stream, based on macroinvertebrate sampling in 2002. The site was field-assessed, and the sample was processed to family level. No prior data were available for the stream.

Kripplebush Creek

This tributary of Rondout Creek was sampled for macroinvertebrates at Kripplebush in 2002. The habitat was considered poor, with negligible current and a substrate composed largely of gravel. The processed sample, although sparse, was dominated by clean-water mayflies, and was assessed as slightly impacted based on the metrics. The assessment is considered to reflect poor habitat rather than actual water quality impact. No substantial water quality problems are evident.

Kromma Kill

Based on macroinvertebrate sampling the Kromma Kill in Menands in 1997, 1998 and 1999, water quality was assessed as moderately impacted. The fauna was very limited, and dominated by toxic-tolerant midges. Water quality at this site was also assessed as moderately impacted in 1991, and impacts were attributed primarily to the Altech operations. Although the plant has now closed, metals in the stream are an ongoing concern.

Krum Kill

Based on macroinvertebrate sampling in 1997, water quality was assessed as moderately impacted. This fauna was similar to that found in 1993 sampling. Impact Source Determination indicated municipal/industrial sources, and urban runoff is a likely source. The stream receives the drainage from Crossgates Mall.

Lake Tiorati Brook

Water quality for this stream is assessed as non-impacted, based on macroinvertebrate sampling at Stony Point in 2002. Algae was abundant in the stream at the time of sampling, but the macroinvertebrate fauna was diverse and well-balanced. Many clean-water mayflies, stoneflies, and caddisflies were present.

Landsman Kill

The site in Rhinebeck was assessed as moderately impacted, based on 1998 macroinvertebrate sampling. Impact Source Determination pointed to toxicity as the type of impact. An apparent decline in water quality is indicated, as this site had been assessed as slightly impacted in the 1992 survey. A site sampled near the mouth in 1998 was assessed as slightly impacted, similar to the 1998 survey.

Lattintown Creek

Water quality was assessed as slightly impacted by nonpoint source nutrient enrichment for this small stream, sampled for macroinvertebrates at Marlboro in 2002. The fauna was heavily dominated by filter-feeding caddisflies and contained few mayflies. No prior data were available for the stream.

Little Shawangunk Kill

Water quality was assessed as non-impacted for this stream, based on macroinvertebrate sampling in 2002. The site was field-assessed, and the sample has not yet been processed. No prior data were available for the stream.

Little Wappinger Creek

This tributary of Wappinger Creek was sampled for macroinvertebrates upstream of Salt Point in 2002. The stream appeared sluggish and silty, but the fauna was dominated by clean-water mayflies. Water quality was assessed as non-impacted based on the metrics. No prior data were available for the stream.

Manayunk Kill

This small tributary of the Wallkill River was assessed is slightly impacted, based on macroinvertebrate sampling in Kaisertown in 2002. Flow was very low at the time of sampling, but the fauna was dominated by clean-water mayflies. The assessment for this site may mostly reflect the headwater nature of the stream.

Maritje Kill

Water quality for this stream was assessed as slightly impacted by nonpoint source nutrient enrichment, based on sampling near Hyde Park in 2002. The stream was very small and sluggish, and the metrics likely reflect some degree of headwater effects. No prior data were available for the stream.

Masonic Creek

Masonic Creek is a small tributary of the Wallkill River in Middletown. Macroinvertebrate sampling in 2002 assessed water quality as slightly impacted, with the fauna heavily dominated by facultative midges. The stream contained much silt-laden filamentous algae. ISD denoted toxicity as the primary stressor.

Michaels Brook

Moderately impacted water quality is assessed for Michaels Brook. Macroinvertebrate sampling has mostly been conducted at Kelly Road in Carmel, and also upstream at Fair Street. The upstream site was impacted by urban runoff, while the downstream site was impacted by sewage wastes. The Carmel (T) Sewer District #2 Wastewater Treatment Facility discharge enters the stream above this site.

Mill Brook (Ulster County)

Based on macroinvertebrate sampling of Mill Brook at Mill Hook in 2002, water quality is assessed as slightly impacted by nonpoint source nutrient enrichment. The fauna contained many clean-water mayflies, but was dominated by filter-feeding caddisflies. No prior data were available for the stream.

Mill Creek (Rensselaer County)

Water quality in Mill Creek is mostly assessed as non-impacted, with the lower mile assessed as moderately impacted. Macroinvertebrate sampling at 5 sites was conducted in 2001. The greatest decline in water quality occurred in the reach where the creek enters the city of Rensselaer, likely due to urban runoff. Sampling at this site in 2002 indicated moderate impact from municipal/industrial inputs. High turbidity that occurred in the lower reach of Mill Creek in 2001 was investigated and traced to a construction site. Subsequent action by DEC Region 4 required the construction company to obtain a SPDES permit and install erosion and sedimentation control measures to prevent further siltation. The company later obtained a stormwater permit and submitted plans for a stormwater pond and other erosion control measures. In previous sampling of the Rensselaer site in 1998 and 1999, water quality was also assessed as moderately impacted by urban runoff. Previous sampling of the Michaels Road site in 1988, 1989, and 1999 indicated non-impacted conditions, similar to the 2001 survey.

Minisceongo Creek

Sampling in Minisceongo Creek at Thiells in 2002 revealed moderate impact, with a greatly reduced macroinvertebrate community, indicative of organic wastes. The likely source of impact was a composting facility on the South Branch of the creek. The dissolved oxygen level at the time of sampling was only 3.2 mg/l, and the stream bottom was covered with brown flocculent algal growth. DEC Region 3 personnel are investigating this problem. Water quality downstream at West Haverstraw was previously assessed as slightly impacted in 1998, attributed to nonpoint runoff.

Moodna Creek

Current water quality is assessed as slightly impacted, as in 1992. Water quality in Cornwall was assessed as moderately impacted in 1997 and slightly impacted in 1998 and 2002, based on macroinvertebrate sampling. These differing assessments may be caused by lower flows in 1997. The fauna has been strongly dominated by filter-feeding caddisflies in all years. Impact Source Determination has indicated nutrient enrichment and possible sewage inputs. Hellgrammites collected at this site in 1997 were analyzed for PAHs, and three were found at levels greatly exceeding the levels of concern: pyrene, benzo (a) anthracene, and chrysene.

Moordener Kill

Based on the most recent sampling, the Moordener Kill is considered mostly non-impacted, with the lower two miles of stream being assessed as slightly impacted. A macroinvertebrate survey in 1999 sampled 8 sites, including 2 sites on the North Branch. A fish survey was coordinated with the macroinvertebrate survey. Most sites exhibited excellent water quality, and a healthy population of brown trout was documented. The site at Brookview was assessed as slightly impacted by nonpoint nutrient enrichment and siltation in 1999 and 2002. This site was previously sampled for macroinvertebrates in 1997 and 1998. Both samples were dominated by midges and filter-feeding caddisflies, and indicated nonpoint nutrient enrichment and siltation, although the 1997 assessment was slightly impacted and the 1998 assessment was non-impacted. Fish sampling at a lower site at Route 150 in Castleton in 2001 also indicated slight impact. The North Branch of the Moordener Kill at Kraft Road in Schodack was assessed as slightly impacted by nonpoint source nutrient enrichment, based on sampling in 1999 and 2002. A long-standing sewage discharge from a trailer park at Route 150 in Schodack was rectified in 1999. A new sewage treatment plant was constructed and is now in compliance with it permit limits.

Muddy Brook

Moderate impact is assessed for this tributary of the East Branch Croton River, based on macroinvertebrate sampling in 1998 and 2000. The habitat resembled a wetland more than a stream, and metrics were calculated for slow sandy streams. ISD denoted organic wastes as the probable stressor. The fauna was dominated by tolerant sowbugs and midges.

Muitzes Kill

Macroinvertebrate sampling in Castleton in 1998 resulted in an assessment of slight impact. The fauna was dominated by filter-feeding caddisflies, and Impact Source Determination indicated both nonpoint sources and municipal/industrial inputs as possible sources of impact. Immature blue crabs were collected in the stream in the 1998 sampling.

Muscoot River

Water quality ranges from slightly to moderately impacted in the Muscoot River, based on macroinvertebrate sampling in 2000. Sampling at Baldwin Place indicated slight impact from nonpoint source nutrient enrichment. A downstream sampling site at Amawalk indicated moderate impact, though some of this impact was due to impoundment effects.

Normans Kill

The overall assessment of water quality for the Normans Kill is slightly impacted. Four mainstem sites were sampled from Westmere to Albany in 1993, and determined to be slightly impacted. Nonpoint source nutrient enrichment and siltation are the primary stressors. Macroinvertebrate sampling at the downstream site in 1991, 1992, 1997, and 1998 also showed similar impacts.

North Creek

North Creek, a tributary of Claverack Creek, was sampled in Mellenville in 2002. Water quality was assessed as slightly impacted by nonpoint source nutrient enrichment. The macroinvertebrate fauna was dominated by filter-feeding caddisflies. No prior data were available for the stream.

North Peters Kill

This small tributary of Rondout Creek was sampled for macroinvertebrates near Whitfield in 2002. Despite a sluggish flow, the fauna was dominated by clean-water mayflies, and water quality was assessed as non-impacted, based on the metrics. Stoneflies, caddisflies, hellgrammites, and riffle beetles were also present. No prior data were available for the stream.

Onesquethaw Creek

As noted in the report of the 1998 survey, the name Onesquethaw Creek correctly applies only to the portion of stream up to the confluence with Coeymans Creek in South Bethlehem. Most of Onesquethaw Creek is assessed as slight impacted, with the exception of the upper portion of the creek in the Clarksville area. Macroinvertebrates were sampled at four sites from Clarksville to Bethlehem Heights in 1998. Nonpoint source nutrient enrichment is considered to be the primary stressor in Onesquethaw Creek. The determination of slight impact at the South Bethlehem site represents an apparent decline compared to non-impacted conditions documented in 1987. Most of the Onesquethaw Creek watershed is in a karst region of porous limestone, and much surface flow in the creek is lost through fractures in the limestone. As a result, some portions of the stream experience dry periods during the summer, exerting a negative effect on resident invertebrate populations.

Patroon Creek

Following initial indication of severe sewage impacts in lower Patroon Creek in 1991, biological sampling was conducted in 1993 and 1994, further documenting severely impacted conditions. The cause of the impact was tracked to a long-standing sewage by-pass that was discharging raw sewage; this discharge was stopped in July, 1995. In order to monitor recovery in the stream, the downstream site was sampled annually from 1997 to 2000. Additional sewage inputs were discovered in 1999, but presently all known sewage inputs have been removed.

Compared to data from 1993 and 1994 at this site, all indices from the 1997-2002 samples show improvement (Figure 13-4). The most outstanding manifestation of improved water quality has been the appearance of caddisflies, mayflies, beetles, and most recently, a stonefly at this site. Qualitative electro-fishing was also performed at this site by Karen Murray of the U.S. Geological Survey in 1997. This sampling collected 22 fathead minnows; in a previous attempt at this site in 1994, no live fish were collected or observed. The 1999 and 2000 macroinvertebrate results were somewhat poorer than those of 1998, apparently reflecting ongoing point source inputs. Results of the 2002 sampling show continued improvement in Patroon Creek, with the final assessment being only slight impact.

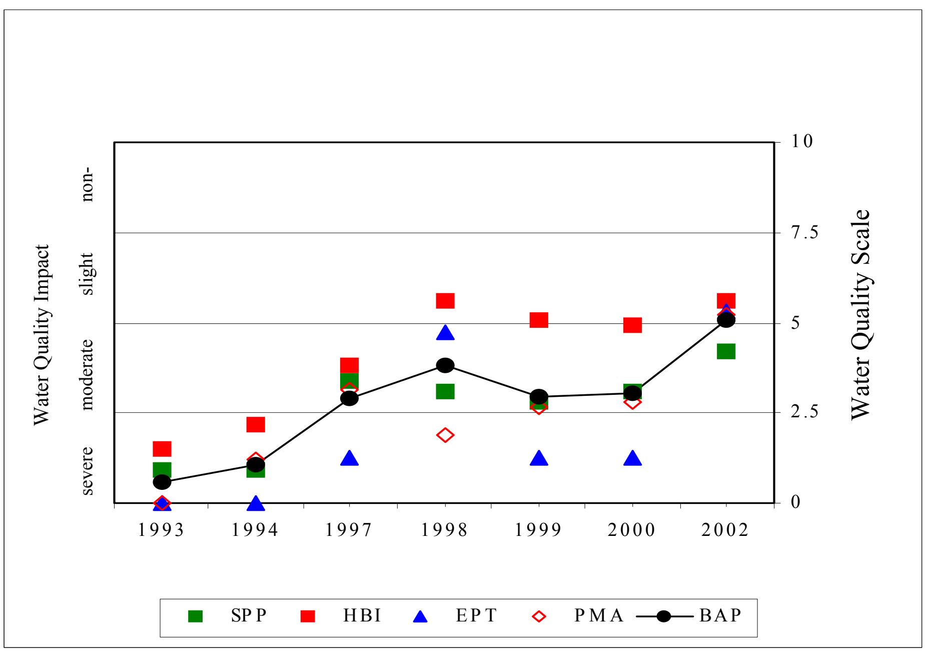


Figure 13-4. Water quality in Patroon Creek, 1993-2002. SPP= species richness, HBI= Hilsenhoff biotic index, EPT= richness of mayflies, stoneflies, and caddisflies, PMA- Percent Model Affinity, BAP= Biological Assessment Profile value.

Peach Lake Outlet

Moderately impacted water quality is assessed for this stream, based on macroinvertebrate sampling in 2000 and 2001. The primary stressors are indicated to be organic wastes and impoundment effect. The site sampled was approximately 0.7 miles downstream of Peach Lake. The fauna is limited, although it does include a species of clean-water stonefly.

Peekskill Hollow Brook

The Van Cortlandtville site was sampled for macroinvertebrates in 1998. The overall water quality assessment was slightly impacted. Impact Source Determination indicated nutrient enrichment and siltation. Clean-water stoneflies were very numerous at this site.

Peters Kill

This tributary of Rondout Creek was sampled for macroinvertebrates near St. Josen in 2002. Based on the metrics, water quality is provisionally assessed as slightly impacted. Although clean-water mayflies, stoneflies, and caddisflies were present, the fauna was dominated by facultative midge larvae. Rather than reflecting actual impacts, the assessment for this site was likely due to the abundant moss on the rocks of the riffle sampled. Moss is known to harbor many midge species, resulting in a skewed biological sample.

Philipse Brook

Slightly impacted water quality was assessed for this small Hudson River tributary, based on macroinvertebrate sampling near Garrison in 2002. The fauna was dominated by algal-feeding riffle
beetles and filter-feeding caddisflies, indicating effects of nonpoint source nutrient enrichment. Stoneflies and mayflies were present by sparse. No prior data were available for the stream.

Platte Kill (Ulster County)

Water quality was assessed as non-impacted for this tributary of the Wallkill River, based on macroinvertebrate sampling near Jenkinstown in 2002. The site was field-assessed, and the sample has was processed to family level. No prior data were available for the stream.

Platte Kill (Sullivan County)

Non-impacted water quality was assessed for this tributary of the Shawangunk Kill, based on macroinvertebrate sampling near Burlingham in 2002. The site was field-assessed, and the sample was processed to family level. No prior data were available for the stream.

Plattekill Creek

Water quality was assessed as non-impacted for this tributary of Esopus Creek, based on macroinvertebrate sampling near Mt. Marion in 2002. The site was field-assessed, and the sample has not yet been processed. No prior data were available for the stream.

Plum Brook

Water quality in Plum Brook is assessed as slightly impacted, based on macroinvertebrate sampling in 2000 and 2001. Much of the impact is likely due to impoundment effects, since the sampling site is immediately downstream of the lake. A site upstream of the lake also assessed as slightly impacted in 2001 sampling, likely due to poor habitat.

Pocantico River

This Hudson River tributary was sampled for macroinvertebrates in Sleepy Hollow in 2002. The alternate stream name Gory Brook appears on some maps. Based on the single sampling, water quality is assessed as moderately impacted. Nonpoint source nutrient enrichment is the likely stressor, although impoundment effects from upstream reservoirs may also be involved. The fauna was heavily dominated by filter-feeding caddisflies.

Pochuck Creek

Non-impacted water quality was assessed for this tributary of the Wallkill River, based on macroinvertebrate sampling near Newport in 2002. The site was field-assessed, and the sample has not yet been processed. No prior data were available for the stream.

Poesten Kill

Recent biological monitoring of the Poesten Kill has shown non-impacted conditions for most of its length, with the lower 2 miles being slightly impacted. Seven sites were sampled from East Poestenkill to Troy in a 2001 study by Katie DeGoosh, in cooperation with the Stream Biomonitoring Unit. The site in Troy had also been assessed as slightly impacted in 1998, showing influences of nonpoint source runoff and nutrient enrichment. Acidity has been measured in the upper Poesten Kill, a result of nutrient-poor soils and decreased buffering capacity. A pH measurement of 5.0 was obtained from this site in the 2001 sampling. The acidity decreases toward the mouth, with a pH of 7.9 being measured in Troy. The most upstream site at East Poestenkill was slightly impacted by acidity in 1992, but was assessed as non-impacted in 2001. The cause of this apparent improvement is not known.

Potic Creek

Water quality was assessed as non-impacted for this tributary of Catskill Creek, based on macroinvertebrate sampling in 2002. The site was field-assessed, and the sample has not yet been processed. No prior data were available for the stream.

Punsit Creek

Water quality was assessed as non-impacted for this tributary of the Kline Kill, based on macroinvertebrate sampling near Spencertown in 2002. The site was field-assessed, and the sample has not yet been processed. No prior data were available for the stream.

Putnam Lake Outlet

The macroinvertebrate community metrics at this site indicated moderate impact. This lake outlet site was located immediately downstream of Putnam Lake, and the impact may be largely impoundment effects. However, many species present also point to organic enrichment. The location of this site makes it difficult to separate water quality effects from impoundment effects.

Quacken Kill

Water quality was assessed as non-impacted for this tributary of the Poesten Kill, based on macroinvertebrate sampling in 2002. The site was field-assessed, and the sample has not yet been processed. No prior data were available for the stream.

Quaker Brook

This stream was sampled in Brewster in 2000, and was determined to be non-impacted. An exemplary fauna of clean-water mayflies, stoneflies, and caddisflies was present, and all community metrics were within the range of non-impacted water quality.

Quaker Creek

Severe water quality impacts in Quaker Creek were measured in 1994 and 1995, downstream of the Florida (V) Sewage Treatment Plant. The greatest impacts occurred 3.3 miles downstream of the discharge, and were likely worsened by water withdrawals from the stream by local onion growers. A daytime dissolved oxygen level of 3.1 mg/l was measured in 1995.

Quassaic Creek

Macroinvertebrates were sampled above the River Road bridge in Newburgh in 1997, 1998, and 1999. The 1997 and 1999 assessments were of slightly impacted water quality, and the 1998 assessment was moderately impacted. Urban runoff is likely the primary stressor at this site, and the lower-flow years of 1997 and 1999 carried less runoff than the higher-flow year of 1998. Overall water quality is considered slightly impacted, similar to the 1992 assessment at this site. An upstream site at Walsh Road in Newburgh was also assessed as slightly impacted in 1999.

Queensboro Creek

Water quality was assessed as non-impacted for this stream, based on macroinvertebrate sampling near Bear Mountain in 2002. The site was field-assessed, and the sample has not yet been processed. No prior data were available for the stream.

Rochester Creek

Water quality was assessed as non-impacted was assessed for this tributary of Rondout Creek, based on macroinvertebrate sampling in 2002. The site was field-assessed, and the sample was processed to family level. No prior data were available for the stream.

Roeliff-Jansen Kill

The Roeliff-Jansen Kill is considered non-impacted from Ancram to Linlithgo, with slight agricultural impact upstream near Hillsdale. Slightly impacted water quality from nutrient enrichment was documented at an upstream site at Route 22 south of Hillsdale in 1993. At Black Grocery Road bridge, downstream of Hillsdale, the fauna appeared more diverse and better balanced, and water quality was assessed as non-impacted. Crayfish from this site analyzed for contaminants were found to contain three PAHs above the levels of concern: pyrene, benzo (a) anthracene, and chrysene. A site located just downstream of the Overlook Road bridge below Hillsdale was assessed as slightly impacted by nutrient enrichment. Macroinvertebrate sampling at Linlithgo in 1997 and 1998 indicated non-impacted water quality. Clean-water mayflies were numerous at this site.

Rondout Creek

Water quality in Rondout Creek is currently assessed as non-impacted for most of its length. Reaches of slight impact are found above Peekamoose, due to acid effects, and from Napanoch to Kerhonkson, due to runoff and various discharges. Macroinvertebrate sampling was conducted at 10 sites on Rondout Creek in 2002 from Peekamoose to Rosendale. The slight impact from acidity documented at Peekamoose was similar to previous studies (DEC, unpublished). The macroinvertebrate fauna was dominated by acid-tolerant midges and stoneflies. Acid effects dampened out within a few miles to non-impacted conditions at Bull Run. The assessment of non-impacted water quality at Sundown represents an apparent improvement from slightly impacted conditions documented at this site in 1991 and 1992.

The Rondout Reservoir did not exert a negative effect on downstream macroinvertebrate communities. The fauna sampled at Lackawack, one mile below the reservoir outlet, exhibited the most diverse and well-balanced fauna in the watershed. An approximate 5 mile reach from below Napanoch to Kerhonkson was assessed as slightly impacted by nonpoint source nutrient enrichment and municipal/industrial inputs. Water quality from Accord to Rosendale was assessed as non-impacted, representing an apparent improvement from the previous assessment of slight impact at Rosendale in 1991. Water quality at this site had been assessed as non-impacted in 1997 and 1998.

Rutgers Creek

Non-impacted water quality was assessed for this tributary of the Wallkill River, based on macroinvertebrate sampling near Johnson in 2002. The site was field-assessed, and the sample was processed to family level. No prior data were available for the stream.

Sandburg Creek

Water quality was assessed as non-impacted for this tributary of Rondout Creek, based on macroinvertebrate sampling in 2002. The fauna was dominated by mayflies, and all metrics were within the range of the non-impacted category. No prior data were available for the stream.

Saw Kill Creek (Dutchess County)

Water quality at Annandale-on-Hudson was assessed as slightly impacted, based on 1998 macroinvertebrate sampling. The fauna was dominated by facultative filter-feeding caddisflies. Impact Source Determination indicated nonpoint source nutrient enrichment and/or pesticides as the probable source of impact.

Saw Kill (Ulster County)

Water quality of this tributary of Esopus Creek was assessed as non-impacted, based on 1997 macroinvertebrate sampling at Sawkill. The sample met the field screening criteria, and was not retained. Many clean-water organisms were present, including mayflies, stoneflies, caddisflies, riffle beetles, and hellgrammites.

Saw Mill River

Based on macroinvertebrate sampling at Yonkers, in 1997, 1998, and 1999, water quality was assessed as moderately impacted. Impact Source Determination indicated municipal/industrial inputs as the source of impact. Indices were slightly improved from those found in 1992, with mayflies and caddisflies collected here in recent samplings. Water quality had been assessed as severely impacted in 1992. Crayfish collected at this site in 1997 were analyzed for metals; lead was found at a level exceeding the current level of concern. Crayfish were also analyzed for the presence of organic compounds. Five PAHs were found at levels exceeding current levels of concern: anthracene, benzo (a) anthracene, pyrene, fluoranthene, and chrysene. Moderate impact was also indicated at Nepera Park in 1999 macroinvertebrate sampling, similar to 1992 conditions.

Shawangunk Kill

Non-impacted water quality is assessed for the Shawangunk Kill. Three sites from Maple Glen to Ganahgote were assessed as non-impacted water quality in macroinvertebrate sampling in 2002. The sites were field-assessed, and the sample was processed to family level. The site at Ganahgote in was previously sampled in 1997 for macroinvertebrates, and was assessed as non-impacted. The field screening criteria were met, and the sample was not retained. An exemplary fauna was noted.

Shekomeko Creek

This tributary of the Roeliff Jansen Kill was sampled northwest of Pine Plains in 2002. The macroinvertebrate fauna was diverse and well-balanced, and water quality was assessed as non-impacted. No prior data were available for the stream.

Shingle Kill

Water quality was assessed as non-impacted for this tributary of Catskill Creek, based on macroinvertebrate sampling near Cairo in 2002. The site was field-assessed, and the sample was processed to family level. No prior data were available for the stream.

Singsing Creek

Slightly impacted water quality is assessed for this stream, sampled for macroinvertebrates in Ossining in 2002. ISD denoted toxic stressors as the primary impact source, likely from urban runoff. Siltation was also a factor. No prior data were available for the stream.

Sparkill Creek

Moderately impacted water quality is assessed for this stream, based on recent sampling. Sampling in Sparkill at the Washington Avenue bridge and the Valentine Street bridge in 2002 denoted moderate impact. Possible toxic stressors were indicated at the lower site, and nonpoint enrichment and organic wastes were indicated at the upper site. These sites had been assessed as slightly impacted in 1999, and the lower site was also assessed as slightly impacted in 1998. Further sampling of the stream is planned for 2003.

Sprout Creek

Water quality is assessed as slightly impacted for Sprout Creek, based on macroinvertebrate sampling at Freedom Plains and Swartoutville in 2002. Communities were dominated by filter-feeding caddisflies, and ISD denoted nonpoint source nutrient enrichment as the primary stressor. No prior data were available for the stream.

Stephens Brook

Slightly impacted water quality is assessed for Stephens Brook, based on macroinvertebrate sampling in Pawling in 2000. Nonpoint source nutrient enrichment and siltation were the primary stressors. Although clean-water mayflies, stoneflies, and caddisflies were present, the fauna was dominated by midges and black flies. The substrate was highly embedded at this site.

Stone Hill River

This stream, also known as Beaverdam Brook, is assessed as slightly impacted by nonpoint sources for most of its length. An upstream segment at Bedford Village was assessed as non-impacted in 2001, and 3 downstream sites were assessed as slightly impacted. Similar assessments were obtained for the downstream site at Beaverdam Road in 1998 and 2000. This site was assessed as non-impacted in 1999, a low-flow summer with runoff.

Stony Clove Creek

Water quality was assessed as non-impacted for this tributary of Esopus Creek, based on macroinvertebrate sampling in 2002. The site was field-assessed, and the sample was processed to family level. No prior data were available for the stream.

Stony Kill (Dutchess County)

Current water quality is assessed as moderately impacted for the Stony Kill, based on macroinvertebrate sampling above and below Tivoli in 1999. This represents an apparent decline in water quality compared to 1991, although further sampling is recommended to verify this trend. Drought conditions were present during the 1999 sampling. The upstream site was affected by nonpoint source nutrient enrichment, while the downstream site was affected by multiple stressors, including inputs with both organic and toxic characteristics. Water quality at the downstream site was previously assessed as slightly impacted in 1998.

Tackawasick Creek

Non-impacted water quality was assessed for this tributary of Kinderhook Creek, based on macroinvertebrate sampling at Hoag Corners in 2002. The site was field-assessed, and the sample was processed to family level. No prior data were available for the stream.

Taghkanic Creek

Water quality was assessed as non-impacted was assessed for this stream at New Forge and below Linlithgo Mills, based on macroinvertebrate sampling in 2002. The site was field-assessed, and the sample was processed to family level. No prior data were available for the stream.

Tenmile Creek

Water quality in Tenmile Creek is slightly impacted for most of its length, with the lower mile assessed as non-impacted. Five sites from Rensselaerville to Oak Hill were sampled for macroinvertebrates in 1997; the upper four sites were slightly impacted by nonpoint source nutrient enrichment, and the lower site was non-impacted. The fauna at most sites was dominated by midges and caddisflies.

Tin Brook

This tributary of the Wallkill River was sampled for macroinvertebrates in Walden in 2002. Water quality was assessed as slightly impacted, likely by a combination of municipal/industrial inputs and siltation. The fauna was dominated by facultative midges and scuds.

Titicus River

Water quality of the Titicus River ranged from slightly to moderately impacted, based on macroinvertebrate sampling at Salem Center and Purdys in 2000. The North Salem site, upstream of the Titicus Reservoir, was assessed as slightly impacted by nonpoint source nutrient enrichment. The Purdys site was 0.5 miles downstream of the Titicus Reservoir, and the moderate impact reflected mostly impoundment effects from the reservoir. The macroinvertebrate fauna was heavily dominated by black fly larvae.

Tonetta Brook

Macroinvertebrate sampling of Tonetta Brook in Brewster in 2000 assessed water quality as slightly impacted. Previous sampling in 1998 and 1999 denoted moderate impact. The site had large amounts of urban refuse, and is apparently influenced by organic wastes and stormwater runoff. The macroinvertebrate fauna in all years sampled has been dominated by caddisflies and midges.

Twaalfskill Creek

This small Hudson River tributary was sampled in Highland in 2002. The macroinvertebrate fauna was sparse, and water quality was assessed as moderately impacted. ISD denoted municipal/industrial inputs as the primary source of impact. Poor habitat may also be a factor at this site.

Valatie Kill

Based on 1997 macroinvertebrate sampling at Mead Road, Nassau, water quality was assessed as non-impacted. The fauna was dominated by caddisflies, and mayflies were sparse, but most indices were favorable. This site is upstream of Nassau Lake. Valatie Kill biota was documented as carrying high levels of PCBs in samplings in 1979 and 1988, attributed to the nearby Dewey Loeffel landfill.

Verkeerder Kill

Water quality was assessed as non-impacted for this tributary of the Shawangunk Kill, based on macroinvertebrate sampling at Ulsterville in 2002. The site was field-assessed, and the sample was processed to family level. No prior data were available for the stream.

Vernooy Kill

Water quality was assessed as non-impacted was assessed for this tributary of Rondout Creek, based on macroinvertebrate sampling at Wawarsing in 2002. The site was field-assessed, and the sample was processed to family level. No prior data were available for the stream.

Vlockie Kill

This Hudson River tributary was sampled in Castleton in 2002. Water quality was assessed as moderately impacted, apparently by nonpoint sources. Habitat factors at this site contributing to a poorer fauna were the gravelly substrate and possible tidal influences from the Hudson River.

Vloman Kill

Water quality is provisionally assessed as moderately impacted for the lower Vloman Kill, based on macroinvertebrate sampling in Selkirk in 1998. Much of the impact may be due to poor habitat, as the substrate was mostly bedrock. Re-sampling at an alternate site is recommended. Sampling upstream near the Five Rivers Environmental Education Center in 2001 by Hudson Basin River Watch yielded a field assessment of non-impacted.

Vly Creek

This small tributary of the Normans Kill was sampled in 1993 and was assessed as slightly impacted. The stream receives the effluent from the Voorheesville (V) Sewer District # 1 Sewage Treatment Plant. The fauna contained mayflies, stoneflies, and caddisflies, but was dominated by facultative midges.

Wallkill River

Water quality in most of the Wallkill River is assessed as slightly impacted. A 1994 macroinvertebrate survey of 11 sites from the New Jersey/New York border to New Paltz found moderate impact at the border site, and slight impact at all downstream sites. It could not be determined if the impact at the border site represented wetland impact or a toxic/organic stress. Most of the impact in the river is due to agricultural nonpoint source nutrient enrichment. Previous sampling found slight impact at Walden and New Paltz in 1999, and at New Paltz in 1997 and 1998. Similar water quality was documented in 1994 sampling at the New Paltz site. Crayfish collected at this site in 1997 were analyzed for contaminants, and three PAHs, pyrene, benzo (a) anthracene, and chrysene, were found at levels exceeding the levels of concern.

Improvement in Wallkill River water quality is noted compared to conditions documented by Cooper and Neuderfer in a 1972 survey of the river. The 1972 study found moderate to severe impacts attributable to sewage effluents from the Middletown, Wallkill, Montgomery and Walden sewage treatment plants. All of these sewage treatment plants were upgraded from 1985 to1989, and the upgrades are likely responsible for the improved water quality documented in the 1994 survey.

Figure 13-5. Wappinger Creek at Salt Point, 2002.

Wappinger Creek

Water quality in most of Wappinger Creek is currently assessed as non-impacted. A biological survey of 5 sites from Stanfordville to below Poughkeepsie in 2002 found excellent water quality at all sites except at Stanfordville, which was assessed as slightly impacted by nutrient enrichment. These assessments represent an apparent improvement from 1991 sampling, when sites at Salt Point and Poughkeepsie were assessed as slightly impacted. Water quality at the downstream site was also assessed as slightly impacted in 1998. The 1997 metrics from this site were within the range of non-impacted water quality.

Wawayanda Creek

Improved water quality was documented in Wawayanda Creek following the 1994 upgrade of the Warwick (V) Wastewater Treatment Facility. Severe impact downstream of the treatment plant discharge was documented in 1989 macroinvertebrate sampling. Early morning dissolved oxygen levels at this site were measured at 2.5 mg/l. Sampling in 1994 showed partial improvement downstream of the discharge, and sampling in 1995 showed further improvement.
Monitoring at the most downstream site at New Milford in 1997, assessed water quality as slightly impacted. Indices were nearly identical to those found in 1995 at this site.

West Beer Kill

Water quality was assessed as non-impacted for this stream at Ellenville, based on macroinvertebrate sampling in 2002. The site was field-assessed, and the sample was processed to family level. No prior data were available for the stream.

West Brook

Non-impacted water quality was assessed for this tributary of Kinderhook Creek, based on macroinvertebrate sampling at Stephentown in 2002. The site was field-assessed, and the sample was processed to family level. No prior data were available for the stream.

Whaley Lake Stream

Water quality for this tributary of Fishkill Creek is assessed as non-impacted, based on macroinvertebrate sampling in Poughquag in 2002. The diverse, well-balanced fauna included many clean-water mayflies, stoneflies, and caddisflies, but the stream apparently receives some inputs, as siltation and enrichment were also factors at this site.

Whortle Kill

This tributary of Fishkill Creek was sampled for macroinvertebrates at Hopewell Junction in 2002. Water quality was assessed as slightly impacted, likely by nonpoint source nutrient enrichment. The fauna contained a few mayflies and stoneflies, but was dominated by filter-feeding caddisflies. Large proportions of sand and gravel in the substrate may have limited the fauna to some degree.

Wynants Kill

Based on macroinvertebrate sampling at 6 sites in 2001, water quality in the Wynants Kill ranges from non-impacted to slightly impacted. The upper portion of the creek, from West Sand Lake through the village of Wynantskill, had water quality bordering on non-impacted to slightly impacted. Nonpoint source runoff is the likely cause of impact at these sites. The greatest decline in water quality in the Wynants Kill occurred in the reach where the creek enters the city of Troy. Previous water quality assessments at this site have ranged from slightly impacted in 1998 to moderately impacted in 1999, and invertebrate tissues have exhibited elevated levels of some metals (copper, lead, mercury, lead, titanium, and zinc) and some PAHs. The elevated PAH levels were also present at the upstream Wynantskill site. No specific sources are known that may contribute these contaminants, and the problems are thought to result from historical contamination and urban runoff. Elevated levels of PAHs and metals are a common result of urban runoff.

Wyomanock Creek

Non-impacted water quality was assessed for this tributary of Kinderhook Creek, based on macroinvertebrate sampling in 2002. The site was field-assessed, and the sample was processed to family level. No prior data were available for the stream.

Unnamed Croton tributary at Locke Ledge

Water quality was assessed as slightly impacted for this stream, based on macroinvertebrate sampling in 2000. Clean-water mayflies, stoneflies, and caddisflies were present, but the fauna was dominated by midges. This is a very small stream, and the fauna is likely influenced by headwater conditions. Effects of nonpoint source nutrient enrichment is also indicated.

Unnamed Middle Branch Croton River tributary (Centennial Links trib)

This small tributary drains the Centennial Links golf course. The habitat at the site was adequate, but the macroinvertebrate fauna was heavily dominated by midges. Based on the metrics, water quality was assessed as slightly impacted. ISD denoted toxicity as the primary stressor.

Unnamed Hudson River tributary at Milton, (H108),

Based on macroinvertebrate sampling in April, 2001, severe impact in Hudson River Tributary H108 was documented, attributable to the discharge of the treatment plant for the Brooklyn Bottling Company wastes. Compared to the upstream site, three biological impairment criteria were exceeded. Follow-up sampling in October, 2001 found the upstream control site to be inundated by iron bacteria, severely limiting the capacity of the site to serve as control site for measuring effects downstream of the effluent. Additionally, the severely limited macroinvertebrate fauna at this site provided a poor recolonization resource for areas downstream of the effluent. This sampling revealed no substantial change in macroinvertebrate communities downstream of the effluent, compared to conditions in April. The sampling in June, 2002, found conditions similar to those in April, 2001, both at the upstream and downstream sites. Three biological impairment criteria. were exceeded, as in the sampling of April, 2001. It is recommended that any further sampling be focused on the chemical composition of the effluent.

Unnamed Muitzes Kill tributary

A small tributary of the Muitzes Kill was sampled for macroinvertebrates in the village of Castleton in 2002. Water quality was assessed as slightly impacted by nonpoint source nutrient enrichment. The fauna was dominated by filter-feeding caddisflies.

Unnamed Onesquethaw Creek tributary

A small tributary of Onesquethaw Creek in Clarksville was sampled for macroinvertebrates in 1996. The upstream site was assessed as moderately impacted, although the impact was due to headwater effects and intermittent conditions. Clean-water stoneflies dominated the fauna. Two downstream sites below Hill Top Farm were assessed as severely impacted by animal wastes. Sewage-tolerant midges and worms dominated the fauna. No prior data were available for the stream.

Unnamed "Power Station" tributary

This small tributary of the West Branch Croton Reservoir was assessed as slightly impacted, based on macroinvertebrate sampling in 2000. The fauna included clean-water mayflies and stoneflies, but ISD denoted a possible toxic stressor.

Unnamed Putnam Lake tributary,

This small unnamed tributary of Putnam Lake was assessed as slightly impacted, based on macroinvertebrate sampling in 2000. Nonpoint source nutrient enrichment was the likely cause of impact. The fauna was dominated by facultative caddisflies and midges.

Unnamed Richardsville tributary

This unnamed stream is a small mossy tributary of the West Branch Croton that has possible headwater influences and wetland influences. Clean-water mayflies, stoneflies, and caddisflies were present, but the fauna was dominated by black flies and midges. Overall water quality was assessed as slightly impacted, based on sampling in 2000.

Unnamed St. Johns Church tributary

This small stream located in North Salem was assessed as slightly impacted, based on macroinvertebrate sampling in 2000. The sandy habitat may have limited some of the metrics. Clean-water mayflies, stoneflies, and caddisflies were present. ISD denoted impoundment effects and nutrient enrichment as possible stressors.

Unnamed Stone Hill River tributary

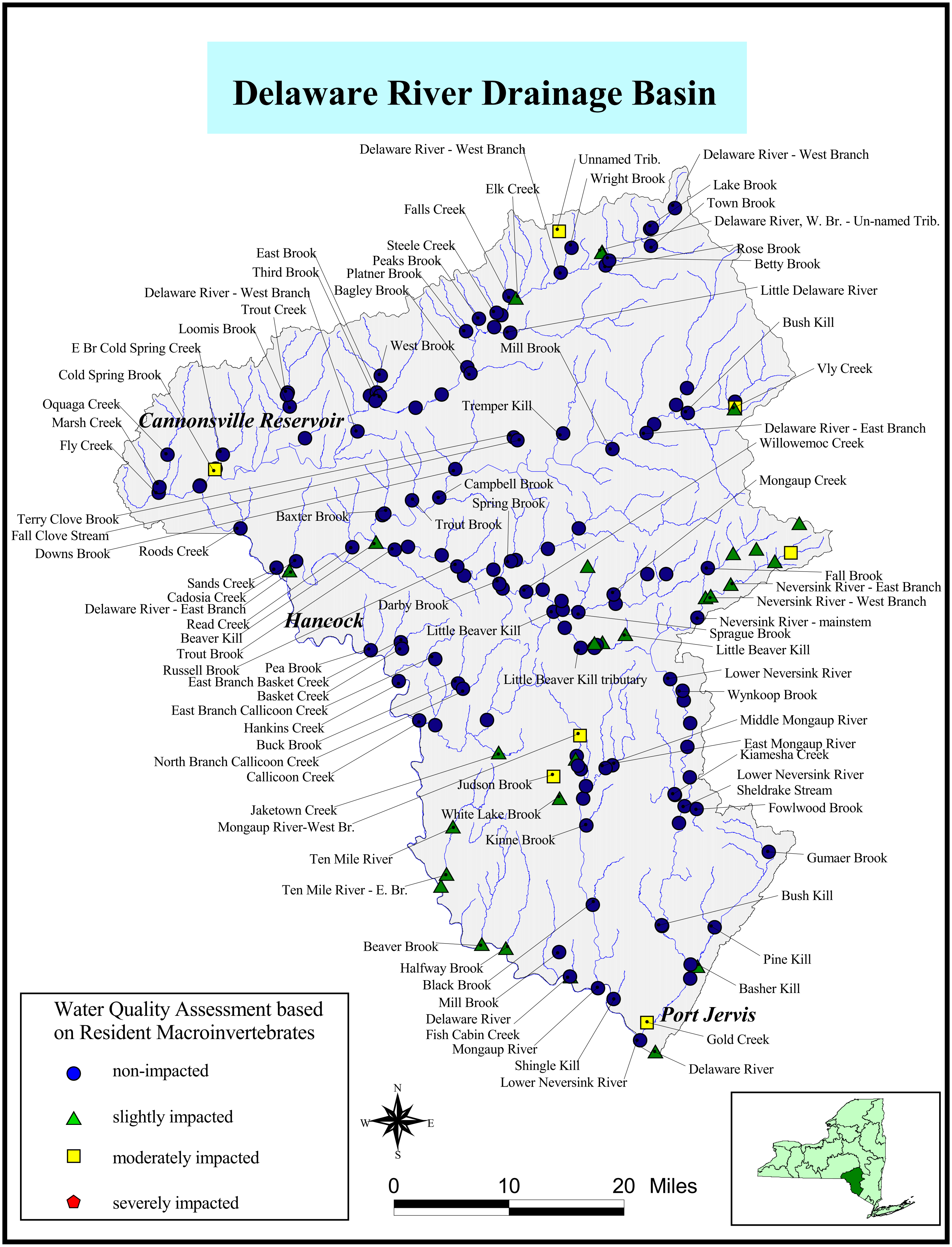
This small stream flows out of Lake Marie approximately 1.5 miles before its confluence with the Stone Hill River. Water quality at the upstream site is assessed as slightly impacted by impoundment effects. Sandy stream criteria were used to evaluate data from the lower two sites. These sites are assessed as slightly impacted by municipal/industrial inputs. Macroinvertebrates collected from the lower site in 2000 were found to have elevated levels of DDD and DDT.

Unnamed Wallkill River tributary

Slightly impacted water quality was assessed for this stream, based on macroinvertebrate sampling near Michigan Corners in 2002. The stream had a sluggish flow, which likely limited the fauna, and nonpoint source nutrient enrichment was also indicated. Crayfish were very abundant at the site.

Literature cited:

Strayer, D. L. and L. C. Smith. 2001. The zoobenthos of the freshwater tidal Hudson River and its response to the zebra mussel (*Dreissena polymorpha*) invasion. Arch. Hydrobiol. Suppl. 139/1, Monogr. Stud., p. 1-52.


Delaware River Drainage Basin
Delaware River - West Branch
Unnamed Trib.
Wright Brook
Delaware River - West Branch
Lake Brook
Town Brook
Delaware River, W. Br. - Un-named Trib.
Elk Creek
Falls Creek
Rose Brook
Betty Brook
East Brook
Steele Creek
Peaks Brook
Third Brook
Platner Brook
Bagley Brook
Delaware River - West Branch
Trout Creek
Little Delaware River
Loomis Brook
Bush Kill
E Br Cold Spring Creek
West Brook
Mill Brook
Cold Spring Brook
Vly Creek
Oquaga Creek
Cannonsville Reservoir
Tremper Kill
Marsh Creek
Delaware River - East Branch
Fly Creek
Willowemoc Creek
Campbell Brook
Mongaup Creek
Spring Brook
Terry Clove Brook
Baxter Brook
Trout Brook
Fall Clove Stream
Downs Brook
Roods Creek
Fall Brook
Neversink River - East Branch
Sands Creek
Neversink River - West Branch
Cadosia Creek
Darby Brook
Delaware River - East Branch
Neversink River - mainstem
Read Creek
Hancock
Sprague Brook
Beaver Kill
Little Beaver Kill
Little Beaver Kill
Trout Brook
Russell Brook
Pea Brook
Lower Neversink River
East Branch Basket Creek
Little Beaver Kill tributary
Basket Creek
Wynkoop Brook
East Branch Callicoon Creek
Middle Mongaup River
Hankins Creek
East Mongaup River
Buck Brook
Kiamesha Creek
North Branch Callicoon Creek
Lower Neversink River
Callicoon Creek
Judson Brook
Sheldrake Stream
Jaketown Creek
Fowlwood Brook
White Lake Brook
Mongaup River-West Br.
Kinne Brook
Gumaer Brook
Ten Mile River
Ten Mile River - E. Br.
Bush Kill
Pine Kill
Beaver Brook
Halfway Brook
Basher Kill
Black Brook
Mill Brook
Port Jervis
Delaware River
Fish Cabin Creek
Gold Creek
Mongaup River
Shingle Kill
Delaware River
Lower Neversink River
Water Quality Assessment based on Resident Macroinvertebrates
non-impacted
slightly impacted
moderately impacted
severely impacted
N
W
E
S
0
10
20
Miles

DELAWARE RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED				
BAGLEY BROOK (BAGL)						
01	De Lancey, Bagley Brook Rd. bridge				99	
BASHER KILL (BSHR)						
01	Cuddebackville, below Galley Hill Rd. bridge		93		99	
BASKET CREEK (BASK)						
02	Above Basket, Rte 134				99	
BASKET CREEK, EAST BRANCH (BASK)						
01	Below Fernwood, above Basket Rd.				99	
BAXTER BROOK (BAXT)						
01	Harvard, above Rte 30 bridge				99	
BEAVER BROOK (BEBR)						
01	Minisink Ford, above Rt. 97 bridge				99	
BEAVER KILL (BEAV)						
01	Lewbeach, at bridge		93		99	
02	Beaverkill, covered bridge		93			
03	Delaware/Sullivan County line, below Craigie Clair		93			
04	Roscoe, Rte 179A bridge		93		99	
05	Below Roscoe, off Old Rte 17		93			
06	Cooks Falls, above bridge	88	93	94	99	
07	Horton, Horton Brook Rd. bridge		93			
08	Above Peakville, Rte 17 bridge		93			
09	East Branch, below Bridge Rd. bridge				99	00
BENTON HOLLOW CREEK (LBEV)						
03A	below Parksville, above Benton Hollow Rd. bridge			94		
BETTY BROOK (BETT)						
01	South Kortright, below Rte 10 bridge				99	
BISCUIT BROOK (UNVR)						
NW-06	Biscuit Brook, Frost Valley	87				
BLACK BROOK (BLAB)						
01	below Fowlerville/Forestburg, Plank Rd; at last bridge				99	
BUCK BROOK (BUCB)						
01	North Branch, Rte 95 bridge				99	
BUSH KILL (BKIL) (Sullivan County)						
01	Oakland Valley, off Rte 49, above Burns Rd bridge				99	
BUSH KILL (BUSH) (Delaware County)						
01	Arkville, Rte 28, above village					00

DELAWARE RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED							
CADOSIA CREEK (CDOS)									
01	Cadosia, above Rte 17 bridge						94	99	
CALKINS CREEK (CALK)									
01	Milanville, PA, below River Rd							99	
CALLICOON CREEK (CALL)									
05	Hortonville, off Rte 17B, below inters. of Rte 121				87				
06	Callicoon, at Rte 97 bridge					93	94	99	00
CALLICOON CREEK, EAST BRANCH (CALL)									
03	Kohlertown, above Miller Rd bridge							99	
04	Hortonville, above Viaduct Rd bridge							99	
CALLICOON CREEK, NORTH BRANCH (CALL)									
01	North Branch, below Poley Rd. bridge at DEC fishing access							99	
02	Hortonville, above Hortonville Rd bridge					93	94	99	
CAMPBELL BROOK (CBEL)									
01	Corbett, above River Rd. bridge							99	
CLOVE BROOK (CLVE)									
01	Duttonville, NJ, above Rte 23 bridge							99	
COLD SPRING BROOK (COLD)									
03	Stilesville, above Cold Spring Br.mouth; near Rt.10 crossing of creek							99	
COLD SPRING BROOK, EAST BRANCH (COLD)									
01	Hambletville, above Rte 8 bridge							99	
DARBY BROOK (DARB)									
01	Roscoe, above confluence; Co Rte 179A								00
DELAWARE RIVER (DELA)									
05	Buckingham Public Access Area	74	81						
06	Hankins at Kellams Bridge	74	81						
07	Callicoon above Callicoon Creek	74	81						
08	Cochecton, below Rte 371 bridge, PA side	74	81			93	94	99	
09	Narrowsburg	74	81		88				
10	Tusten	74	81						
11	Minisink Ford, Roebling's bridge	74	81					99	
12	Pond Eddy, opp. Whitewater Willies Motel	74	81					99	
13	Port Jervis, above Rte 6/209 bridge, PA side		81	87	88	93	94	99	00
16	near Milford, PA	74	81						

DELAWARE RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED									
DELAWARE RIVER, EAST BRANCH (EDEL)											
01	Roxbury, Briggs Rd. bridge										
03	Kelly Corners, E. Hubbell Rd bridge									99	
03A	Arkville, 50 m above Rt. 38 bridge						93	94			00
04	Margaretville, opposite STP								98	99	
04B	Margaretville, off Rt. 28; below Margaretville STP							94			
08	Harvard, below Harvard Rd bridge									99	
10	Fish's Eddy					88					
12	Hancock, below Route 97 bridge	74	81		87		93	94		99	00
DELAWARE RIVER, WEST BRANCH (WDEL)											
00	Stamford, 10 m below School St bridge										00
01	Hobart, off Cornell Ave; 1mi. along old road bed									99	00
02	Below Bloomville, @ Rte. 10 DEC fishing access									99	00
03	Delhi, below Bridge St. bridge					88				99	
03A	Delhi, above Arbor Hill Rd. bridge									99	00
04	Delancy, above Bagley Rd. bridge				87	88				99	00
05C	Hawleys, below Rte. 26 bridge						93			99	00
05D	Hawleys, below landfill							94	98		00
06	Walton, below Rte 206 bridge									99	00
07	Beerston, at Rte. 10 bridge									99	00
08	Stilesville, above Cold Spring Br.mouth	74	81	86						99	
09	Deposit, above Deposit STP			86							
10	below Deposit, below Deposit STP			86							
11	above Hale Eddy, above Co. Rt. 18 bridge			86							
12	Hale Eddy	74	81	86							
13	Hancock, 100 m above Rt. 191 bridge	74	81	86	87					99	00
DOWNS BROOK (DOWN)											
01	Downsville, above Rt. 30 bridge									99	
DRYDEN BROOK (DRYD)											
01	Finch Hollow, above Dryden Brook Rd bridge									99	
EAST BROOK (EAST)											
01	Walton, above East St bridge									99	
ELK CREEK (ELK)											
01	East Delhi, below Rte 10 bridge									99	
FALL BROOK (FALB)											
01	above Claryville, above Co. Rte 47 bridge									99	
FALL CLOVE STREAM (FCLV)											
01	Fall Clove, above BWS Rd #6 bridge									99	

DELAWARE RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED
FALLS CREEK (FALS)		
01	Delhi, above Rte 10 bridge	99
FISH CABIN CREEK (FCAB)		
01	Pond Eddy, Off Rte 97	99
FLY CREEK (FLYC)		
01	McClure, below Rte 41 bridge	99
FOWLWOOD BROOK (FOWL)		
01	Glen Wild, above Glen Wild Rd bridge	99
GOLD CREEK (GOLD)		
01	Port Jervis, Rt. 209 bridge	99
GUMAER BROOK (GUMR)		
01	above Wurtsboro, above Rte 209 bridge	99
HALFWAY BROOK (HAFY)		
01	Barryville, above Rt. 97 bridge	99
HANKINS CREEK (HANK)		
01	Hankins, below Rte 97 bridge (opp. Co Rt 94)	99
HIGH FALLS BROOK (UNVR)		
NW-07	High Falls Brook, Frost Valley	87
JAKETOWN CREEK (JAKE)		
01	Kenoza Lake, above Burr Rd bridge	99
JUDSON BROOK (JUDS)		
01	Kauneoga Lake, below Rte 55 bridge	99
KIAMESHA CREEK (KIAM)		
02	Thompsonville, above Thompsonville Rd bridge	99
KINNE BROOK (KINN)		
01	Mongaup Valley, Starlight Rd bridge	99
LACKAWAXEN RIVER (WAXN)		
01	Lackawaxen, below PA-Rt. 590 bridge	99
LAKE BROOK (LAKE)		
01	Hobart, below Rte 10 bridge	99
LILY POND OUTLET (LBEV)		
01A	Cooley, Lily Pond Outlet, above Fishman Rd. bridge	94

DELAWARE RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED					
LITTLE BEAVER KILL (LBEV)							
01	Cooley, above Rt. 85 bridge			94			
02	Parksville, above Lily Pond Rd. bridge			94			
03	below Parksville, off old Rt. 17; behind Sunoco station			94			
04	Morsston, DEC Fishing Access		93	94		99	
05	Livingston Manor, Route 149 bridge		93	94			
LITTLE DELAWARE RIVER (LDEL)							
01	Delhi, Thompson Cross Rd. bridge		93				
01A	Delhi, at college golf course		93				
LOOMIS BROOK (LOOM)							
01	Loomis, off Loomis Brook Rd.				98	99	
MARSH CREEK (MRSH)							
01	McClure, above Rte 41 bridge					99	
MELBERN LAKE OUTLET (LBEV)							
02A	Parksville, below Main St. bridge			94			
MILL BROOK (MILP) (Sullivan County)							
01	Pond Eddy, below Rte 97 bridge					99	
MILL BROOK (MLBR) (Delaware County)							
01	Arena, Mill Brook Rd. @ USGS gage				98	99	
MONGAUP CREEK (GAUP)							
01	Debruce, above Willowemoc Rd bridge					99	
MONGAUP RIVER (MONG)							
00	Mongaup Valley, above Rte 17B bridge					99	00
01	Mongaup, above Route 97 bridge	87	93			99	
MONGAUP RIVER, EAST BRANCH (MONG)							
E	Harris, above Rte 174 bridge					99	
M	Bushville, above Rte 75 bridge					99	
MONGAUP RIVER, WEST BRANCH (WMON)							
01	below Swan Lake, off Rte 55						00
02	btw Swan Lake & Mongaup Valley, below unnamed trib that runs by landfill						00
03	Bethel, above Blum Rd bridge @inter w/Creamery Rd						00
04	Bethel, Creamery Rd at trib						00
05	Mongaup Valley, above Gail Rd bridge					99	00
NEVERSINK RIVER, UPPER (UNVR)							
NE-01	Upper Neversink R., East Br., Denning, above Tison estate	87					
NE-05	Upper Neversink R., East Br., Denning, opposite Tison estate	87				99	

DELAWARE RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED							
NEVERSINK RIVER, UPPER (UNVR), cont.									
NE-07	Upper Neversink R., East Br., below bridge at Strauss estate		87	90					
NE-08	Upper Neversink R., East Br., New Hill Road			90					
NE-09	Upper Neversink R., East Br., Ladleton			90					
NE-10	Upper Neversink R., East Br., below Ladleton		87	90				99	
NE-11	Upper Neversink R., East Br., Claryville		87	90			98	99	
NW-01	Upper Neversink R., West Br., near Winisook Lake		87						
NW-02	Upper Neversink R., West Br., DEC parking lot site			90					
NW-03	Upper Neversink R., West Br., West Branch Road			90					
NW-04	Upper Neversink R., West Br., near Frost Valley YMCA		87	90				99	
NW-08	Upper Neversink R., West Br., mouth of High Falls Brook		87						
NW-11	Upper Neversink R., West Br., near Claryville		87						
N-12	Upper Neversink R., near Claryville below confluence		87			94		99	00
NEVERSINK RIVER, LOWER (NEVR)									
01	Neversink River, below reservoir, above Route 105 bridge		87						
02	Neversink River, Hasbrouck, above bridge		87						
03	Neversink River, Woodbourne, below Rte 52 bridge		87		93	94		99	
04	Neversink River, Fallsburg, below Rte 53 bridge		87						
07	Neversink River, South Fallsburg, Avon Lodge Rd		87						
09	Neversink River, below Thompsonville, opposite confluence with Sheldrake Stream		87						
12	Neversink River, Bridgeville, above Rte. 173 bridge		87					99	
13	Neversink River, Oakland Valley, above bridge		87					99	
14	Neversink River, Westbrookville, above Rte 209	74	87						
14A	Neversink River, Godeffroy, Graham Road bridge		87		93	94		99	
15	Neversink River, Port Jervis, below Rte 6 bridge	74	87					99	00
OQUAGA CREEK (OQUA)									
01	Sanford, Loomis Hill Road					94			00
02	Deposit, below Mill Street bridge							99	00
PEA BROOK (PEA)									
01	Long Eddy, above Acid Factory Rd bridge							99	
PEAKS BROOK (PEAK)									
01	Fraser, Peaks Brook Rd; above 2nd bridge							99	
PINE KILL (PINE)									
01	Westbrookville, above Rt. 209 bridge							99	
PLATNER BROOK (PLTN)									
01	Fraser, Treadwell Rd							99	

DELAWARE RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED	
READ CREEK (READ)			
01	near Fish’s Eddy, above Co. Rt. 17 bridge		99
ROODS CREEK (ROOD)			
01	east of Hale Eddy, above Roods Creek Rd bridge		99
ROSE BROOK (ROSE)			
01	South Kortright, below Co. Rte 18 bridge		99
RUSSELL BROOK (RSLL)			
01	Butternut Grove, above Co. Rte 17 bridge		99
SANDS CREEK (SNDS)			
01	Hancock, above Co. Rte 17 bridge		99
SHELDRAKE STREAM (SHEL)			
01	Thompsonville, above Ranch Rd bridge		99
02	Thompsonville, above mouth	87	
SHINGLE KILL (SHNG)			
01	above Sparrow Bush, above Rt. 42 bridge		99
SHOHOLA CREEK (HOLA)			
01	Shohola, PA, below Twins Lake Rd		99
SPRAGUE BROOK (SPRA)			
01	west of Parkston, above Co. Rte 82 bridge		99
SPRING BROOK (SPRB)			
01	near Rockland, above Beaverkill/Berry Bk Rd bridge		99
STEELE CREEK (STEL)			
01	Delhi, above Woolerton St bridge		99
TEN MILE RIVER (TENR)			
01	near Lava, below Hoffman Rd. bridge		99
02	East Branch, in Tusten, above Brooks Rd. bridge		99
03	Tusten, above Tusten Rd bridge		99
TERRY CLOVE BROOK (TCLV)			
01	Coles Clove, above BWS Rd 1, inter w/Coles Clove Rd		99
THIRD BROOK (THRD)			
01	Walton, below Ogden St bridge		99
TOWN BROOK (TOWN)			
01	Hobart, below Clove Rd bridge		99

DELAWARE RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED
TREMPER KILL (TRMP)		
01	Bussey Hollow, Co. Rte. 1, below bridge	99
TROUT BROOK (TRBR)		
01	Peakville, above Peakville Rd. bridge	99
TROUT BROOK (TROT)		
01	Shinhopple, above Rt. 30 bridge	99
TROUT CREEK (TRUT)		
01	Trout Creek, above Rte 206 bridge	98
02	Trout Creek, above Bullock Hill Rd bridge @ new gage	98 99
VLY CREEK (VLY)		
01	Fleischmanns, Halcott Rd.; 0.1 mi. above Lake Switzerland	95
02	Fleischmanns, 50 m below Lake Switzerland dam	95
03	Fleischmanns, 200 m below Lake Switzerland dam	95
04	Fleischmanns, above Mill St. bridge	95
WEST BROOK (WSTB)		
01	above Walton, Rte 23 bridge, just abv Kerrs Ck	99
02	Walton, below Austin Lincoln Park Rd	99
WHITE LAKE BROOK (WLAK)		
01	Smallwood, below Mattison Rd bridge	99
WILLOWEMOC CREEK (WILL)		
01	Above Willowemoc, above Flugertown Road bridge	93
02	Willowemoc, below bridge	93
03	Debruce, above Hunter Lake Road	93 94
04	Above Livingston Manor, DeBruce Rd., at closed USGS gaging station	93 94
05	Below Livingston Manor, above covered bridge	93 94 99
06	Below Livingston Manor, @NYSG&E substation	93 94
07	Hazel, above Hazel Road bridge	93 94
08	Roscoe, above Main Street bridge	93 94
WRIGHT BROOK (WRIT)		
01	Bloomville, below Co. Rte 33 bridge	99
WYNKOOP BROOK (WYNK)		
01	Hasbrouck, above Hasbrouck Rd bridge	99
UNNAMED DELAWARE RIVER, WEST BRANCH, TRIBUTARY (SHAW)		
02	South Kortright, below Shaw Road	96 97 98 99 00
UNNAMED WRIGHT BROOK TRIBUTARY (ROBT)		
01	Bloomville, Crowe Rd., below Robertson farm	96 97 98 99 00

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE DELAWARE RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Bagley Brook, De Lancey	non-impacted	no prior data
Basher Kill, Cuddebackville	slightly impacted	no prior data
Basket Creek, above Basket	non-impacted	no prior data
Basket Creek, East Branch	non-impacted	no prior data
Baxter Brook, Harvard	non-impacted	no prior data
Beaver Brook, Minisink Ford	slightly impacted	no prior data
Beaver Kill, Lewbeach	non-impacted	no prior data
Beaver Kill, Beaverkill	non-impacted	no prior data
Beaver Kill, at Delaware/ Sullivan County line	non-impacted	no prior data
Beaver Kill, Roscoe	non-impacted	no prior data
Beaver Kill, below Roscoe	non-impacted	no prior data
Beaver Kill, Cooks Falls	non-impacted	no change
Beaver Kill, Horton	non-impacted	no prior data
Beaver Kill, above Peakville	non-impacted	no prior data
Beaver Kill, East Branch	slightly impacted	no prior data
Benton Hollow Creek, Parksville	non-impacted	no prior data
Betty Brook, South Kortright	non-impacted	no prior data
Black Brook, below Fowlerville/Forestburg	non-impacted	no prior data
Buck Brook, North Branch	non-impacted	no prior data
Bush Kill, Oakland Valley	non-impacted	no prior data
Bush Kill, Arkville	non-impacted	no prior data
Cadosia Creek, Cadosia	non-impacted	no prior data
Calkins Creek, Milanville, PA	non-impacted	no prior data
Callicoon Creek , Callicoon	non-impacted	no prior data
Callicoon Creek, East Branch, Kohlertown	non-impacted	no prior data
Callicoon Creek, East Branch, Hortonville	non-impacted	no prior data
Callicoon Creek, North Branch, North Branch	non-impacted	no prior data
Callicoon Creek, North Branch, Hortonville	non-impacted	no prior data
Campbell Brook, Corbett	non-impacted	no prior data
Clove Brook, Duttonville, NJ	slightly impacted	no prior data
Cold Spring Brook, Stilesville	non-impacted	no prior data
Cold Spring Brook, E. Br. Hambletville	non-impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE DELAWARE RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Darby Brook, Roscoe	non-impacted	no prior data
Delaware River, Cochecton	non-impacted	no change
Delaware River, Minisink Ford	non-impacted	**IMPROVED**
Delaware River, Pond Eddy	slightly impacted	no change
Delaware River, Port Jervis	slightly impacted	**DECLINED**
Delaware River, East Branch, Kelly Corners	non-impacted	no prior data
Delaware River, East Branch, Arkville	non-impacted	no prior data
Delaware River, East Branch, Margaretville, opposite STP	non-impacted	no prior data
Delaware River, East Branch, Margaretville, off Rt. 28	non-impacted	no prior data
Delaware River, East Branch, Harvard	non-impacted	no prior data
Delaware R., East Branch, Hancock	slightly impacted	**DECLINED**
Delaware River, West Branch, Stamford	non-impacted	no prior data
Delaware River, West Branch, Hobart	non-impacted	no prior data
Delaware River, West Branch, below Bloomville	non-impacted	no prior data
Delaware River, West Branch, Delhi, below Bridge St.	non-impacted	no change
Delaware River, West Branch, Delhi, above Arbor Hill Rd.	non-impacted	no prior data
Delaware River, West Branch, Delancy	non-impacted	no change
Delaware River, West Branch, Hawleys, below Rte. 26	non-impacted	no prior data
Delaware River, West Branch, Hawleys, below landfill	non-impacted	no prior data
Delaware River, West Branch, Walton	non-impacted	no prior data
Delaware River, West Branch, Beerston	non-impacted	no prior data
Delaware River, West Branch, Stilesville	moderately impacted	**IMPROVED**
Delaware River, West Branch, Hancock	non-impacted	no change
Downs Brook, Downsville	non-impacted	no prior data
Dryden Brook, Finch Hollow	non-impacted	no prior data
East Brook, Walton	non-impacted	no prior data
Elk Creek, East Delhi	slightly impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE DELAWARE RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Fall Brook, above Claryville	non-impacted	no prior data
Fall Clove Stream, Fall Clove	non-impacted	no prior data
Falls Creek, Delhi	non-impacted	no prior data
Fish Cabin Creek, Pond Eddy	non-impacted	no prior data
Fly Creek, McClure	non-impacted	no prior data
Fowlwood Brook, Glen Wild	non-impacted	no prior data
Gold Creek, Port Jervis	moderately impacted	no prior data
Gumaer Brook, above Wurtsboro	non-impacted	no prior data
Halfway Brook, Barryville	slightly impacted	no prior data
Hankins Creek, Hankins	non-impacted	no prior data
Jaketown Creek, Kenoza Lake	slightly impacted	no prior data
Judson Brook, Kauneoga Lake	moderately impacted	no prior data
Kiamesha Creek, Thompsonville	non-impacted	no prior data
Kinne Brook, Mongaup Valley	non-impacted	no prior data
Lackawaxen River, Lackawaxen, PA	non-impacted	no prior data
Lake Brook, Hobart	non-impacted	no prior data
Lily Pond Outlet, below Cooley	slightly impacted	no prior data
Little Beaver Kill, Cooley	slightly impacted	no prior data
Little Beaver Kill, Parksville	non-impacted	no prior data
Little Beaver Kill, below Parksville	slightly impacted	no prior data
Little Beaver Kill, Morsston	non-impacted	no prior data
Little Beaver Kill, Livingston Manor	non-impacted	no prior data
Little Delaware River, Delhi, Thompson Cross Rd.	non-impacted	no prior data
Little Delaware River, Delhi, at college golf course	non-impacted	no prior data
Loomis Brook, Loomis	non-impacted	no prior data
Marsh Creek, McClure	non-impacted	no prior data
Melbern Lake Outlet, Parksville	non-impacted	no prior data
Mill Brook, Pond Eddy	non-impacted	no prior data
Mill Brook, Arena	non-impacted	no prior data
Mongaup Creek, Debruce	non-impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE DELAWARE RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Mongaup River, Mongaup Valley	non-impacted	no prior data
Mongaup River, Mongaup	non-impacted	no change
Mongaup River, East Branch, Harris	non-impacted	no prior data
Mongaup River, Middle Branch, Bushville	non-impacted	no prior data
Mongaup River, West Branch, below Swan Lake	moderately impacted	no prior data
Mongaup River, W. Branch, between Swan Lake & Mongaup Valley	non-impacted	no prior data
Mongaup River, West Branch, Bethel, above Blum Rd	slightly impacted	no prior data
Mongaup River, West Branch, Bethel, Creamery Rd	non-impacted	no prior data
Mongaup River, West Branch, Mongaup Valley	non-impacted	no prior data
Neversink River, Upper, East Branch, opposite Tison estate	slightly impacted	no change
Neversink River, Upper, East Branch, below Ladelton	slightly impacted	no change
Neversink River, Upper, East Branch, Claryville	slightly impacted	no change
Neversink River, Upper, West Branch, near Frost Valley YMCA camp	non-impacted	**IMPROVED**
Neversink River, Upper, West Branch, near Claryville	non-impacted	**IMPROVED**
Neversink River, Upper, Claryville	non-impacted	**IMPROVED**
Neversink River, Lower, Woodbourne	non-impacted	no change
Neversink River, Lower, Bridgeville	non-impacted	no change
Neversink River, Lower, Oakland Valley	non-impacted	no change
Neversink River, Lower, Godeffroy	non-impacted	no change
Neversink River, Lower, Port Jervis	non-impacted	no change
Oquaga Creek, Sanford, below Mill St.	non-impacted	no prior data
Oquaga Creek, Deposit, Oquaga Lake Rd.	non-impacted	no prior data
Pea Brook, Long Eddy	non-impacted	no prior data
Peaks Brook, Fraser	non-impacted	no prior data
Pine Kill, Westbrookville	non-impacted	no prior data
Platner Brook, Fraser	non-impacted	no prior data
Read Creek, near Fishs Eddy	non-impacted	no prior data
Roods Creek, east of Hale Eddy	non-impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE DELAWARE RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Rose Brook, South Kortright	non-impacted	no prior data
Russell Brook, Butternut Grove	non-impacted	no prior data
Sands Creek, Hancock	non-impacted	no prior data
Sheldrake Stream, Thompsonville	non-impacted	no change
Shingle Kill, above Sparrow Bush	non-impacted	no prior data
Shohola Creek, Shohola, PA	slightly impacted	no prior data
Sprague Brook, west of Parkston	non-impacted	no prior data
Spring Brook, near Rockland	non-impacted	no prior data
Steele Creek, Delhi	non-impacted	no prior data
Ten Mile River, near Lava	slightly impacted	no prior data
Ten Mi. R., E. Br, Tusten, abv Brooks Rd.	slightly impacted	no prior data
Ten Mile River, Tusten, above Tusten Rd.	slightly impacted	no prior data
Terry Clove Brook, Coles Clove	non-impacted	no prior data
Third Brook, Walton	non-impacted	no prior data
Town Brook, Hobart	non-impacted	no prior data
Tremper Kill, Bussey Hollow	non-impacted	no prior data
Trout Brook, Peakville	non-impacted	no prior data
Trout Brook, Shinhopple	non-impacted	no prior data
Trout Creek, Trout Creek, above Rte 206	non-impacted	no prior data
Trout Creek, Trout Creek, above Bullock Hill Rd	non-impacted	no prior data
Vly Creek, Fleischmanns, Halcott Rd.	non-impacted	no prior data
Vly Creek, Fleischmanns, 50 m below Lake Switzerland dam	moderately impacted	no prior data
Vly Creek, Fleischmanns, 200 m below Lake Switzerland dam	slightly impacted	no prior data
Vly Creek, Fleischmanns, above Mill St.	non-impacted	no prior data
West Brook, above Walton	non-impacted	no prior data
West Brook, Walton	non-impacted	no prior data
White Lake Brook, Smallwood	slightly impacted	no prior data
Willowemoc Creek, above Willowemoc	non-impacted	no prior data
Willowemoc Creek, Willowemoc	non-impacted	no prior data
Willowemoc Creek, Debruce	non-impacted	no prior data
Willowemoc Creek, above Livingston Manor	non-impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE DELAWARE RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Willowemoc Creek, below Livingston Manor	non-impacted	no prior data
Willowemoc Creek, below Livingston Manor	non-impacted	no prior data
Willowemoc Creek, Hazel	non-impacted	no prior data
Willowemoc Creek, Roscoe	non-impacted	no prior data
Wright Brook, Bloomville	non-impacted	no prior data
Wynkoop Brook, Hasbrouk	non-impacted	no prior data
Unnamed tributary of Delaware River, West Branch, South Kortright, downstream of Shaw Rd.	slightly impacted	no prior data
Unnamed tributary of Wright Brook, Bloomville	moderately impacted	no prior data

REPORTS OF MACROINVERTEBRATE SURVEYS WITHIN THE DELAWARE RIVER WATERSHED

STREAM	YEAR OF SURVEY	REPORT
Beaver Creek	1974	AVON
Beaver Kill	1993	SBU,1993
Callicoon Creek	2001	SCCC
Delaware River	1974	DOH
Delaware River Basin	1974	EPA,1976
Delaware River, West Branch	1973	AVON
Delaware River, West Branch	1986	SBU,1987
Delaware River, West Branch	2000	SBU,2001
Little Beaver Kill	1994	SBU,1995
Mongaup River, West Branch	2000	SBU,2001
Neversink River	1974	AVON
Neversink River	1987	SBU,1988
Vly Creek	1995	SBU,1995
Willowemoc Creek	1974	AVON
Willowemoc Creek	1993	SBU,1993
Willowemoc Creek	1994	SBU,1995
Watershed Streams	1987-1988	RIBS,1990
Watershed Streams	1993-1994	RIBS,1996

AVON	Avon Pollution Investigations Unit, Div. of Fish & Wildlife, NYS DEC
DOH	New York State Department of Health
EPA	United States Environmental Protection Agency
RIBS	Rotating Intensive Basin System, Statewide Waters Assessment Section, NYS DEC
SBU	Stream Biomonitoring Unit, Division of Water, NYS DEC
SCCC	Sullivan County Community College, (Stephen Fleckenstein)

Bagley Brook

Non-impacted water quality is assessed for this tributary of the West Branch Delaware River, based on macroinvertebrate sampling at Delancey in 1999. All the screening criteria were met, and the sample was not processed. No prior data were available for the stream.

Basher Kill

Water quality was assessed as slightly impacted, based on 1999 invertebrate sampling at Cuddebackville. Nonpoint source nutrient enrichment was strongly indicated to be the primary source of impact. This site was similarly assessed in 1993 macroinvertebrate sampling.

Basket Creek

Non-impacted water quality is assessed for this tributary of the Delaware River, based on macroinvertebrate sampling above Basket in 1999. All the screening criteria were met, and the sample was not processed. No prior data were available for the stream. A similar sample was obtained from the East Branch of Basket Creek below Fernwood.

Baxter Brook

Water quality is assessed as non-impacted for this tributary of the East Branch Delaware River. A macroinvertebrate sample was taken in 1999 at Harvard. All the screening criteria were met, and the sample was not processed. No prior data were available for the stream.

Beaver Brook

Slightly impacted water quality is assessed for this Delaware River tributary, based on macroinvertebrate sampling at Minisink Ford in 1999. Mayflies were few, and diatoms were abundant on the rocks. A field assessment was made, and the sample was not processed. No prior data were available for the stream.

Beaver Kill

The Beaver Kill is currently assessed as non-impacted for all but the lower mile. In a 1993 macroinvertebrate survey, 8 sites were sampled from Lew Beach to Peakville, and all sites were assessed as non-impacted. The macroinvertebrate fauna was dominated by clean-water mayflies, stoneflies, and caddisflies. Four sites were re-sampled in 1999 and were similarly assessed as non-impacted. In 2000, a sample taken at East Branch just upstream of the confluence with the East Branch Delaware River yielded an assessment of slightly impacted. The fauna was dominated by clean-water species, but was unbalanced and low in diversity. ISD denoted siltation as the possible stressor. Further sampling at this site is recommended to determine if this assessment is genuine.

Benton Hollow Creek

Non-impacted water quality was assessed for this tributary of the Little Beaver Kill in a 1994 macroinvertebrate sampling near Parksville. The fauna was diverse and well-balanced. No prior data were available for the stream.

Betty Brook

Betty Brook is a tributary of the West Branch Delaware River. Non-impacted water quality was assessed for a site near South Kortright, based on 1999 invertebrate sampling. The fauna was diverse and well-balanced with many clean-water mayflies, stoneflies, and caddisflies.

Black Brook

Water quality is assessed as non-impacted for this tributary of the Mongaup River. In macroinvertebrate sampling near Fowlerville in 1999, all the screening criteria were met, and the sample was not processed. No prior data were available for the stream.

Buck Brook

Non-impacted water quality was assessed in 1999. for this tributary of North Branch Callicoon Creek. The fauna was diverse and well-balanced with many clean-water mayflies, stoneflies, and caddisflies. All the screening criteria were met, and the sample was not processed. No prior data were available for the stream.

Bush Kill (Sullivan County)

Water quality is assessed as non-impacted for this Neversink River tributary. In macroinvertebrate sampling near Oakland Valley in 1999, all the screening criteria were met, and the sample was not processed. No prior data were available for the stream.

Bush Kill (Delaware County)

Non-impacted water quality was assessed for a site sampled at Arkville in 2000. The fauna was diverse and well-balanced, and dominated by clean-water mayflies and caddisflies.

Cadosia Creek

Cadosia Creek is a tributary of the East Branch Delaware River. Water quality is assessed as non-impacted, based on macroinvertebrate sampling in Cadosia in 1994 and 1999. The 1994 sample was processed, the 1999 sample was field-assessed and not processed.

Calkins Creek

Non-impacted water quality was assessed for this Delaware River tributary, sampled at Milanville, Pennsylvania, in 1999. The fauna was diverse and well-balanced with many clean-water mayflies, stoneflies, and caddisflies. All the screening criteria were met, and the sample was not processed. No prior data were available for the stream.

Callicoon Creek

Water quality of Callicoon Creek at Callicoon has ranged from non-impacted to slightly impacted in the last ten years. The stream has been sampled at the Route 97 bridge and 0.1 mile below at County Route 133. These two locations have been considered as one site, since they are so close to one another and no discharges are known to exist between them. In 1999 and 2000, snails were the most numerous organism, but clean-water taxa such as mayflies, stoneflies, and caddisflies were also abundant. Impact Source Determination denoted siltation as a factor affecting the fauna. Effluents of two sewage treatment facilities enter Callicoon Creek upstream of both sites: Delaware (T) (Callicoon Sewer District) and Jeffersonville (V). The Delaware facility was upgraded in 1991, but it is not known if this is related to the impacts measured in 1993-94.

Non-impacted water quality was assessed for the North Branch of Callicoon Creek, based on macroinvertebrate sampling in 1999. Sites were sampled at North Branch and Hortonville. Both samples passed field screening criteria and were not laboratory-processed.

Non-impacted water quality was also assessed for the East Branch of Callicoon Creek, based on macroinvertebrate sampling in 1999. Sites were sampled at Kohlertown and Hortonville. Both samples passed field screening criteria and were not laboratory-processed.

Campbell Brook

Campbell Brook is a tributary of the East Branch Delaware River. Water quality is assessed as non-impacted, based on 1999 invertebrate sampling in Corbett. Clean-water mayflies, stoneflies, and caddisflies were numerous.

Clove Brook

Based on 1999 invertebrate sampling in Duttonville, New Jersey, water quality for this Delaware River tributary was assessed as slightly impacted. Filter-feeding caddisflies were dominant, but mayflies, stoneflies, and hellgrammites were present. ISD denoted nonpoint source nutrient enrichment as the likely stressor. No prior data were available for the stream.

Cold Spring Brook

Non-impacted water quality was assessed for this tributary of the West Branch Delaware River in 1999. The fauna was diverse and well-balanced with many clean-water mayflies, stoneflies, and caddisflies. All the screening criteria were met, and the sample was not processed. No prior data were available for the stream. A site on the East Branch of Cold Spring Brook at Hambletville was also assessed as non-impacted in 1999.

Darby Brook

Water quality was assessed as non-impacted in a macroinvertebrate sampling near the mouth in 2000. All metrics were within the range of the non-impacted category. Much of the stream was inundated with willow saplings, and the only open riffle that could be sampled was immediately upstream of the confluence with the Beaver Kill in Roscoe. The fauna included clean-water mayflies, stoneflies, and caddisflies.

Delaware River

Numerous sites have been sampled on the East and West Branches, as well as the mainstem of the Delaware River. Both branches have been surveyed at several locations above and below the reservoir on each branch (Pepacton Reservoir on the East Branch and Cannonsville Reservoir on the West Branch), and at Hancock, New York, immediately above their confluence.

Based on macroinvertebrate communities sampled in 2000, water quality in the West Branch Delaware River is currently assessed as non-impacted water from Stamford to Beerston (Figure 14-1). Assessments based on resident diatom communities differed substantially from macroinvertebrate assessments at most sites, and the combined assessment for these sites would be slightly impacted. Nonpoint nutrient enrichment was indicated as the major source of impact. Overall, the West Branch Delaware River is considered heavily enriched by nutrients, but still supportive of a healthy, productive invertebrate fauna. Prior sampling at Hobart and Beerston in 1999 documented non-impacted water quality, but Impact Source Determination showed highest similarities to communities affected by nonpoint source nutrient enrichment.

Downstream of Cannonsville Reservoir at Stilesville, water quality was assessed as moderately impacted in1999 macroinvertebrate sampling. The fauna was dominated by tolerant taxa such as black flies, midges, worms, and sowbugs. No mayflies, stoneflies, or caddisflies were present. Impact Source Determination denoted impoundment effect and possible sewage inputs as the primary factors affecting the fauna. These conditions may represent a modest improvement compared to 1986 findings of severe impact at this site. The cold-water hypolimnion release from Cannonsville Reservoir has been shown to disrupt the life cycles of mayflies, stoneflies, and caddisflies for a short distance downstream of the reservoir

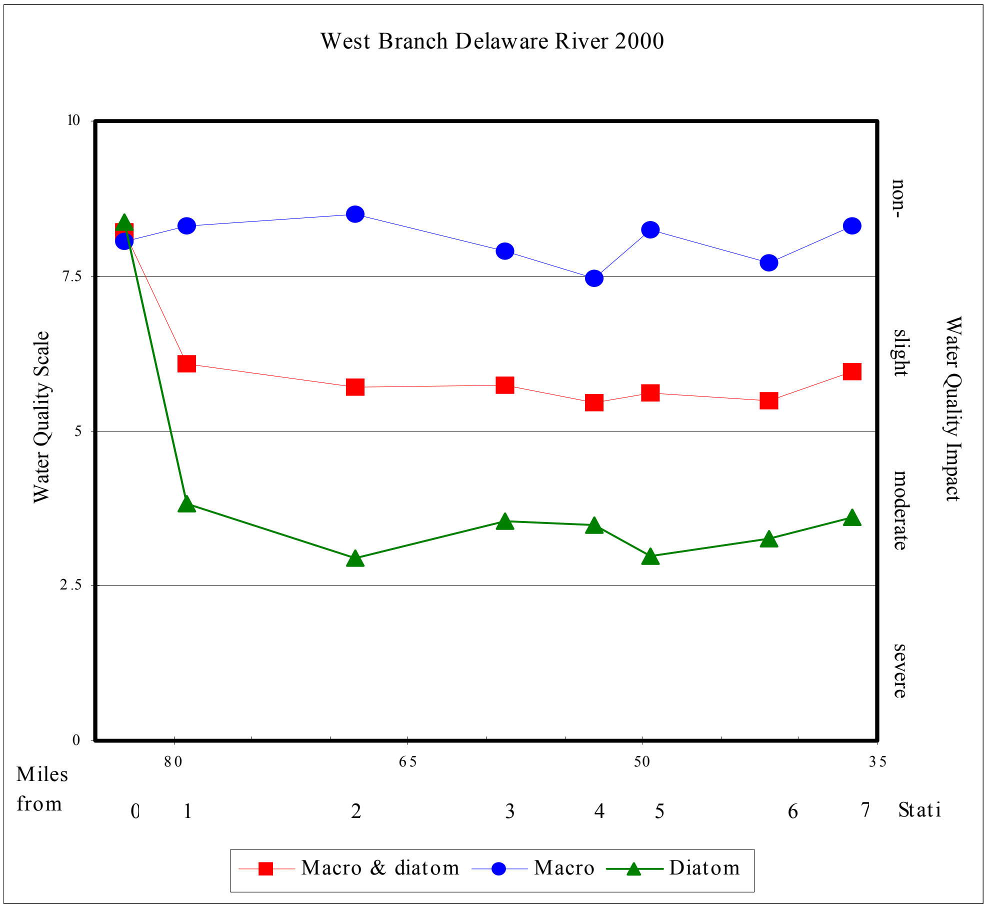


Figure 14-1. Water quality in the West Branch Delaware River, 2000, showing assessments of macroinvertebrates, diatoms, and combined assessments.

Non-impacted water quality was assessed for the West Branch Delaware River at Hancock, based on macroinvertebrate sampling in 1999 and 2000, similar to previous assessments at this site. Impact Source Determination showed highest similarities to natural communities.

Water quality in the East Branch Delaware River ranges from non-impacted to slightly impacted. Non-impacted water quality was assessed for the river at Kelly Corners, Margaretville, and Harvard, based on 1999 invertebrate sampling, and at Arkville in 2000 sampling. Nonpoint source nutrient enrichment was indicated to be a factor at the Kelly Corners site. Slight impact was documented in the East Branch Delaware River at Hancock in 2000. The fauna included tolerant worms and snails, and ISD denoted organic wastes and siltation as possible stressors. This represents an apparent decline, compared to non-impacted conditions documented for this site in 1974, 1981, and 1987, but needs to be confirmed. Sampling in 1993 and 1994 yielded ambiguous results.

In the main stem of the Delaware River, water quality ranges from non-impacted to slightly impacted. Non-impacted water quality was measured at Cochecton in macroinvertebrate samplings in 1993, 1994, and 1999. Water quality was also assessed as non-impacted at Minisink Ford in 1999 invertebrate sampling. This represents an apparent improvement compared to slightly impacted conditions documented in 1981. Effects of nonpoint source nutrient enrichment were also indicated as being present.

Slightly impacted water quality was assessed for the site at Pond Eddy, based on 1999 invertebrate sampling. The results of the Impact Source Determination analysis did not clearly indicate the cause of impact. Water quality appears similar to that measured in 1981. Slightly impacted water quality was also assessed for the site at Port Jervis, based on macroinvertebrate sampling in 1993, 1999, and 2000, representing an apparent decline compared to the 1988 assessment. A 1994 sample showed non-impacted water quality, although a species of snail dominated the fauna. Impact Source Determination was unclear about the cause of impact; but decomposable wastes may be present. Tolerant snails dominated the fauna of the 1999 sample and facultative midges dominated the 2000 sample, although clean-water mayflies, stoneflies, and caddisflies were also present in both communities.

Downs Brook

Non-impacted water quality is assessed for this tributary of the East Branch Delaware River. A site at Downsville was sampled for macroinvertebrates in 1999. The sample was field-assessed as passing screening criteria, and was not laboratory-processed. No prior data were available for the stream. Abundant periphyton at this site indicates likely nutrient enrichment.

Dryden Brook

Water quality in Dryden Brook is assessed as non-impacted. A site near Finch Hollow, approximately 0.1 mile above the stream's mouth at Cannonsville Reservoir, was sampled for macroinvertebrates in 1999. The sample was field-assessed as passing screening criteria, and was not laboratory-processed. No prior data were available for the stream.

East Brook

Non-impacted water quality is assessed for this tributary of the West Branch Delaware River. A site at Walton was sampled for macroinvertebrates in 2002. The sample was field-assessed as passing screening criteria, and was not laboratory-processed. No prior data were available for the stream.

Elk Creek

Elk Creek is a tributary of the West Branch Delaware River. Water quality at East Delhi was assessed as slightly impacted, based on 1999 invertebrate sampling. Impact Source Determination denoted that the fauna was most similar to natural communities, with possible nutrient enrichment.

Fall Brook

This tributary of the West Branch Neversink River is assessed as non-impacted, based on macroinvertebrate sampling in 1999. The watershed appeared entirely forested. The sample was field-assessed as passing screening criteria, and was not laboratory-processed. No prior data were available for the stream.

Fall Clove Stream

This small tributary of the Pepacton Reservoir at Fall Clove is assessed as non-impacted, based on macroinvertebrate sampling in 1999. The sample was field-assessed as passing screening criteria, and was not laboratory-processed. No prior data were available for the stream.

Falls Creek

Non-impacted water quality was assessed for this tributary of the West Branch Delaware River, based on 1999 invertebrate sampling near East Delhi. Clean-water mayflies, stoneflies, and caddisflies were numerous.

Fish Cabin Creek

This small tributary of the Delaware River was assessed as non-impacted in macroinvertebrate sampling at Pond Eddy in 1999. The sample was field-assessed as passing screening criteria, and was not laboratory-processed. No prior data were available for the stream.

Fly Creek

Water quality is assessed as non-impacted for this tributary of Oquaga Creek, sampled at McClure in 1999. The sample was field-assessed as passing screening criteria, and was not laboratory-processed. No prior data were available for the stream.

Fowlwood Brook

Non-impacted water quality is assessed for this tributary of the Neversink River, sampled at Glen Wild in 1999. The sample was field-assessed as passing screening criteria, and was not laboratory-processed. No prior data were available for the stream.

Gold Creek

Gold Creek is a tributary of the lower Neversink River. Water quality is assessed as moderately impacted, based on 1999 invertebrate sampling near Port Jervis. Most species present were facultative or tolerant, and diversity was low. Impact Source Determination denoted complex sources, likely sewage and industrial wastes.

Gumaer Brook

Water quality is assessed as non-impacted for this tributary of the Basher Kill, sampled near Wurtsboro in 1999. The sample was field-assessed as passing screening criteria, and was not laboratory-processed. No prior data were available for the stream.

Halfway Brook

Slightly impacted water quality is assessed for this tributary of the Delaware River, sampled at Barryville in 1999. The sample was field-assessed, and was not laboratory-processed. No prior data were available for the stream. Abundant periphyton was noted at this site, indicating likely elevated nutrient levels.

Hankins Creek

Water quality is assessed as non-impacted for this tributary of the Delaware River, sampled near Hankins in 1999. The sample was field-assessed as passing screening criteria, and was not laboratory-processed. No prior data were available for the stream.

Jaketown Creek

Based on 1999 invertebrate sampling near Kenoza Lake, water quality was assessed as slightly impacted, near the low end of that category. Midges dominated the fauna. The impact may represent impoundment effects from Hunter Lake, less than one mile upstream.

Judson Creek

Moderate impact was assessed for this stream in the hamlet of Kauneoga Lake, based on 1999 invertebrate sampling. Facultative and tolerant midges dominated the fauna, and clean-water mayflies were absent. Impact Source Determination denoted toxicity as the primary factor affecting the fauna, although the source is unknown.

Kiamesha Creek

Water quality is assessed as non-impacted for Kiamesha Creek, sampled near Thompsonville in 1999. The sample was field-assessed as passing screening criteria, and was not laboratory-processed. No prior data were available for the stream. A sample taken at an upstream site near the golf course was considered invalidated by a pond upstream.

Kinne Brook

Non-impacted water quality is assessed for this tributary of Swinging Bridge Reservoir. A site south of Mongaup Valley was sampled for macroinvertebrates in 1999. The sample was field-assessed as passing screening criteria, and was not laboratory-processed. No prior data were available for the stream.

Lackawaxen River

Water quality is assessed as non-impacted for the Lackawaxen River, sampled in 1999 near Lackawaxen, Pennsylvania, just upstream of its confluence with the Delaware River. The sample was field-assessed as passing screening criteria, and was not laboratory-processed. No prior data were available for the stream.

Lake Brook

Non-impacted water quality was assessed for this tributary of the West Branch Delaware River, based on 1999 macroinvertebrate sampling near Hobart. Clean-water mayflies and caddisflies were numerous. Impact Source Determination did, however denote slight effects of nonpoint source nutrient enrichment. No prior data were available for the stream.

Lily Pond Outlet

Slightly impacted water quality was assessed for this tributary of the Little Beaver Kill in a 1994 macroinvertebrate sampling. The fauna was diverse at this site, but was likely limited by habitat and impoundment effect.

Little Beaver Kill

Water quality in most of the Little Beaver Kill is assessed as non-impacted, based on a 1994 macroinvertebrate survey of 5 sites from Cooley to Livingston Manor. Short reaches of slight impact were indicated at Cooley (impoundment effects) and below Parksville (nutrient enrichment). All sites contained diverse communities of clean-water mayflies, stoneflies, and caddisflies.

Little Delaware River

Water quality was assessed as non-impacted for this stream, sampled at Thompson Cross Road bridge in Delhi in 1993. The fauna was dominated by clean-water mayflies. A site opposite the golf course, just upstream of the confluence with the Delaware River, was also assessed as non-impacted.

Loomis Brook

Non-impacted water quality was assessed for this tributary of Cannonsville Reservoir, based on macroinvertebrate sampling near Loomis in 1998 and 1999. The 1999 sample was field-assessed as passing screening criteria, and was not laboratory-processed.

Marsh Creek

Water quality is assessed as non-impacted for this tributary of Oquaga Creek, sampled at McClure in 1999. The sample was field-assessed as passing screening criteria, and was not laboratory-processed. No prior data were available for the stream.

Melbern Lake Outlet

Non-impacted water quality was assessed for this tributary of the Little Beaver Kill in a 1994 macroinvertebrate sampling. The fauna was diverse and well-balanced. No prior data were available for the stream.

Mill Brook (Sullivan County)

Water quality is assessed as non-impacted for this tributary of the Delaware River, sampled at Pond Eddy in 1999. The sample was field-assessed as passing screening criteria, and was not laboratory-processed. No prior data were available for the stream.

Mill Brook (Delaware County)

This tributary of the Pepacton Reservoir was assessed as non-impacted in 1999. The watershed appeared entirely forested. The sample was field-assessed as passing screening criteria, and was not laboratory-processed. No prior data were available for the stream.

Mongaup Creek

Water quality is assessed as non-impacted for this tributary of Willowemoc Creek, sampled at Debruce in 1999. The watershed appeared entirely forested. The sample was field-assessed as passing screening criteria, and was not laboratory-processed. No prior data were available for the stream.

Mongaup River

Non-impacted water quality is assessed for the Mongaup River, based on sampling at Mongaup Valley and Mongaup. The Mongaup Valley site was sampled for macroinvertebrates in 1999 and was assessed as non-impacted.. Impact Source Determination showed high similarities to natural communities and to communities affected by nonpoint source nutrient enrichment. Excellent water quality was assessed for the Mongaup River at Mongaup, sampled above the Route 97 bridge in 1993. All metrics were within the range of non-impacted water quality.

Water quality in the West Branch Mongaup River ranges from non-impacted to moderately impacted, based on resident macroinvertebrate communities sampled at 5 sites in 2000. Upstream impact at Swan Lake apparently results from natural effects of the Swan Lake outlet, and possibly from the Liberty (T) Swan Lake wastewater treatment plant discharge. Water quality showed slight impact downstream of the Bethel Landfill, but recovered quickly downstream. The influence of the Bethel Landfill is considered to extend no more than 0.5 miles.

Non-impacted water quality is assessed for the East Branch and Middle Branch of the Mongaup River, based on sampling at Harris and Bushville in 1999. These sites had diverse faunas of clean-water mayflies, stoneflies, and caddisflies. The samples were field-assessed as passing screening criteria, and were not laboratory-processed. No prior data were available for these streams.

Neversink River

The East Branch of the Upper Neversink River is currently assessed as slightly impacted by acidity. Sites at Denning and below Ladleton were sampled in 1999, and a site at Claryville above the confluence with the West Branch was sampled in 1998 and 1999. Macroinvertebrate communities at these sites were characterized by low species richness; in particular, mayfly richness was very low. Diatom indices from the East Branch show moderate acidity effects.

The West Branch of the Upper Neversink River is currently assessed as non-impacted, based on macroinvertebrate sampling conducted near Frost Valley and at Claryville in 1999. This reach was previously assessed as slightly impacted. Further sampling is planned for 2003 to determine if this improvement is a genuine trend.

An invertebrate sample collected in 1999 from the Upper Neversink River at Claryville downstream of the confluence of the East and West branches showed non-impacted water quality. For this sample, the Percent Model Affinity was set aside as an outlier, since high numbers of *Brachycentrus* caddisflies skewed this metric. These caddisflies are clean-water organisms and are occasionally found in abundance in optimal situations. The site was sampled again in 2000, and clearly denoted non-impacted conditions.

Non-impacted water quality is assessed from Woodbourne to Port Jervis in the Lower Neversink River. The Woodbourne was sampled in 1999 and was assessed as non-impacted. Impact Source Determination showed highest similarities to natural communities. This site was previously assessed as slightly impacted in 1993-94, but had been assessed as non-impacted in 1987. Sites at Bridgeville, Oakland Valley, Godeffroy, and Port Jervis were assessed as non-impacted in 1999 sampling. These samples were field-assessed as passing screening criteria, and were not laboratory-processed. The Port Jervis site was sampled again in 2000, and the laboratory-processed sampled confirmed non-impacted water quality. The macroinvertebrate community was very diverse and well-balanced.

Oquaga Creek

Water quality is assessed as non-impacted for Oquaga Creek, based on macroinvertebrate samplings at Sanford and Deposit. Both sites were field-assessed as non-impacted in 1999, and the samples were not processed. The Deposit site was sampled in 1994 and 2000, and these laboratory-processed samples were clearly non-impacted, based on all metrics. Macroinvertebrate communities were dominated by clean-water mayflies.

Pea Brook

Non-impacted water quality is assessed for this Delaware River tributary, based on macroinvertebrate sampling at Long Eddy in 1999. The sample was field-assessed as passing screening criteria, and was not laboratory-processed. No prior data were available for the stream.

Peaks Brook

Water quality was assessed as non-impacted for this small tributary of the West Branch Delaware River, based on macroinvertebrate sampling near Fraser in 1999. The sample was field-assessed as passing screening criteria, and was not laboratory-processed. No prior data were available for the stream.

Pine Kill

This tributary of the Basher Kill is assessed as non-impacted, based on 1999 sampling at Westbrookville. The sample was field-assessed as passing screening criteria, and was not laboratory-processed. No prior data were available for the stream.

Platner Brook

Water quality was assessed as non-impacted for this small tributary of the West Branch Delaware River, based on macroinvertebrate sampling near Fraser in 1999. The substrate was mostly bedrock, but the sample was taken in pockets of rubble. The sample was field-assessed as passing screening criteria, and was not laboratory-processed. No prior data were available for the stream.

Read Creek

Non-impacted water quality was assessed for this tributary of the East Branch Delaware River in 1999 sampling. The watershed appeared mostly forested. The sample was field-assessed as passing screening criteria, and was not laboratory-processed. No prior data were available for the stream.

Roods Creek

This small tributary of the West Branch Delaware River was assessed as non-impacted in macroinvertebrate sampling east of Hale Eddy in 1999.   The sample was field-assessed as passing screening criteria, and was not laboratory-processed. No prior data were available for the stream.

Rose Brook

Non-impacted water quality was assessed for a site near South Kortright, based on 1999 macroinvertebrate sampling. Impact Source Determination showed highest similarities to natural communities, but also indicated possible siltation effects.

Russell Brook

Water quality was assessed as non-impacted for this tributary of the Beaver Kill in macroinvertebrate sampling near Butternut Grove in 1999. The sample was field-assessed as passing screening criteria, and was not laboratory-processed. No prior data were available for the stream.

Sands Creek

Non-impacted water quality is assessed for this tributary of the West Branch Delaware River. A site at Hancock was sampled for macroinvertebrates in 1999. The stream showed some signs of nutrient enrichment and siltation, but the fauna appeared diverse. The sample was field-assessed as passing screening criteria, and was not laboratory-processed. No prior data were available for the stream.

Sheldrake Stream

Non-impacted water quality was assessed for this Neversink River tributary, based on 1999 invertebrate sampling at Thompsonville. Impact Source Determination showed high similarities to natural communities but also to communities affected by nonpoint source nutrient enrichment. Caddisflies and midges were very numerous at this site.

Shingle Kill

Water quality was assessed as non-impacted for this tributary of the Delaware River in macroinvertebrate sampling near Sparrow Bush in 1999. The sample was field-assessed as passing screening criteria, and was not laboratory-processed. No prior data were available for the stream.

Shohola Creek

Slightly impacted water quality is provisionally assessed for this Pennsylvania tributary of the West Branch Delaware River. A site at Shohola, Pennsylvania, was sampled for macroinvertebrates in 1999. The stream had abundant diatoms, but the fauna appeared diverse. The sample was field-assessed, and was not laboratory-processed. No prior data were available for the stream.

Sprague Brook

Water quality is assessed as non-impacted for this tributary of Willowemoc Creek. A site west of Parkston was sampled for macroinvertebrates in 1999. The stream showed some signs of nutrient enrichment and siltation, but the fauna appeared diverse. The sample was field-assessed as passing screening criteria, and was not laboratory-processed. No prior data were available for the stream.

Spring Brook

Non-impacted water quality was assessed for this small tributary of the Beaver Kill in 1999 sampling north of Rockland. The sample was field-assessed as passing screening criteria, and was not laboratory-processed. No prior data were available for the stream.

Steele Creek

Water quality was assessed as non-impacted for this tributary of the West Branch Delaware River, based on 1999 invertebrate sampling in Delhi. The fauna was dominated by clean-water mayflies, stoneflies, and caddisflies, and Impact Source Determination showed highest similarities to natural communities.
No prior data were available for the stream.

Ten Mile River

This stream arises from two ponds, and flows for about three miles into the Delaware River. Water quality is provisionally assessed as slightly impacted for the stream, based on macroinvertebrate sampling at 3 sites from Lava to Tusten in 1999. The watershed appeared mostly forested, but the fauna may be limited by both impoundment effects and headwater effects. The samples were field-assessed, and were not laboratory-processed. No prior data were available for the stream.

Terry Clove Brook

Non-impacted water quality was assessed for this small tributary of the Pepacton Reservoir in 1999 sampling at Coles Clove. The sample was field-assessed as passing screening criteria, and was not laboratory-processed. No prior data were available for the stream.

Third Brook

Water quality is assessed as non-impacted for this small tributary of the West Branch Delaware River, based on macroinvertebrate sampling at Walton in 1999. The sample was field-assessed as passing screening criteria, and was not laboratory-processed. No prior data were available for the stream.

Town Brook

Non-impacted water quality was assessed for this stream at Hobart, based on macroinvertebrate sampling in 1999. The stream had abundant periphyton growth, indicating nutrient enrichment, but the macroinvertebrate fauna was very diverse, with very high metric levels. No prior data were available for the stream.

Tremper Kill

Water quality is assessed as non-impacted for this tributary of the Pepacton Reservoir, based on macroinvertebrate sampling at Bussey Hollow in 1999. The sample was field-assessed as passing screening criteria, and was not laboratory-processed. No prior data were available for the stream.

Trout Brook

Water quality of this Beaver Kill tributary at Peakville was assessed as non-impacted, based on 1999 invertebrate sampling. Impact Source Determination showed highest similarities to natural communities.

Trout Brook

This tributary of the East Branch Delaware River was assessed as non-impacted in 1999 sampling at Shinhopple. The sample was field-assessed as passing screening criteria, and was not laboratory-processed. No prior data were available for the stream.

Trout Creek

Water quality of Trout Creek was assessed as non-impacted, based on macroinvertebrate sampling in the village of Trout Creek in 1998 and 1999. Impact Source Determination showed highest similarities to natural communities. However, organisms collected from this site in 1998 (stoneflies, hellgrammites, and dragonflies) carried elevated body burdens of dioxins. A site on the East Branch of Trout Creek was also assessed as non-impacted in 1998 sampling. All metrics were within the range of non-impacted water quality.

Vly Creek

Water quality in this stream ranged from non-impacted to moderately impacted, as documented in a 1995 sampling of 5 sites from above Lake Switzerland to Fleischmanns. The principal impact was impoundment effect from Lake Switzerland. Macroinvertebrate communities recovered in approximately 0.4 miles. Elevated chlorine levels were measured immediately downstream of Lake Switzerland in the 1995 study. These were considered to have no substantial impact on the resident biota. Water quality at the most downstream site above the confluence with the Bush Kill was assessed as non-impacted.

West Brook

Non-impacted water quality was assessed for two sites above and below Walton, based on 1999 invertebrate sampling. Impact Source Determination showed highest similarities to natural communities. The fauna was diverse and well-balanced, with many clean-water mayflies, stoneflies, and caddisflies.

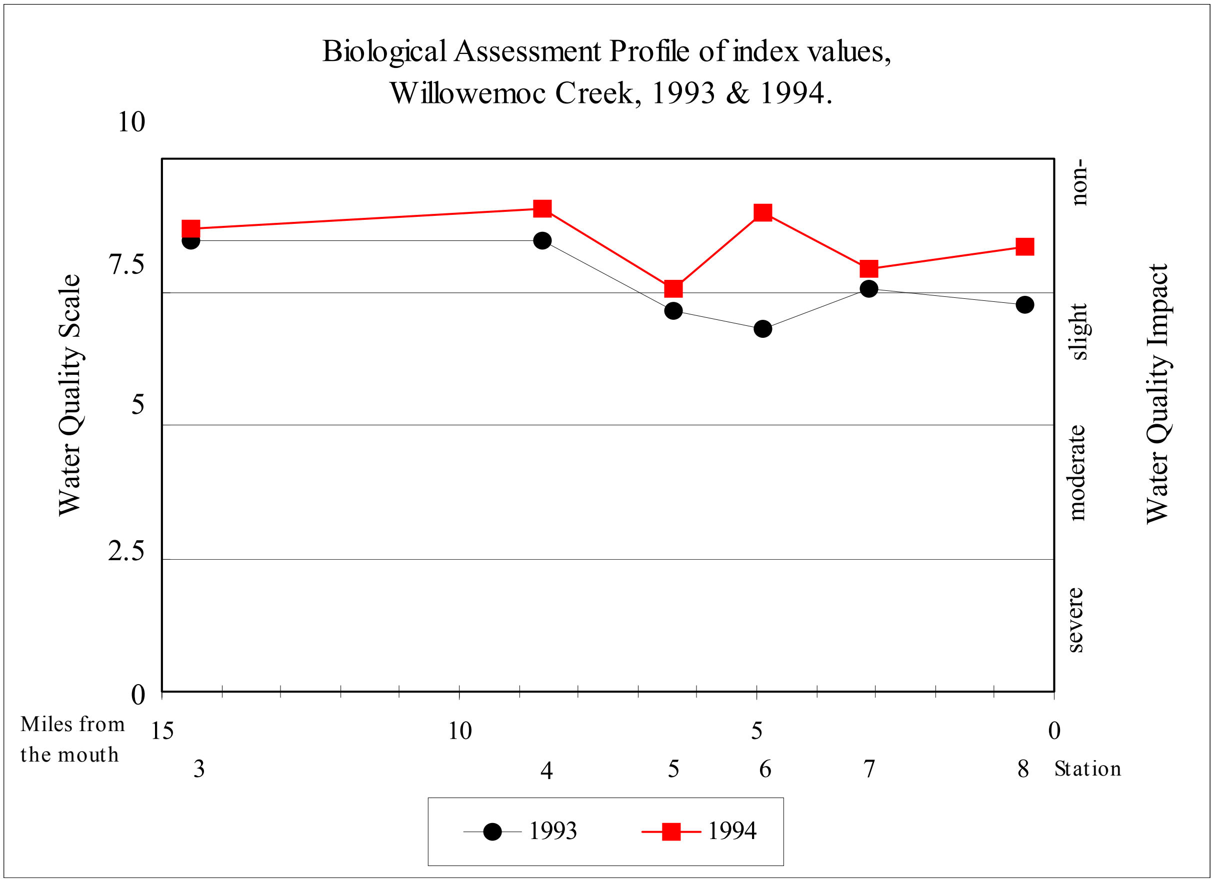


Figure 14-2. Water quality in Willowemoc Creek from Debruce to Roscoe, 1993 and 1994.

<u>White Lake Brook</u>

This stream is a tributary of Swinging Bridge Reservoir. Water quality at Smallwood was assessed as slightly impacted for this site, based on 1999 invertebrate sampling. Caddisflies dominated the sample, apparently reflecting impoundment effects.

<u>Willowemoc Creek</u>

Willowemoc Creek is currently assessed as non-impacted for its entire length, based on macroinvertebrate sampling from Debruce to Roscoe in 1993 and 1994. The 1993 sampling found a reach of slight impact downstream of Livingston Manor (Figure 14-2), apparently attributable to a lapse in treatment at the Rockland (T) Livingston Manor Wastewater Treatment Plant. Sampling below Livingston Manor in 1994 documented a faunal reduction, but indices were within the range of non-impacted conditions. It was postulated that during low-flow years the discharge could result in slight impact, but re-sampling of this site in 1999, a low-flow summer, documented non-impacted conditions.

<u>Wright Brook</u>

Non-impacted water quality was assessed for a site in Bloomville, based on 1999 invertebrate sampling. Impact Source Determination showed highest similarities to natural communities. The fauna was diverse and well-balanced, with many clean-water mayflies, stoneflies, and caddisflies.

Wynkoop Brook

This tributary of the Neversink River was assessed as non-impacted in 1999 sampling at Hasbrouk. The sample was field-assessed as passing screening criteria, and was not laboratory-processed. No prior data were available for the stream.

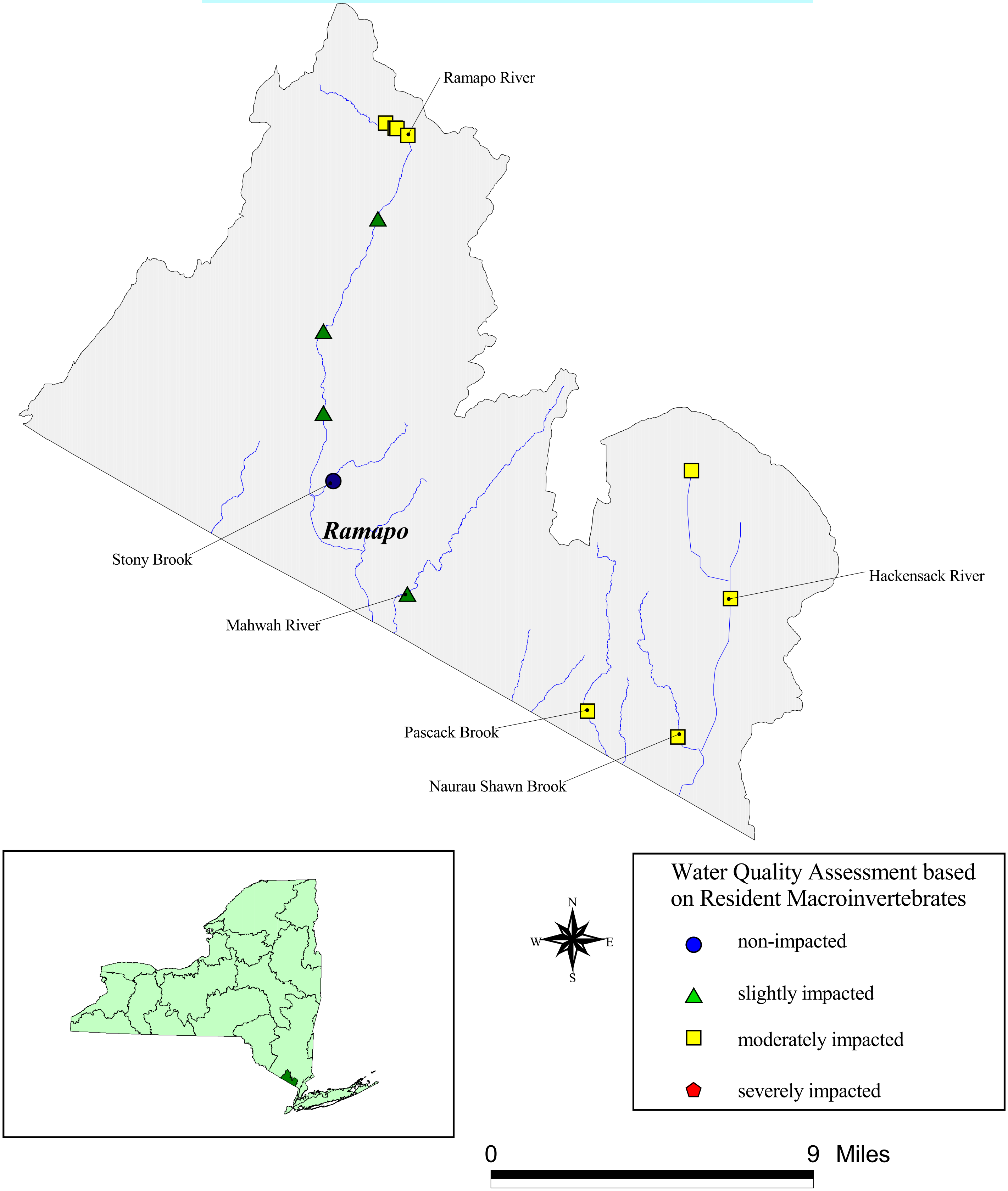
Unnamed West Branch Delaware River tributary (Shaw Road)

This small stream was sampled annually for macroinvertebrates from 1996 to 2000, serving as a control site in an ongoing nonpoint source study. Water quality was non-impacted from 1996 to 1998, but was slightly impacted in 1999 and 2000, for unknown reasons. Further sampling is planned for the site in 2003.

Unnamed Wright Brook tributary , Bloomville

This small stream, located directly downstream of the Robertson Farm, was sampled annually for macroinvertebrates from 1996 to 2000 as part of an ongoing nonpoint source study . Replicated sampling showed moderate impacts from farm runoff in 1996. As best management practices were implemented, water quality improved linearly to 1999, when it was assessed as slightly impacted. Many clean-water species of mayflies and stoneflies appeared in the stream over this time period. Sampling in 2000 documented a return to moderate impact, apparently responding to a new source of cattle wastes. Continued sampling at this site is planned to further monitor improved water quality.

Passaic - Newark Drainage Basin



PASSAIC - NEWARK DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED					
HACKENSACK RIVER (HACK)							
01	West Nyack, above CR 15 bridge						02
HACKENSACK RIVER, WEST BRANCH (HACK)							
02	Centenary, below Old State Rte 304 bridge						02
MAHWAH RIVER (MAWA)							
01	Antrim, above Montebello Rd. bridge						02
NAURAUSHAUN BROOK (NAUR)							
01	Nauraushaun, below Sickletown Rd. bridge						02
PASCACK BROOK (PASC)							
01	Pearl River, above West Washington St. bridge						02
RAMAPO RIVER (RAMA)							
00	Harriman/Monroe Park, at River Rd. bridge		91	93		98	
01	Harriman, above Rte 17 bridge	86					
02	Harriman, below Rte 17 bridge	86	91	93			
03	Harriman, Nepera Rd. bridge	86	91	93		98	
04	Arden, Rte 17	86	91	93		98	
05	Below Southfields, Rte 210 bridge	86	91	93			
06	Tuxedo Park, East Village Rd.	86	91	93		98	
07	Hillburn, 4th St. bridge		91	93	97	98	02
SADDLE RIVER (SADL)							
01	Upper Saddle River, NJ, above Lake Rd bridge						02
STONY BROOK (STOB)							
01	Sloatsburg, above Seven Lakes Rd bridge						02

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE PASSAIC - NEWARK DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Hackensack River, West Nyack	moderately impacted	no prior data
Hackensack River, West Branch, Centenary	moderately impacted	no prior data
Mahwah River, Antrim	slightly impacted	no prior data
Nauraushaun Brook, Nauraushaun	moderately impacted	no prior data
Pascack Brook, Pearl River	moderately impacted	no prior data
Ramapo River, Harriman, below River Rd.	moderately impacted	no change
Ramapo River, Harriman, downstream of Rte 17	moderately impacted	**IMPROVED**
Ramapo River, Harriman, at Nepera plant bridge	moderately impacted	**IMPROVED**
Ramapo River, Arden	slightly impacted	**IMPROVED**
Ramapo River, Southfields	slightly impacted	no change
Ramapo River, Tuxedo Park	slightly impacted	no change
Ramapo River, Hillburn	slightly impacted	no change
Saddle River, Upper Saddle River, NJ	slightly impacted	no prior data
Stony Brook, Sloatsburg	non-impacted	no prior data

REPORTS OF MACROINVERTEBRATE SURVEYS WITHIN THE PASSAIC - NEWARK WATERSHED

STREAM	YEAR OF SURVEY	REPORT
Ramapo River	1973	AVON
Ramapo River	1986	SBU,1986
Ramapo River	1991	SBU,1991
Ramapo River	1993	SBU,1993
Ramapo River	1998	SBU,1998
Watershed Streams	1991-1992	RIBS,1994

AVON	Avon Pollution Investigations Unit, Div. of Fish & Wildlife, NYS DEC
DOH	New York State Department of Health
RIBS	Rotating Intensive Basin System, Statewide Waters Assessment Section, NYS DEC
SBU	Stream Biomonitoring Unit, Division of Water, NYS DEC

Hackensack River

Moderately impacted water quality is assessed for the Hackensack River and West Branch Hackensack River. Sites at West Nyack and Centenary were sampled for macroinvertebrates in 2002. Macroinvertebrate communities were dominated by facultative caddisflies and midges at both sites. ISD denoted municipal/industrial inputs as the primary stressor. No prior data were available for the river.

Mahwah River

Water quality is assessed as slightly impacted for the Mahwah River, based on macroinvertebrate sampling in Antrim in 2002. The fauna was dominated by facultative midges, although hellgrammites were also numerous. ISD denoted nonpoint source nutrient enrichment as the primary stressor. Specific conductance was 1035 μmhos/cm at this site, likely reflecting urban runoff. No prior data were available for the stream.

Nauraushaun Brook

Moderately impacted water quality is assessed for Nauraushaun Brook, based on macroinvertebrate sampling in 2002. The fauna was heavily dominated by facultative caddisflies and midges. ISD denoted nonpoint source nutrient enrichment as the primary stressor. No prior data were available for the stream.

Pascack Brook

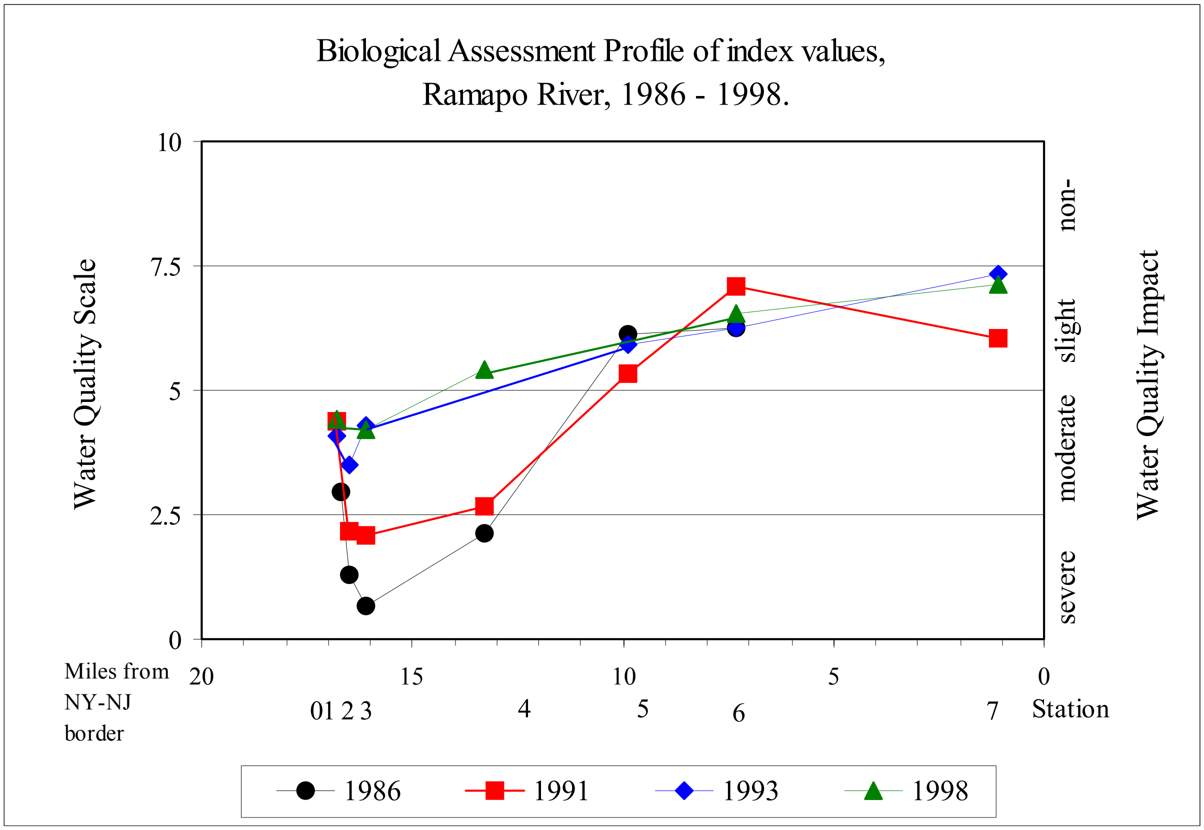
Water quality is assessed as moderately impacted for this small stream, likely by municipal/industrial inputs. A site at Pearl River was sampled for macroinvertebrates in 2002. The fauna was heavily dominated by facultative filter-feeding caddisflies, and species richness was low. No prior data were available for the stream.

Ramapo River

Water quality in the Ramapo River ranges from moderately impacted at the Harriman sites to slightly impacted downstream to Hillburn, representing substantial improvement compared to severe impact documented in 1986 and 1991 (Figure 15-1). The Orange County Sewer District # 1 treatment facility was upgraded in 1987, but was not operating within permit limits until 1992, and severe impact persisted. The macroinvertebrate survey of 1993 documented substantial improvements at Harriman and Arden. The plant discharge currently has a very minor and short-lived impact on the river's water quality. Upstream of Harriman, the river continues to be moderately impacted, likely by urban runoff from Monroe. Downstream of Harriman, water quality in the river improves steadily downstream to Hillburn. Macroinvertebrate sampling conducted from Harriman to Hillburn in 1998 indicated that water quality was very similar to that documented in 1993. The Hillburn site was also sampled in 1997 and 2002 and was similarly assessed as slightly impacted.

Saddle River

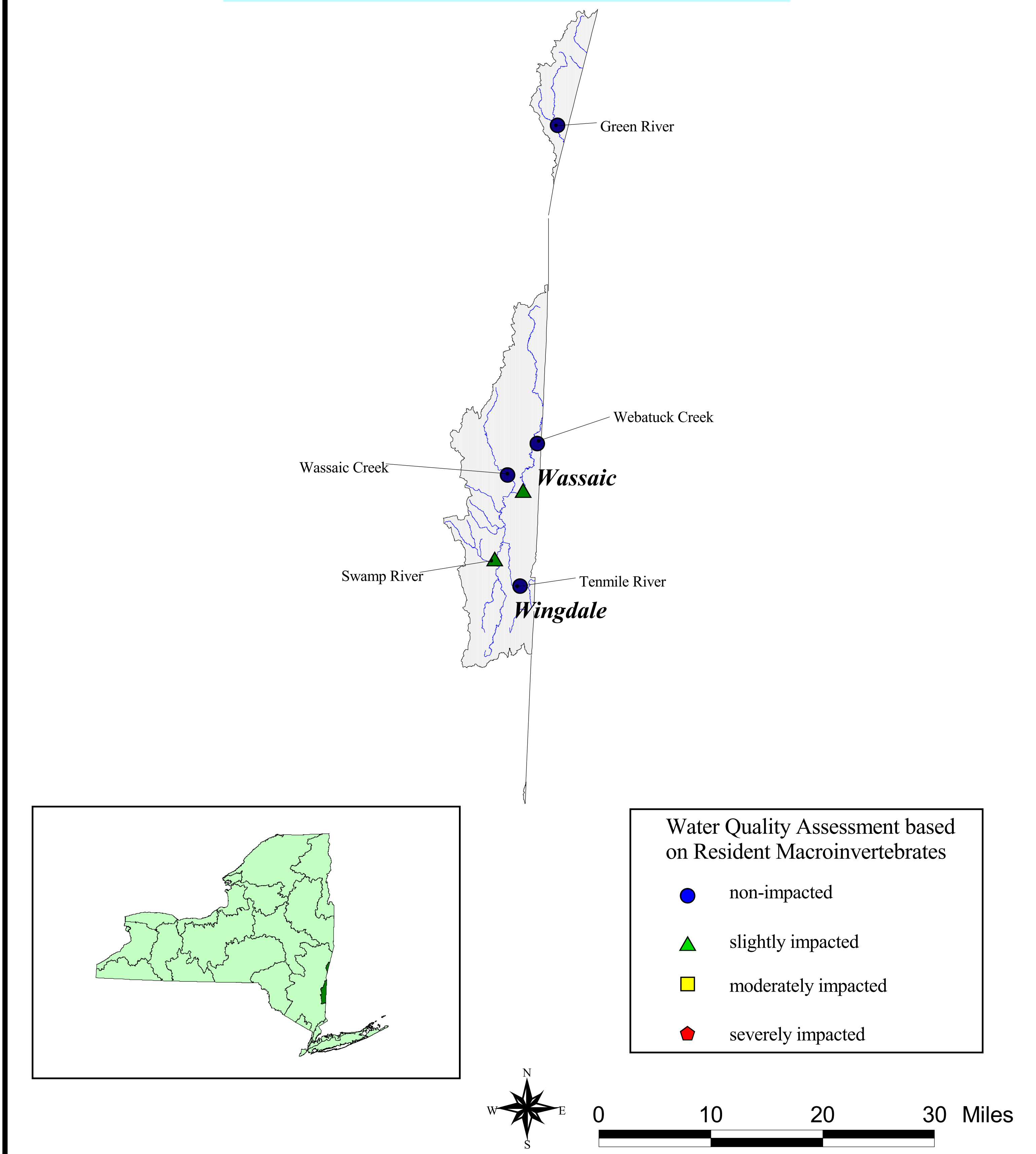
Slightly impacted water quality is assessed for the Saddle River, based on macroinvertebrate sampling in 2002 at Upper Saddle River, New Jersey. The fauna was heavily dominated by facultative filter-feeding midges and caddisflies, and municipal/industrial inputs were denoted to be the primary stressor. No prior data were available for the stream.



Stony Brook

Non-impacted water quality was assessed for this stream, based on macroinvertebrate sampling in Sloatsburg in 2002. The fauna was heavily dominated by clean-water mayflies, with stoneflies, caddisflies, and dragonflies also present. No prior data were available for the stream.

Housatonic River Drainage Basin



HOUSATONIC RIVER DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED	
GREEN RIVER (GREE)			
01	Green River, below Rte 71 bridge		02
MILL RIVER (MLLR)			
01	Dover Furnace, below Rte 26 bridge		02
SWAMP RIVER (SWMP)			
01	Dover Plains, Route 6	92	02
TENMILE RIVER (TEN)			
01	Below Wassaic, Sinpatch Road bridge	92	
02	Dover Plains, Main Street	92	
03	Below Dover Plains, Lime Kiln Road	92	
04	Above South Dover, single lane bridge	92	
05	Webatuck, Lake Ellis Road	92	02
WASSAIC CREEK (WASS)			
01	Wassaic, above Rte 81		02
WEBATUCK CREEK (WEBA)			
01	Leedsville, Amenia Union Road	92	02
04	Wassaic, above Sinpatch Rd bridge		02

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE HOUSATONIC RIVER DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Green River, Green River	non-impacted	no prior data
Mill River, Dover Furnace	[unassessed]	no prior data
Swamp River, Dover Plains	slightly impacted	**DECLINED**
Tenmile River, Webatuck	non-impacted	no change
Wassaic Creek, Wassaic	non-impacted	no prior data
Webatuck Creek, Leedsville	non-impacted	no change
Webatuck Creek, Wassaic	slightly impacted	no prior data

REPORTS OF MACROINVERTEBRATE SURVEYS WITHIN THE HOUSATONIC RIVER WATERSHED

STREAM	YEAR OF SURVEY	REPORT
Housatonic River		MWRC,1974
Tenmile River Basin	1984	MDEQ,1984
Tenmile River	1992	SBU,1993
Watershed Streams	1991-1992	RIBS,1994

AVON	Avon Pollution Investigations Unit, Div. of Fish & Wildlife, NYS DEC
DOH	New York State Department of Health
MDEQ	Massachusetts Department of Environmental Quality
MWRC	Massachusetts Water Resources Commission
RIBS	Rotating Intensive Basin System, Statewide Waters Assessment Section, NYS DEC
SBU	Stream Biomonitoring Unit, Division of Water, NYS DEC

Green River

Water quality was assessed as non-impacted for this tributary of the Housatonic River, based on macroinvertebrate sampling near the village of Green River in 2002. The site was field-assessed, and the sample has not yet been processed. No prior data were available for the stream.

Mill River

This stream was first sampled in 2002 in Dover Furnace. As determined by the fauna and confirmed by a local resident, the stream flow is intermittent, carrying water only after significant rainfall. However, in the interest of determining what types of organisms inhabited such a stream, the sample was processed. The fauna was heavily dominated by two species of aquatic worms. Other organisms included riffle beetles, stoneflies, midges, and aquatic millipedes. Because of the extreme intermittent flow in the stream, water quality was not assessed, and the site is dropped from further monitoring.

Swamp River

The Swamp River was sampled for macroinvertebrates in Dover Plains in 2002 above Route 6. The substrate habitat was good, although diatoms, macrophytes, and filamentous algae were abundant. The macroinvertebrate fauna was dominated by filter-feeding midges and algal-feeding riffle beetles. Nonpoint source nutrient enrichment was clearly indicated. Water quality was assessed as slightly impacted, indicating a decline compared to conditions documented at this site in 1992. Furthering sampling is recommended to monitor this trend.

Tenmile River

Non-impacted water quality was assessed for the Tenmile River, based on macroinvertebrate sampling in 2002 in Webatuck at the most downstream site. The fauna was well-balanced and carried a diverse assemblage of clean-water mayflies, stoneflies, caddisflies, and hellgrammites. Conditions were similar to those documented for the site in 1992.

Wassaic Creek

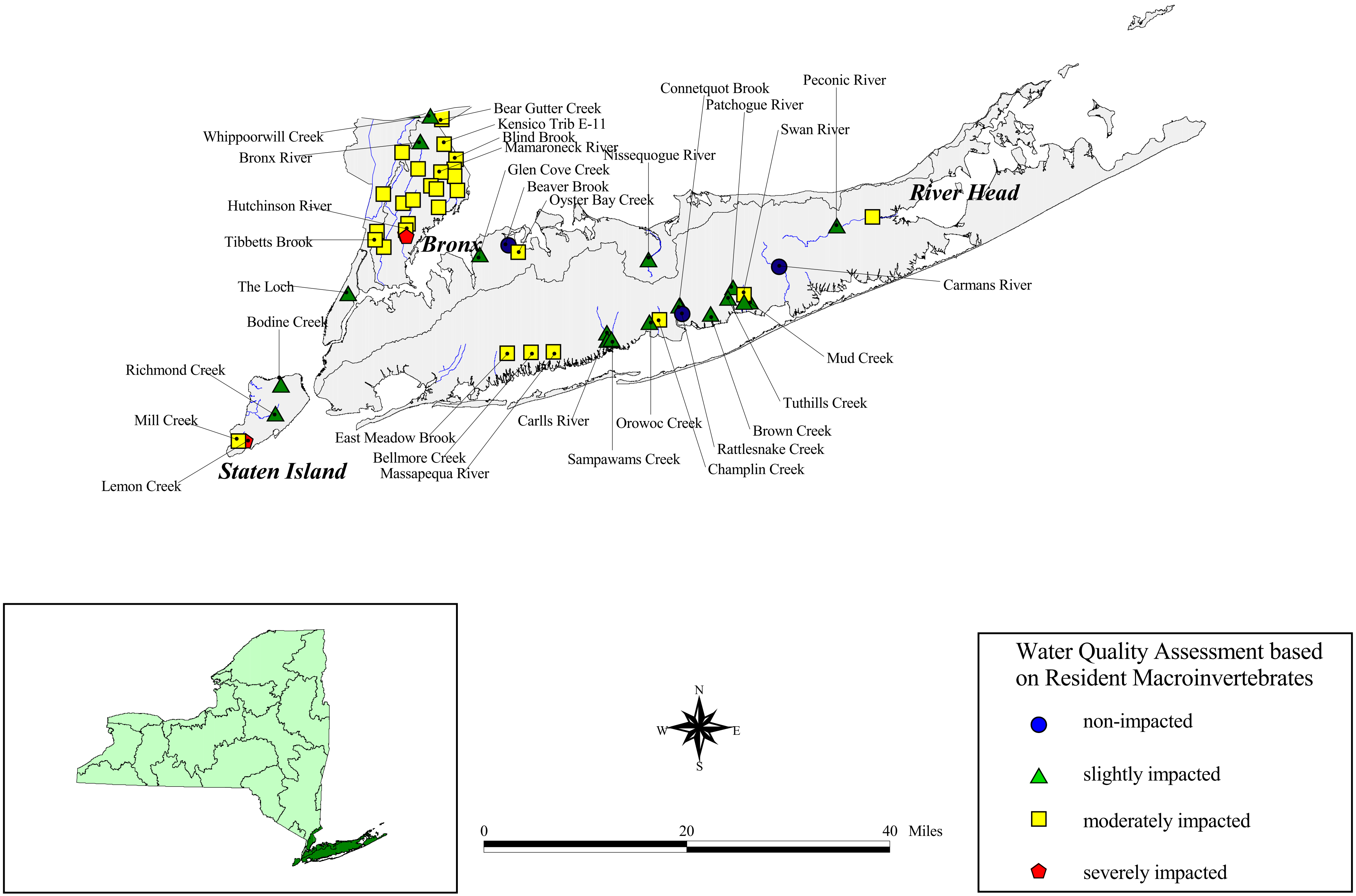
Water quality was assessed as non-impacted for Wassaic Creek, based on macroinvertebrate sampling in 2002 in Wassaic, approximately one mile upstream of the confluence with Webatuck Creek. Stream habitat was adequate, and the fauna was dominated by caddisflies, riffle beetles, and mayflies, with several species of stoneflies present. No prior data were available for the stream.

Webatuck Creek

Water quality in Webatuck Creek currently ranges from non-impacted to slightly impacted, based on 2002 macroinvertebrate sampling. The upstream site in Leedsville was assessed as non-impacted, with a fauna dominated by riffle beetles and mayflies. Metrics were similar to those obtained at this site in 1992. Downstream at Wassaic, approximately 0.1 miles upstream of the confluence with Wassaic Creek, water quality was slightly impacted by nonpoint source nutrient enrichment and siltation. The water appeared turbid compared to the Leedsville site, likely from two sand and gravel mines located upstream of the site. No prior data were available for this site.


Figure 16-1. Sample processing and organism identification in the Stream Biomonitoring Unit laboratory.

Atlantic Ocean - Long Island Drainage Basin



ATLANTIC OCEAN - LONG ISLAND SOUND DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED						
BEAR GUTTER (KEND)								
00	Armonk, Kaysal Ct							01
01	Armonk, below Rte 22						00	01
BEAVER BROOK (BVBR)								
01	Mill Neck, Frost Mill Rd.				98			
BELLMORE CREEK (BMOR)								
01	Bellmore, Wantagh State Parkway				98			
BLIND BROOK (BLND)								
01	Purchase, Anderson Hill Road					99		
02	Port Chester, Lincoln Rd					99		
03	Port Chester, Westchester Ave					99		
04	Rye, at Theodore Fremd St.				98	99		
BODINE CREEK (BODN)								
01	Port Richmond, Forest Ave. bridge; Clove Lakes Park			96	98			
02	Port Richmond, culvert under Richmond Terrace			96				
BRONX RIVER (BRNX)								
01	Valhalla, Legion Rd. culvert				98			02
02	White Plains, Bronx River Parkway bridge				98			02
03	Tuckahoe, bridge above Crestview Station				98			02
04	Bronx, above East Gun Hill Rd. bridge				98			02
BROWN CREEK (BRWN)								
01	Sayville, below Aldrich St. culvert				98			
BYRAM RIVER (BYRM)								
01	Pemberwick, CT, below Comly Ave. bridge				98			
CARLLS RIVER (CARL)								
01	Babylon, at Rt. 27		94		98			
02	Babylon, below Park Ave. culvert		94		98			
CARMANS RIVER (CARM)								
01	Above Yaphank, East Bartlett Rd	89						
02	Siegfield Park, below Upper Lake	89						
03	Below Yaphank, USGS Gaging Station	89	94		98	99		
04	South Haven, DEC fishing access	89						
05	Below South Haven, USFW Wertheim Ranger Station	89						
06	Below South Haven, above Yaphank Ck	89						
07	Below Squassux Landing marina, Buoy 3	89						
08	Bellport Bay, opposite museum (Shirley)	89						
09	Bellport Bay, Buoy 2, opp Beaverdam Ck	89						
10	Bellport Bay, Buoy 8, opp Smith Point	89						

ATLANTIC OCEAN - LONG ISLAND SOUND DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED				
CHAMPLIN CREEK (CHAM)						
01	East Islip, below Moffitt Blvd. bridge		94		98	
CONNETQUOT BROOK (CONQ)						
01	Oakdale, above hatchery at foot bridge in park				98	
02	Oakdale, below hatchery in Connetquot State Park				98	
EAST MEADOW BROOK, (EMED)						
01	Roosevelt, below Washington Ave. bridge				98	
GLEN COVE CREEK (GLEN)						
01	Glen Cove, below USGS gage in Pratt Park				98	99
HUTCHINSON RIVER (HUCH)						
01	Maplewood, 100yds past inters of Wilmot & Old Wilmot					99
02	Vernon, Hutchinson Blvd-west of Pkwy					99
03	Vernon Park, Cnr Farell & Beechwood, under pedestrian bridge					99
04	Mount Vernon, above East Sandford Ave. bridge				98	99
LEMON CREEK (LEMN)						
01	Pleasant Plains - Staten Island above Amboy Rd. & Maguire Ave. bridge			96	98	
THE LOCH (LOCH)						
01	Manhattan, Central Park, between Harlem Meer and The Pool				98	
MAMARONECK RIVER (MAMR)						
01	White Plains, below Corporate Park Dr. bridge					99
02	White Plains, off Hutchinson River Pky @ exit 23					99
02A	White Plains, off Saxon Woods Rd.					99
04	Mamaroneck, above Ward Ave. bridge		94		98	99
MASSAPEQUA (MASS)						
01	Massapequa, above Clark Ave.		94		98	99
MIANUS RIVER (MIAN)						
03	North Castle, Greenwich Banksville Road	91				
04	Bedford, Middle Patent Road bridge	91				
05	Bedford, Miller's Mill Road bridge	91				
08	Riverbank (Conn.), June Road bridge	91				
MILL CREEK (MILS)						
01	Richmond, end of service road parallel to & south of Rt. 440			96	98	
MUD CREEK (MUDL)						
01	East Patchogue, below RR off Montauk Highway				98	
NISSEQUOGUE RIVER (NISS)						
01	Smithtown, Rt. 25, Caleb State Park		94		98	99

ATLANTIC OCEAN - LONG ISLAND SOUND DRAINAGE BASIN SAMPLING SITES, 1972-2002

STATION	LOCATION	YEAR SAMPLED				
OROWOC CREEK (OROW)						
01	Bayshore, below Moffitt Blvd. culvert	94		98	99	
OYSTER BAY CREEK (OYST)						
01	Oyster Bay, below culvert at Glen Cove Rd.			98		
PATCHOGUE RIVER (PACH)						
A	North Patchogue, opposite Linden St.			98		
01	Patchogue, below Montauk Highway, above STP	94		98		
PECONIC RIVER (PECN)						
01	Calverton, below culvert in Otis Pike Preserve			98	99	
02	above Riverhead, opposite Mapletree Deli			98		
RATTLESNAKE CREEK (RATT)						
01	Oakdale, between Rt. 27A and L.I. RR tracks	94				
RICHMOND CREEK (RMON)						
01	Richmond, below Aultman Ave bridge		96	98		
SAMPAWAMS CREEK (SAMP)						
01	West Islip, above Union Blvd. bridge	94		98	99	
SWAN RIVER (SWAN)						
01	East Patchogue, below culvert under Rt.27	94		98		
02	Patchogue, below culvert under Rt. 80	94				
TIBBETTS BROOK (TIBB)						
01	Yonkers, off Damon St.			98		
02	Bronx, above swamp & lake on Van Cortlandt Park golf course			98		
TUTHILLS CREEK (TUTL)						
01	Patchogue, off Mowbray			98		
WHIPPOORWILL CREEK, TRIB N12 (KENC)						
01	Mt. Pleasant, above Nannyhagen Road					00
UNNAMED KENSICO TRIB E-11(KENF)						
01	Purchase, Rte 684 by Rye Lake and airport					00

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE ATLANTIC OCEAN - LONG ISLAND DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Bear Gutter Creek, Armonk, Kaysal Ct	moderately impacted	no prior data
Bear Gutter Creek, Armonk, below Rte 22	moderately impacted	no prior data
Beaver Brook, Mill Neck	non-impacted	no prior data
Bellmore Creek, Bellmore	moderately impacted	no prior data
Blind Brook, Purchase	moderately impacted	no prior data
Blind Brook, Port Chester, Lincoln Rd	moderately impacted	no prior data
Blind Brook, Port Chester, Westchester Ave	moderately impacted	no prior data
Blind Brook, Rye	moderately impacted	no prior data
Bodine Creek, Port Richmond, above Forest Ave.	slightly impacted	no prior data
Bronx River, Valhalla	moderately impacted	no prior data
Bronx River, White Plains	moderately impacted	no prior data
Bronx River, Tuckahoe	moderately impacted	no prior data
Bronx River, Bronx	moderately impacted	no prior data
Brown Creek, Sayville	slightly impacted	no prior data
Byram River, Pemberwick, Conn.	slightly impacted	no prior data
Carlls River, Babylon, at Rt. 27	slightly impacted	no prior data
Carlls River, Babylon, below Park Ave.	slightly impacted	no prior data
Carmans River, below Yaphank	non-impacted	**IMPROVED**
Champlin Creek, East Islip	moderately impacted	no prior data
Connetquot Brook, Oakdale, above hatchery	slightly impacted	no prior data
Connetquot Brook, Oakdale, below hatchery	slightly impacted	no prior data
East Meadow Brook, Roosevelt	moderately impacted	no prior data
Glen Cove Creek, Glen Cove	slightly impacted	no prior data
Hutchinson River, Maplewood	moderately impacted	no prior data
Hutchinson River, Vernon	moderately impacted	no prior data
Hutchinson River, Vernon Park	moderately impacted	no prior data
Hutchinson River, Mount Vernon	severely impacted	no prior data
Lemon Creek, Pleasant Plains	severely impacted	no prior data
The Loch, Manhattan	slightly impacted	no prior data

ASSESSMENTS OF WATER QUALITY OF STREAMS IN THE ATLANTIC OCEAN - LONG ISLAND DRAINAGE BASIN, BASED ON MACROINVERTEBRATE COMMUNITIES

Site/Reach	Water Quality Assessment	Change from 1992
Mamaroneck River, White Plains, Corporate Park Dr.	moderately impacted	no prior data
Mamaroneck River, White Plains, Hutchinson R. Pkwy	moderately impacted	no prior data
Mamaroneck River, White Plains, Saxon Woods Rd.	moderately impacted	no prior data
Mamaroneck River, Mamaroneck	moderately impacted	no prior data
Massapequa River, Massapequa	moderately impacted	no prior data
Mill Creek, Richmond Valley	moderately impacted	no prior data
Mud Creek, East Patchogue	slightly impacted	no prior data
Nissequogue River, Smithtown	slightly impacted	no prior data
Orowoc Creek, Bayshore	slightly impacted	no prior data
Oyster Bay Creek, Oyster Bay	moderately impacted	no prior data
Patchogue River, North Patchogue	slightly impacted	no prior data
Peconic River, Calverton	slightly impacted	no prior data
Peconic River, above Riverhead	moderately impacted	no prior data
Rattlesnake Creek, Oakdale	non-impacted	no prior data
Richmond Creek, Richmond	slightly impacted	no prior data
Sampawams Creek, West Islip	slightly impacted	no prior data
Swan River, East Patchogue	moderately impacted	no prior data
Swan River, Patchogue	slightly impacted	no prior data
Tibbetts Brook, Yonkers	moderately impacted	no prior data
Tibbetts Brook, Bronx	moderately impacted	no prior data
Tuthills Creek, Patchogue	slightly impacted	no prior data
Whippoorwill Creek, Mt. Pleasant	slightly impacted	no prior data
Unnamed Kensico Trib E-11, Harrison	moderately impacted	no prior data

REPORTS OF MACROINVERTEBRATE SURVEYS WITHIN THE ATLANTIC OCEAN-LONG ISLAND SOUND WATERSHED

STREAM	YEAR OF SURVEY	REPORT
Blind Brook	1999	SBU,2000
Bronx River	1997	OLSON, 1998
Bronx River	1998	SBU,1999
Carmans River	1989	SBU,1990
Hutchinson River	1999	SBU,2000
Long Island Streams	1994	SBU, 1995
Mamaroneck River	1999	SBU,2000
Mianus River	1991	SBU,1991
Mianus River Watershed	1991-1992	WLT,1992
Staten Island Streams	1996	SBU, 1997
Watershed Streams	1989-1990	RIBS,1990

AVON	Avon Pollution Investigations Unit, Div. of Fish & Wildlife, NYS DEC
DOH	New York State Department of Health
OLSON	Olson, C., NYC DEP
RIBS	Rotating Intensive Basin System, Statewide Waters Assessment Section, NYS DEC
SBU	Stream Biomonitoring Unit, Division of Water, NYS DEC
WLT	Westchester Land Trust

Bear Gutter Creek

Moderately impacted water quality is assessed for Bear Gutter Creek. Two sites were sampled in Armonk in 2001, and exhibited macroinvertebrate faunas composed primarily of tolerant midges, worms, and crustaceans, although mayflies were also present. Poor habitat was a factor at both sites, and sandy stream criteria were used to evaluate the data. Municipal/industrial inputs and urban runoff are the likely stressors. Elevated levels of 3 PAHs were found in tissues of crayfish collected at the downstream site in 2000.

Beaver Brook

Water quality in Beaver Brook is assessed as non-impacted, based on invertebrate sampling at Mill Neck in 1998. The stream bottom was composed entirely of sand and silt, with tree roots and macrophytes providing habitat for invertebrates. Sandy stream criteria were used to evaluate the data. Several brown trout were seen at this site.

Bellmore Creek

Water quality at Bellmore in 1998 showed moderate impact, mostly by municipal/industrial sources. The dominance of worms and sowbugs pointed to organic inputs. Filamentous algae was also heavy at this site. Sandy stream criteria were used to evaluate the data.

Blind Brook

Based on macroinvertebrate kick sampling from Purchase to Rye in 1999, water quality was assessed as moderately impacted for this entire reach.. Nonpoint runoff is the probable cause of impact; airport and golf course runoff may be major contributors. The entire length of Blind Brook should be listed as a priority waterbody. Habitat in this stream is mostly favorable, but water quality is poor. Crayfish collected from the site in Port Chester exhibited very high levels of PAHs, and this is likely a major factor limiting water quality. A follow-up collection of crayfish at the upstream site at Purchase by Holly Bukofser in 2001 did not show any PAHs exceeding levels of concern. This indicates that PAHs likely enter the stream between Purchase and Port Chester.

Bodine Creek

Water quality is assessed as slightly impacted in Bodine Creek, based on kick sampling at Port Richmond, Staten Island, in 1998. This site was previously sampled in 1996, and was assessed as moderately impacted. Further sampling is needed to determine if this is an improvement trend. Dissolved oxygen measured in the 1998 sampling was 4.8 (62% saturation). Habitat at this site was very good, and capable of supporting a more diverse fauna. A sample taken at Richmond Terrace in Port Richmond in 1996 was considered invalid since high conductivity indicated tidal conditions. This location is dropped as a sampling site.

Bronx River

Water quality in the Bronx River is currently assessed as moderately impacted at all sites. Macroinvertebrate sampling from Valhalla to Bronx was conducted by Charles Olson (NYC DEP) in 2002, and the samples were processed by the Stream Biomonitoring Unit. Water quality declined linearly from upstream to downstream (Figure 17-1). Compared to a 1998 study at the same sites, slight improvement is seen at White Plains (Station 2), where a large sewage input was present in 1998. Fecal coliform sampling conducted by Joesph Marcogliese (NYS DEC) in 1999 found very high levels in White Plains that pointed to a sewage discharge into the city storm drain system. The input is now reported to be remediated, and mayflies were found at this site in 2002. Another input of raw sewage between Stations 3 and 4 was corrected in 1999. Impacts in the river are currently caused by remaining municipal and industrial discharges and runoff, including many illegal sanitary connections to storm sewers in the city of Yonkers. Fish sampling by Doug Carlson (NYS DEC Fish & Wildlife) in 1998 showed trends similar to invertebrate data, with assessments ranging from slightly impacted to moderately impacted. For many years the stream was stocked annually with brown trout, but this was recently discontinued. A contaminant trackdown study by Joseph Spodaryk (NYS DEC Fish & Wildlife) projected that many fish in the Bronx River would have total chlordane levels exceeding the FDA limit.

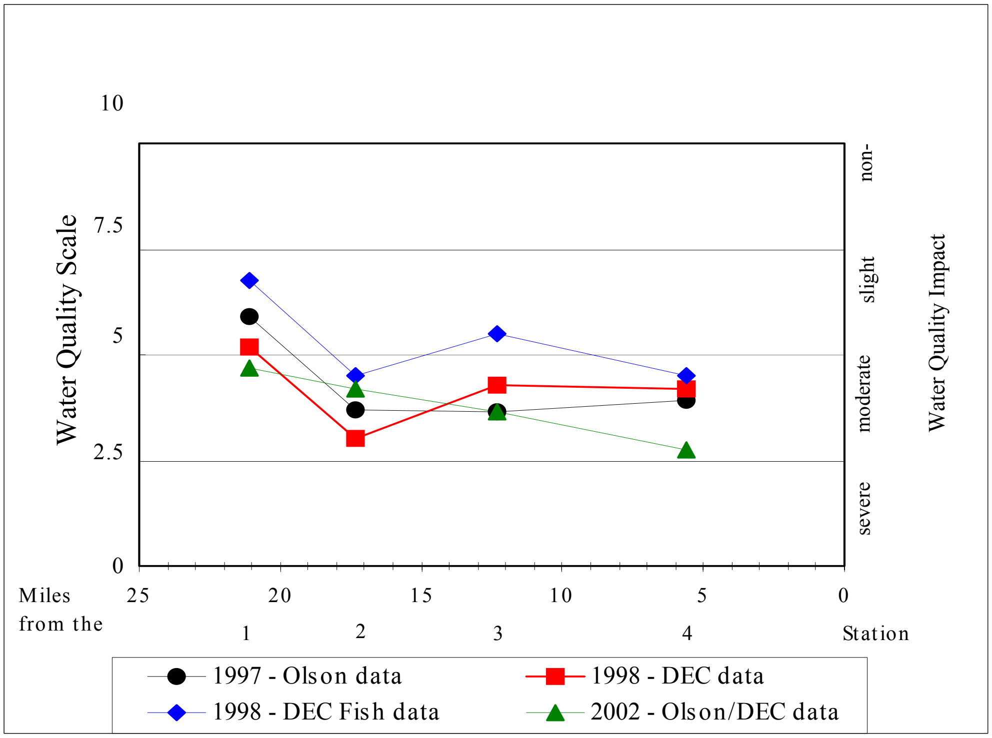


Figure 17-1. Water quality in the Bronx River, Valhalla to Bronx, as assessed by different studies.

Brown Creek

Based on 1998 sampling at Sayville, water quality is assessed as slightly impacted. The sand and gravel stream bottom likely contributed to the limited invertebrate fauna, as well as nonpoint source nutrient enrichment. No major water quality problems appear to be indicated. Sandy stream criteria were used to evaluate the data from this site.

Byram River

Water quality is assessed as slightly impacted, based on 1998 sampling at Pemberwick, Connecticut. The fauna was dominated by snails and caddisflies, and filamentous algae was very abundant on the stream bottom. ISD denoted nonpoint source nutrient enrichment and possible toxic stressors.

Carlls River

This stream was sampled in Babylon at Route 27 and at Park Avenue in 1998. Both sites were assessed as slightly impacted, but near the range of non-impacted. Mayflies and caddisflies were numerous at both sites. Similar conditions were documented in 1994 sampling. Nonpoint source nutrient enrichment is the likely stressor. Sandy stream criteria were used to evaluate the data. Large rainbow trout were present at the Park Avenue site.

Carmans River

Water quality at Yaphank was assessed as non-impacted, based on 1998 and 1999 macroinvertebrate sampling. This site was assessed as slightly impacted in 1989 and non-impacted in 1994. The difference in these assessments represents a change in criteria rather than a change in water quality. Sandy stream criteria were instituted in 1994, representing more realistic expectations for stream bottoms dominated by sand and gravel rather than rubble. When the data from these years is compared on a common scale, water quality appears stable from 1989-1999 (Figure 17-2).

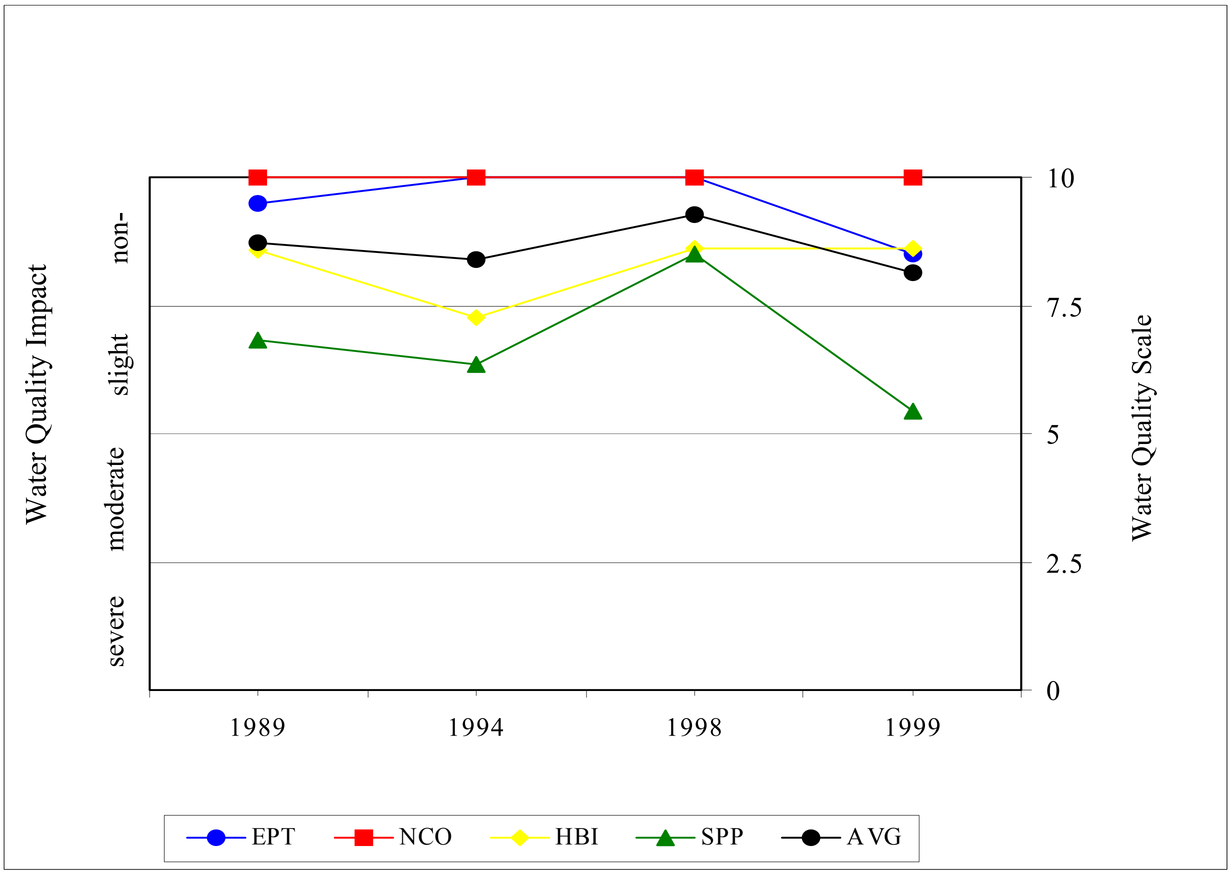


Figure 17-2. Water quality in the Carmans River at Yaphank, 1989-1999. EPT= species of mayflies, stoneflies, and caddisflies, NCO= species in groups other than Chironomidae and Oligochaeta, HBI= Hilsenhoff Biotic Index, SPP= species richness, AVG= average.

Champlin Creek

Based on 1998 invertebrate sampling at Islip Terrace, water quality was assessed as moderately impacted. The stream bottom was mostly sand and gravel, and the fauna was dominated by midges and scuds. Similar conditions were found in 1994 at an East Islip site on Champlin Creek. It is likely that poor habitat and poor water quality both contribute to the limited fauna. ISD denoted organic wastes as the primary stressor. Sandy stream criteria were used to evaluate the data from this site.

Connetquot Brook

This stream was sampled at two sites in Connetquot State Park, Oakdale in 1998. Both sites were assessed as slightly impacted. Both sites contained mayflies and caddisflies, and the upstream site also contained stoneflies. Sowbugs were numerous at both sites, and impoundment effects are likely influencing the fauna. No major water quality problems are indicated.

East Meadow Brook

Water quality was assessed as moderately impacted, based on 1998 invertebrate sampling at Roosevelt. Poor substrate that consisted of concrete pieces over gravel likely contributed to the limited fauna. This situation made it difficult to determine the extent of any water quality problems.

Glen Cove Creek

Based on invertebrate sampling in 1998 and 1999 at Glen Cove, water quality was assessed as slightly impacted. The fauna was mostly dominated by worms. Caddisflies were present, but mayflies were not found. The source of impact is likely from nonpoint sources; many golf courses in the watershed may contribute nutrient and pesticide loadings.

Hutchinson River

Based on sampling at one site in 1998 and four sites in 1999, water quality was assessed as moderately impacted to severely impacted. Most of the impact appears assignable to sewage inputs. The invertebrate fauna at the East Sanford Boulevard site in Mount Vernon indicates extreme sewage pollution. There is likely a major sewage input in the half-mile reach above East Sanford Boulevard. The three stations upstream of Mount Vernon showed moderate impact, from unknown sources. Impact Source Determination showed that macroinvertebrate communities in the river are mostly affected by sewage and municipal/industrial inputs.

Lemon Creek

Water quality at Pleasant Plains was assessed as severely impacted, based on 1998 invertebrate sampling. The fauna consisted entirely of tolerant midges, worms, and snails. This was similar to a 1996 sampling of this site, and was attributable to discharges of failing septic systems, a long-standing problem. Daytime dissolved oxygen at this site was only 3.7 ppm (42% saturation). Programs are underway installing sanitary sewers and handling storm flows, and should improve the quality of this waterbody in the future.

The Loch

This stream, connecting Harlem Meer and "The Pool" in Central Park, Manhattan, was sampled for macroinvertebrates in 1998. Based on the indices, water quality was assessed as slightly impacted. The fauna, dominated by midges and caddisflies, was likely controlled primarily by impoundment effects from the upstream pond. Although the sampling produced little water quality information, it was collected to establish baseline data for the waterbody.

Mamaroneck River

Based on sampling at one site in 1998 and four sites from White Plains to Mamaroneck in 1999, water quality was assessed as moderately impacted for the entire reach. Runoff from areas of high population density and high percentage of impervious surfaces are likely causes of impact in the river. Based on results of the present survey, the entire length of the Mamaroneck River should be listed as a priority waterbody. Since the invertebrate fauna appears moderately impacted by poor water quality, fish propagation may be affected for some species.

Massapequa Creek

Water quality at Massapequa is currently assessed as moderately impacted, based on macroinvertebrate sampling in 1999. Caddisflies were abundant at this site, and mayflies were present but limited; tolerant sowbugs were numerous. This site was assessed as slightly impacted in 1994 and 1998. Impacts at this site may be caused in large part by flow-dependent urban runoff.

Mill Creek

Based on 1998 sampling at Richmond Valley, water quality was assessed as moderately impacted. The fauna was dominated by scuds, midges, and worms, and municipal/industrial inputs are indicated. This site was assessed as slightly impacted in 1996. It is not known if a change in water quality has occurred, since poor habitat exerts a strong influence on the limited fauna. Programs are underway installing sanitary sewers and handling storm flows, and should improve the quality of this waterbody in the future.

Mud Creek

This stream was sampled near the Montauk Highway at East Patchogue in 1998, and was assessed as slightly impacted. Sowbugs and scuds dominated the sample, but clean-water stoneflies were also found. Young brook trout were previously collected here (Bruce Cronemeyer, DEC. pers. comm.). No major water quality problems are indicated.

Nissequogue River

Current water quality of the Nissequogue River is considered to be slightly impacted, but close to the range of non-impacted. The fauna in all samplings has included many clean-water species, but species richness is low. Nonpoint sources are indicated. Water quality at Smithtown was assessed as slightly impacted in 1994 and 1999, and non-impacted in 1998. The species richness metric excluded from the 1999 data as being a non-representative outlier; sandy stream criteria were used to evaluate the data. The freshwater Asian clam *Corbicula fluminea* is found at this site.

Orowoc Creek

Water quality is currently assessed as slightly impacted, based on 1999 sampling at Brook Street in Bayshore. Sampling at this site in 1998 denoted moderate impact. The fauna in 1999 was dominated by filter-feeding caddisflies, while the 1998 fauna was dominated by sewage-tolerant sowbugs. Organic wastes are indicated to be the primary stressor. The stream was sampled in 1994 at Moffitt Boulevard, and was determined to be moderately impacted.

<u>Oyster Bay Creek</u>

Moderately impacted water quality was assessed for a site at Oyster Bay, based on invertebrate sampling in 1998. The fauna was heavily dominated by worms. The stream bottom was composed primarily of sand and gravel, and this likely contributed to the limited fauna. Sandy stream criteria were used to evaluate the data. ISD denoted municipal/industrial inputs were the primary stressors. Trout were present at this site, and may be a better indicator of water quality.

<u>Patchogue Creek</u>

Based on 1998 sampling at North Patchogue, water quality was assessed as slightly impacted. Scuds and black flies dominated the sample, but some mayflies and stoneflies were also present. Municipal/industrial inputs are the likely stressors. The Patchogue Creek site sampled in 1994 in Patchogue below the Montauk Highway was likely tidal. Those results do not accurately represent water quality, and the site is dropped.

<u>Peconic River</u>

Water quality is currently assessed as slightly impacted for the Peconic River, based on macroinvertebrate sampling in 1998 and 1999. The Calverton site was assessed as only slightly impacted in 1999, a low-flow year, and the fauna was dominated by clean-water mayflies. Sampling at Calverton and Riverhead in 1998 denoted moderately impacted water quality. Dissolved oxygen was very low (2.8 ppm) at the Calverton site in 1998, and the invertebrate fauna was dominated by midges and scuds. Dissolved oxygen was higher (6.0 ppm) at the Riverhead site, but the fauna was still dominated by tolerant organisms, mostly scuds, worms, and midges. The cause of impact was not determined. Sandy stream criteria were used to evaluate the data from this site.

<u>Rattlesnake Creek</u>

Water quality is assessed as non-impacted for Rattlesnake Creek. A site at Oakdale was sampled in 1994, and the fauna was dominated by clean-water mayflies, stoneflies, and caddisflies. Standing crop was low, likely reflecting the headwater nature of the stream.

<u>Richmond Creek</u>

Slightly impacted water quality was assessed for this Staten Island stream at Richmond, based on 1998 sampling. The fauna included viable populations of mayflies and caddisflies. ISD denoted municipal/industrial stressors. This site was assessed as moderately impacted in 1996. Further sampling is recommended at the site. Programs are underway installing sanitary sewers and handling storm flows, and should improve the quality of this waterbody in the future.

<u>Sampawams Creek</u>

Based on 1998 and 1999 sampling at West Islip, water quality was assessed as slightly impacted. Municipal/industrial inputs are indicated to be the primary stressors. This site was previously assessed as moderately impacted in 1994. Caddisflies were more numerous in 1998 and 1999, and may indicate improved conditions, although tolerant worms, scuds, and sowbugs continue to be abundant. Additional sampling at this site would be helpful in better defining water quality conditions.

Swan River

Water quality was assessed as moderately impacted, based on 1998 invertebrate sampling downstream of Route 27, East Patchogue. Mayflies, stoneflies, and caddisflies were absent, and the fauna was dominated by scuds and worms. Municipal/industrial inputs are indicated to be the primary stressors. This appears to represent a decline from 1994, when four species of mayflies were found, and water quality was assessed as only slightly impacted. A site in Patchogue sampled in 1994 was also assessed as slightly impacted.

Tibbetts Brook

Based on 1998 sampling at Yonkers and Bronx, overall water quality is assessed as moderately impacted. The Yonkers site had adequate current speed, but the stream bottom was predominately sand and gravel. The water had a slight grey tint, possibly reflecting sewage inputs. The benthic invertebrate fauna consisted mostly of tolerant midges and worms, and had greatest similarity to streams affected by sewage or animal wastes. The current speed at the Bronx site was very slow, and the habitat was more that of a wetland than a stream. Sampling consisted of using the net to skim through the top layer of sediment. The benthic invertebrate fauna consisted mostly of midges, worms, fingernail clams, and sow bugs. Overall water quality was assessed as moderately impacted, although this assessment is considered provisional because stream criteria are applied to a wetland situation.

Tuthills Creek

The 1998 sampling of Tuthills Creek yielded an assessment of slight impact. The site was downstream of Route 27, Patchogue, accessed off the end of Mowbray Street. Midges and black flies dominated the sample, but a few mayflies and stoneflies were also found. A fingerling brook trout was also collected at this site. The limited fauna was likely related to nonpoint sources and the less-than-optimal stream bottom habitat of gravel and sand. Sandy stream criteria were used to evaluate the data.

Whippoorwill Creek

Water quality is assessed as slightly impacted for this tributary of the Kensico Reservoir. A site near the mouth was sampled in 2000. Although clean-water stoneflies were found, midges and worms dominated the sample, and mayflies were poorly represented. Nonpoint source nutrient enrichment was indicated to be the primary stressor.

Unnamed Kensico tributary “E-11"

Moderate impact from complex stressors is indicated for this site, adjacent to the Westchester County Airport.. The habitat is more of a wetland than a stream. The invertebrate fauna sampled in 2000 was dominated by scuds and midges. Due to the nature of the site, criteria for slow sandy streams were used.

APPENDIX I. BIOLOGICAL METHODS FOR KICK SAMPLING

A. Rationale. The use of the standardized kick sampling method provides a biological assessment technique that lends itself to rapid assessments of stream water quality.

B. Site Selection. Sampling sites are selected based on these criteria: (1) The sampling location should be a riffle with a substrate of rubble, gravel, and sand. Depth should be one meter or less, and current speed should be at least 0.4 meters per second. (2) The site should have comparable current speed, substrate type, embeddedness, and canopy cover to both upstream and downstream sites to the degree possible. (3) Sites are chosen to have a safe and convenient access.

C. Sampling. Macroinvertebrates are sampled using the standardized traveling kick method. An aquatic net is positioned in the water at arms' length downstream and the stream bottom is disturbed by foot, so that the dislodged organisms are carried into the net. Sampling is continued for a specified time and for a specified distance in the stream. Rapid assessment sampling specifies sampling 5 minutes for a distance of 5 meters. The net contents are emptied into a pan of stream water. The contents are then examined, and the major groups of organisms are recorded, usually on the ordinal level (e.g., stoneflies, mayflies, caddisflies). Larger rocks, sticks, and plants may be removed from the sample if organisms are first removed from them. The contents of the pan are poured into a U.S. No. 30 sieve and transferred to a quart jar. The sample is then preserved by adding 95% ethyl alcohol.

D. Sample Sorting and Subsampling. In the laboratory the sample is rinsed with tap water in a U.S. No. 40 standard sieve to remove any fine particles left in the residues from field sieving. The sample is transferred to an enamel pan and distributed homogeneously over the bottom of the pan. A small amount of the sample is randomly removed with a spatula, rinsed with water, and placed in a petri dish. This portion is examined under a dissecting stereomicroscope and 100 organisms are randomly removed from the debris. As they are removed, they are sorted into major groups, placed in vials containing 70 percent alcohol, and counted. The total number of organisms in the sample is estimated by weighing the residue from the picked subsample and determining its proportion of the total sample weight.

E. Organism Identification. All organisms are identified to the species level whenever possible. Chironomids and oligochaetes are slide-mounted and viewed through a compound microscope; most other organisms are identified as whole specimens using a dissecting stereomicroscope. The number of individuals in each species, and the total number of individuals in the subsample is recorded on a data sheet. All organisms from the subsample are archived, either slide-mounted or preserved in alcohol. Following identification of a subsample, if the results are ambiguous, suspected of being spurious, or do not yield a clear water quality assessment, additional subsampling may be required.

Appendix II. MACROINVERTEBRATE COMMUNITY PARAMETERS

1. Species richness. This is the total number of species or taxa found in the sample. Expected ranges for 100-specimen subsamples of kick samples in most streams in New York State are: greater than 26, non-impacted; 19-26, slightly impacted; 11-18, moderately impacted; less than 11, severely impacted.

2. EPT value. EPT denotes the total number of species of mayflies (Ephemeroptera), stoneflies (Plecoptera), and caddisflies (Trichoptera) found in an average 100-organism subsample. These are considered to be mostly clean-water organisms, and their presence generally is correlated with good water quality (Lenat, 1987). Expected ranges from most streams in New York State are: greater than 10, non-impacted; 6-10, slightly impacted; 2-5, moderately impacted; and 0-1, severely impacted.

3. Biotic index. The Hilsenhoff Biotic Index is a measure of the tolerance of the organisms in the sample to organic pollution (sewage effluent, animal wastes) and low dissolved oxygen levels. It is calculated by multiplying the number of individuals of each species by its assigned tolerance value, summing these products, and dividing by the total number of individuals. On a 0-10 scale, tolerance values range from intolerant (0) to tolerant (10). For purposes of characterizing species' tolerance, intolerant = 0-4, facultative = 5-7, and tolerant = 8-10. Values are listed in Hilsenhoff (1987); additional values are assigned by the NYS Stream Biomonitoring Unit. The most recent values for each species are listed in the Quality Assurance document (Bode et al., 1996). Ranges for the levels of impact are: 0-4.50, non-impacted; 4.51-6.50, slightly impacted; 6.51-8.50, moderately impacted; and 8.51-10.00, severely impacted.

4. Percent Model Affinity is a measure of similarity to a model non-impacted community based on percent abundance in 7 major groups (Novak and Bode, 1992). Percentage similarity is used to measure similarity to a community of 40% Ephemeroptera, 5% Plecoptera, 10% Trichoptera, 10% Coleoptera, 20% Chironomidae, 5% Oligochaeta, and 10% Other. Ranges for the levels of impact are: >64, non-impacted; 50-64, slightly impacted; 35-49, moderately impacted; and <35, severely impacted.

Bode, R.W., M.A. Novak, and L.E. Abele. 1996. Quality assurance work plan for biological stream monitoring in New York State. NYS DEC technical report, 89 pp.

Hilsenhoff, W. L. 1987. An improved biotic index of organic stream pollution. The Great Lakes Entomologist 20(1): 31-39.

Lenat, D. R. 1987. Water quality assessment using a new qualitative collection method for freshwater benthic macroinvertebrates. North Carolina DEM Tech. Report. 12 pp.

Novak, M.A., and R.W. Bode. 1992. Percent model affinity: a new measure of macroinvertebrate community composition. J. N. Am. Benthol. Soc. 11(1):80-85.

Appendix III. LEVELS OF WATER QUALITY IMPACT IN STREAMS

The description of overall stream water quality based on biological parameters uses a four-tiered system of classification. Level of impact is assessed for each individual parameter, and then combined for all parameters to form a consensus determination. Four parameters are used: species richness, EPT value, biotic index, and percent model affinity. The consensus is based on the determination of the majority of the parameters; since parameters measure different aspects of the community, they cannot be expected to always form unanimous assessments. The ranges given for each parameter are based on 100-organism subsamples of macroinvertebrate riffle kick samples, and also apply to most multiplate samples, with the exception of percent model affinity.

1. Non-impacted

Indices reflect very good water quality. The macroinvertebrate community is diverse, usually with at least 27 species in riffle habitats. Mayflies, stoneflies, and caddisflies are well-represented; the EPT value is greater than 10. The biotic index value is 4.50 or less. Percent model affinity is greater than 64. Water quality should not be limiting to fish survival or propagation. This level of water quality includes both pristine habitats and those receiving discharges which minimally alter the biota.

2. Slightly impacted

Indices reflect good water quality. The macroinvertebrate community is slightly but significantly altered from the pristine state. Species richness usually is 19-26. Mayflies and stoneflies may be restricted, with EPT values of 6-10. The biotic index value is 4.51-6.50. Percent model affinity is 50-64. Water quality is usually not limiting to fish survival, but may be limiting to fish propagation.

3. Moderately impacted

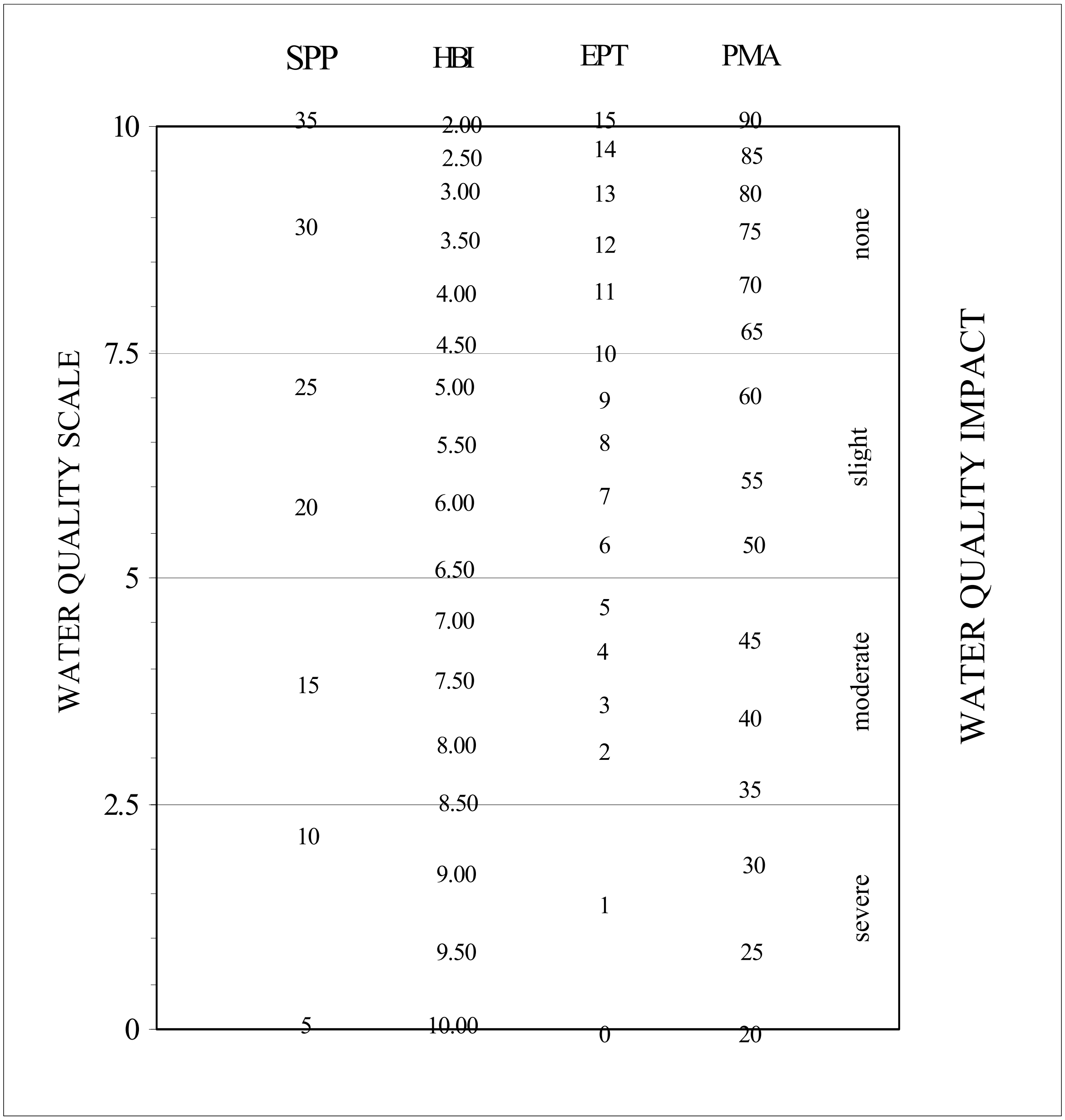
Indices reflect poor water quality. The macroinvertebrate community is altered to a large degree from the pristine state. Species richness usually is 11-18 species. Mayflies and stoneflies are rare or absent, and caddisflies are often restricted; the EPT value is 2-5. The biotic index value is 6.51-8.50. The percent model affinity value is 35-49. Water quality often is limiting to fish propagation, but usually not to fish survival.

4. Severely impacted

Indices reflect very poor water quality. The macroinvertebrate community is limited to a few tolerant species. Species richness is 10 or less. Mayflies, stoneflies, and caddisflies are rare or absent; EPT value is 0-1. The biotic index value is greater than 8.50. Percent model affinity is less than 35. The dominant species are almost all tolerant, and are usually midges and worms. Often 1-2 species are very abundant. Water quality is often limiting to both fish propagation and fish survival.

Appendix IV. BIOLOGICAL ASSESSMENT PROFILE OF INDEX VALUES

The Biological Assessment Profile of index values, developed by Mr. Phil O'Brien, Division of Water, NYS DEC, is a method of plotting biological index values on a common scale of water quality impact. Values from the four indices defined in Appendix II are converted to a common 0-10 scale as shown in the figure below.



To plot survey data, each site is positioned on the x-axis according to river miles from the mouth, and the scaled values for the four indices are plotted on the common scale. The mean scale value of the four indices represents the assessed impact for each site.

Appendix V.
WATER QUALITY ASSESSMENT CRITERIA
for non-navigable flowing waters

	Species Richness	Hilsenhoff Biotic Index	EPT Value	Percent Model Affinity#	Diversity*
Non-Impacted	>26	0.00-4.50	>10	>64	>4
Slightly Impacted	19-26	4.51-6.50	6-10	50-64	3.01-4.00
Moderately Impacted	11-18	6.51-8.50	2-5	35-49	2.01-3.00
Severely Impacted	0-10	8.51-10.00	0-1	<35	0.00-2.00

Percent model affinity criteria are used for traveling kick samples but not for multiplate samples.
* Diversity criteria are used for multiplate samples but not for traveling kick samples.

WATER QUALITY ASSESSMENT CRITERIA
for navigable flowing waters

	Species Richness	Hilsenhoff Biotic Index	EPT Value	Diversity
Non-Impacted	>21	0.00-7.00	>5	>3.00
Slightly Impacted	17-21	7.01-8.00	4-5	2.51-3.00
Moderately Impacted	12-16	8.01-9.00	2-3	2.01-2.50
Severely Impacted	0-11	9.01-10.00	0-1	0.00-2.00

Appendix VI.

THE TRAVELING KICK SAMPLE

← current

Rocks and sediment in the riffle are dislodged by foot upstream of a net; organisms dislodged are carried by the current into the net. Sampling is continued for five minutes, as the sampler gradually moves downstream to cover a distance of five meters.

Appendix VII. A.

AQUATIC MACROINVERTEBRATES THAT USUALLY INDICATE GOOD WATER QUALITY

Mayfly nymphs are often the most numerous organisms found in clean streams. They are sensitive to most types of pollution, including low dissolved oxygen (less than 5 ppm), chlorine, ammonia, metals, pesticides, and acidity. Most mayflies are found clinging to the undersides of rocks.

MAYFLIES

Stonefly nymphs are mostly limited to cool, well-oxygenated streams. They are sensitive to most of the same pollutants as mayflies, except acidity. They are usually much less numerous than mayflies. The presence of even a few stoneflies in a stream suggests that good water quality has been maintained for several months.

STONEFLIES

Caddisfly larvae often build a portable case of sand, stones, sticks, or other debris. Many caddisfly larvae are sensitive to pollution, although a few are tolerant. One family spins nets to catch drifting plankton, and is often numerous in nutrient-enriched stream segments.

CADDISFLIES

The most common beetles in streams are riffle beetles and water pennies. Most of these require a swift current and an adequate supply of oxygen, and are generally considered clean-water indicators.

BEETLES

Appendix VII. B.

AQUATIC MACROINVERTEBRATES THAT USUALLY INDICATE POOR WATER QUALITY

Midges are the most common aquatic flies. The larvae occur in almost any aquatic situation. Many species are very tolerant to pollution. Large, red midge larvae called "bloodworms" indicate organic enrichment. Other midge larvae filter plankton, indicating nutrient enrichment when numerous.

MIDGES

Black fly larvae have specialized structures for filtering plankton and bacteria from the water, and require a strong current. Some species are tolerant of organic enrichment and toxic contaminants, while others are intolerant of pollutants.

BLACK FLIES

The segmented worms include the leeches and the small aquatic earthworms. The latter are more common, though usually unnoticed. They burrow in the substrate and feed on bacteria in the sediment. They can thrive under conditions of severe pollution and very low oxygen levels, and are thus valuable pollution indicators. Many leeches are also tolerant of poor water quality.

WORMS

Aquatic sowbugs are crustaceans that are often numerous in situations of high organic content and low oxygen levels. They are classic indicators of sewage pollution, and can also thrive in toxic situations.

SOWBUGS

Digital images by Larry Abele, New York State Department of Environmental Conservation, Stream Biomonitoring Unit.

APPENDIX VIII. THE RATIONALE OF BIOLOGICAL MONITORING

Biological monitoring as applied here refers to the use of resident benthic macroinvertebrate communities as indicators of water quality. Macroinvertebrates are larger-than-microscopic invertebrate animals that inhabit aquatic habitats; freshwater forms are primarily aquatic insects, worms, clams, snails, and crustaceans.

Concept

Nearly all streams are inhabited by a community of benthic macroinvertebrates. The species comprising the community each occupy a distinct niche defined and limited by a set of environmental requirements. The composition of the macroinvertebrate community is thus determined by many factors, including habitat, food source, flow regime, temperature, and water quality. The community is presumed to be controlled primarily by water quality if the other factors are determined to be constant or optimal. Community components which can change with water quality include species richness, diversity, balance, abundance, and presence/absence of tolerant or intolerant species. Various indices or metrics are used to measure these community changes. Assessments of water quality are based on metric values of the community, compared to expected metric values.

Advantages of using macroinvertebrates as water quality indicators:

1) they are sensitive to environmental impacts
2) they are less mobile than fish, and thus cannot avoid discharges
3) they can indicate effects of spills, intermittent discharges, and lapses in treatment
4) they are indicators of overall, integrated water quality, including synergistic effects and substances lower than detectable limits
5) they are abundant in most streams and are relatively easy and inexpensive to sample
6) they are able to detect non-chemical impacts to the habitat, such as siltation or thermal changes
7) they are vital components of the aquatic ecosystem and important as a food source for fish
8) they are more readily perceived by the public as tangible indicators of water quality
9) they can often provide an on-site estimate of water quality
10) they can often be used to identify specific stresses or sources of impairment
11) they can be preserved and archived for decades, allowing for direct comparison of specimens
12) they bioaccumulate many contaminants, so that analysis of their tissues is a good monitor of toxic substances in the aquatic food chain

Limitations

1) Biological monitoring is not intended to replace chemical sampling, toxicity testing, or fish surveys. Each of these measurements provides information not contained in the others.
2) Substances may be present in levels exceeding ambient water quality criteria, yet have no apparent adverse community impact.
3) Macroinvertebrate sampling cannot determine if water is safe for drinking.

APPENDIX IX. GLOSSARY

assessment: a diagnosis or evaluation of water quality

benthos: organisms occurring on or in the bottom substrate of a waterbody

biomonitoring: the use of biological indicators to measure water quality

community: a group of populations of organisms interacting in a habitat

drainage basin: an area in which all water drains to a particular waterbody; watershed

EPT value: the number of species of mayflies, stoneflies, and caddisflies in a sample

facultative: occurring over a wide range of water quality; neither tolerant nor intolerant of poor water quality

fauna: the animal life of a particular habitat

impact: a change in the physical, chemical, or biological condition of a waterbody

impairment: a detrimental effect caused by an impact

index: a number, metric, or parameter derived from sample data used as a measure of water quality

intolerant: unable to survive poor water quality

macroinvertebrate: a larger-than-microscopic invertebrate animal that lives at least part of its life in aquatic habitats

multiplate: multiple-plate sampler, a type of artificial substrate sampler of aquatic macroinvertebrates

organism: a living individual

rapid bioassessment: a biological diagnosis of water quality using field and laboratory analysis designed to allow assessment of water quality in a short turn-around time; usually involves kick sampling and laboratory subsampling of the sample

riffle: wadeable stretch of stream usually with a rubble bottom and sufficient current to have the water surface broken by the flow; rapids

species richness: the number of macroinvertebrate species in a sample or subsample

station: a sampling site on a waterbody

survey: a set of samplings conducted in succession along a stretch of stream

tolerant: able to survive poor water quality

APPENDIX X. METHODS FOR IMPACT SOURCE DETERMINATION

Definition Impact Source Determination (ISD) is the procedure for identifying types of impacts that exert deleterious effects on a waterbody. While the analysis of benthic macroinvertebrate communities has been shown to be an effective means of determining severity of water quality impacts, it has been less effective in determining what kind of pollution is causing the impact. Impact Source Determination uses community types or models to ascertain the primary factor influencing the fauna.

Development of methods The method found to be most useful in differentiating impacts in New York State streams was the use of community types, based on composition by family and genus. It may be seen as an elaboration of Percent Model Affinity (Novak and Bode, 1992), which is based on class and order. A large database of macroinvertebrate data was required to develop ISD methods. The database included several sites known or presumed to be impacted by specific impact types. The impact types were mostly known by chemical data or land use. These sites were grouped into the following general categories: agricultural nonpoint, toxic-stressed, sewage (domestic municipal), sewage/toxic, siltation, impoundment, and natural. Each group initially contained 20 sites. Cluster analysis was then performed within each group, using percent similarity at the family or genus level. Within each group four clusters were identified, each cluster usually composed of 4-5 sites with high biological similarity. From each cluster a hypothetical model was then formed to represent a model cluster community type; sites within the cluster had at least 50 percent similarity to this model. These community type models formed the basis for Impact Source Determination (see tables following). The method was tested by calculating percent similarity to all the models, and determining which model was the most similar to the test site. Some models were initially adjusted to achieve maximum representation of the impact type. New models are developed when similar communities are recognized from several streams.

Use of the ISD methods Impact Source Determination is based on similarity to existing models of community types (see tables following). The model that exhibits the highest similarity to the test data denotes the likely impact source type, or may indicate "natural", lacking an impact. In the graphic representation of ISD, only the highest similarity of each source type is identified. If no model exhibits a similarity to the test data of greater than 50%, the determination is inconclusive. The determination of impact source type is used in conjunction with assessment of severity of water quality impact to provide an overall assessment of water quality.

Limitations These methods were developed for data derived from 100-organism subsamples of traveling kick samples from riffles of New York State streams. Application of the methods for data derived from other sampling methods, habitats, or geographical areas would likely require modification of the models.

	NATURAL												
	A	B	C	D	E	F	G	H	I	J	K	L	M
PLATYHELMINTHES	-	-	-	-	-	-	-	-	-	-	-	-	-
OLIGOCHAETA	-	-	5	-	5	-	5	5	-	-	-	5	5
HIRUDINEA	-	-	-	-	-	-	-	-	-	-	-	-	-
GASTROPODA	-	-	-	-	-	-	-	-	-	-	-	-	-
SPHAERIIDAE	-	-	-	-	-	-	-	-	-	-	-	-	-
ASELLIDAE	-	-	-	-	-	-	-	-	-	-	-	-	-
GAMMARIDAE	-	-	-	-	-	-	-	-	-	-	-	-	-
<u>Isonychia</u>	5	5	-	5	20	-	-	-	-	-	-	-	-
BAETIDAE	20	10	10	10	10	5	10	10	10	10	5	15	40
HEPTAGENIIDAE	5	10	5	20	10	5	5	5	5	10	10	5	5
LEPTOPHLEBIIDAE	5	5	-	-	-	-	-	-	5	-	-	25	5
EPHEMERELLIDAE	5	5	5	10	-	10	10	30	-	5	-	10	5
<u>Caenis</u>/<u>Tricorythodes</u>	-	-	-	-	-	-	-	-	-	-	-	-	-
PLECOPTERA	-	-	-	5	5	-	5	5	15	5	5	5	5
<u>Psephenus</u>	5	-	-	-	-	-	-	-	-	-	-	-	-
<u>Optioservus</u>	5	-	20	5	5	-	5	5	5	5	-	-	-
<u>Promoresia</u>	5	-	-	-	-	-	25	-	-	-	-	-	-
<u>Stenelmis</u>	10	5	10	10	5	-	-	-	10	-	-	-	5
PHILOPOTAMIDAE	5	20	5	5	5	5	5	-	5	5	5	5	5
HYDROPSYCHIDAE	10	5	15	15	10	10	5	5	10	15	5	5	10
HELICOPSYCHIDAE/ BRACHYCENTRIDAE/ RHYACOPHILIDAE	5	5	-	-	-	20	-	5	5	5	5	5	-
SIMULIIDAE	-	-	-	5	5	-	-	-	-	5	-	-	-
<u>Simulium vittatum</u>	-	-	-	-	-	-	-	-	-	-	-	-	-
EMPIDIDAE	-	-	-	-	-	-	-	-	-	-	-	-	-
TIPULIDAE	-	-	-	-	-	-	-	-	5	-	-	-	-
CHIRONOMIDAE													
Tanypodinae	-	5	-	-	-	-	-	-	5	-	-	-	-
Diamesinae	-	-	-	-	-	-	5	-	-	-	-	-	-
Cardiocladius	-	5	-	-	-	-	-	-	-	-	-	-	-
<u>Cricotopus/</u> <u>Orthocladius</u>	5	5	-	-	10	-	-	5	-	-	5	5	5
<u>Eukiefferiella/</u> <u>Tvetenia</u>	5	5	10	-	-	5	5	5	-	5	-	5	5
<u>Parametriocnemus</u>	-	-	-	-	-	-	-	5	-	-	-	-	-
<u>Chironomus</u>	-	-	-	-	-	-	-	-	-	-	-	-	-
<u>Polypedilum aviceps</u>	-	-	-	-	-	20	-	-	10	20	20	5	-
<u>Polypedilum</u> (all others)	5	5	5	5	5	-	5	5	-	-	-	-	-
Tanytarsini	-	5	10	5	5	20	10	10	10	10	40	5	5
TOTAL	100	100	100	100	100	100	100	100	100	100	100	100	100

NONPOINT NUTRIENTS, PESTICIDES

	A	B	C	D	E	F	G	H	I	J
PLATYHELMINTHES	-	-	-	-	-	-	-	-	-	-
OLIGOCHAETA	-	-	-	5	-	-	-	-	-	15
HIRUDINEA	-	-	-	-	-	-	-	-	-	-
GASTROPODA	-	-	-	-	-	-	-	-	-	-
SPHAERIIDAE	-	-	-	5	-	-	-	-	-	-
ASELLIDAE	-	-	-	-	-	-	-	-	-	-
GAMMARIDAE	-	-	-	5	-	-	-	-	-	-
Isonychia	-	-	-	-	-	-	-	5	-	-
BAETIDAE	5	15	20	5	20	10	10	5	10	5
HEPTAGENIIDAE	-	-	-	-	5	5	5	5	-	5
LEPTOPHLEBIIDAE	-	-	-	-	-	-	-	-	-	-
EPHEMERELLIDAE	-	-	-	-	-	-	-	5	-	-
Caenis/Tricorythodes	-	-	-	-	5	-	-	5	-	5
PLECOPTERA	-	-	-	-	-	-	-	-	-	-
Psephenus	5	-	-	5	-	5	5	-	-	-
Optioservus	10	-	-	5	-	-	15	5	-	5
Promoresia	-	-	-	-	-	-	-	-	-	-
Stenelmis	15	15	-	10	15	5	25	5	10	5
PHILOPOTAMIDAE	15	5	10	5	-	25	5	-	-	-
HYDROPSYCHIDAE	15	15	15	25	10	35	20	45	20	10
HELICOPSYCHIDAE/ BRACHYCENTRIDAE/ RHYACOPHILIDAE	-	-	-	-	-	-	-	-	-	-
SIMULIIDAE	5	-	15	5	5	-	-	-	40	-
Simulium vittatum	-	-	-	-	-	-	-	-	5	-
EMPIDIDAE	-	-	-	-	-	-	-	-	-	-
TIPULIDAE	-	-	-	-	-	-	-	-	-	5
CHIRONOMIDAE										
Tanypodinae	-	-	-	-	-	-	5	-	-	5
Cardiocladius	-	-	-	-	-	-	-	-	-	-
Cricotopus/ Orthocladius	10	15	10	5	-	-	-	-	5	5
Eukiefferiella/ Tvetenia	-	15	10	5	-	-	-	-	5	-
Parametriocnemus	-	-	-	-	-	-	-	-	-	-
Microtendipes	-	-	-	-	-	-	-	-	-	20
Polypedilum aviceps	-	-	-	-	-	-	-	-	-	-
Polypedilum (all others)	10	10	10	10	20	10	5	10	5	5
Tanytarsini	10	10	10	5	20	5	5	10	-	10
TOTAL	100	100	100	100	100	100	100	100	100	100

	MUNICIPAL/INDUSTRIAL								TOXIC					
	A	B	C	D	E	F	G	H	A	B	C	D	E	F
PLATYHELMINTHES	-	40	-	-	-	5	-	-	-	-	-	-	5	-
OLIGOCHAETA	20	20	70	10	-	20	-	-	-	10	20	5	5	15
HIRUDINEA	-	5	-	-	-	-	-	-	-	-	-	-	-	-
GASTROPODA	-	-	-	-	-	5	-	-	-	5	-	-	-	5
SPHAERIIDAE	-	5	-	-	-	-	-	-	-	-	-	-	-	-
ASELLIDAE	10	5	10	10	15	5	-	-	10	10	-	20	10	5
GAMMARIDAE	40	-	-	-	15	-	5	5	5	-	-	-	5	5
Isonychia	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BAETIDAE	5	-	-	-	5	-	10	10	15	10	20	-	-	5
HEPTAGENIIDAE	5	-	-	-	-	-	-	-	-	-	-	-	-	-
LEPTOPHLEBIIDAE	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPHEMERELLIDAE	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caenis/Tricorythodes	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PLECOPTERA	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Psephenus	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Optioservus	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Promoresia	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stenelmis	5	-	-	10	5	-	5	5	10	15	-	40	35	5
PHILOPOTAMIDAE	-	-	-	-	-	-	-	40	10	-	-	-	-	-
HYDROPSYCHIDAE	10	-	-	50	20	-	40	20	20	10	15	10	35	10
HELICOPSYCHIDAE/ BRACHYCENTRIDAE/ RHYACOPHILIDAE	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SIMULIIDAE	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Simulium vittatum	-	-	-	-	-	-	20	10	-	20	-	-	-	5
EMPIDIDAE	-	5	-	-	-	-	-	-	-	-	-	-	-	-
CHIRONOMIDAE														
Tanypodinae	-	10	-	-	5	15	-	-	5	10	-	-	-	25
Cardiocladius	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cricotopus/ Orthocladius	5	10	20	-	5	10	5	5	15	10	25	10	5	10
Eukiefferiella/ Tvetenia	-	-	-	-	-	-	-	-	-	-	20	10	-	-
Parametriocnemus	-	-	-	-	-	-	-	-	-	-	-	5	-	-
Chironomus	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polypedilum aviceps	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polypedilum (all others)	-	-	-	10	20	40	10	5	10	-	-	-	-	5
Tanytarsini	-	-	-	10	10	-	5	-	-	-	-	-	-	5
TOTAL	100	100	100	100	100	100	100	100	100	100	100	100	100	100

SEWAGE EFFLUENT, ANIMAL WASTES

	A	B	C	D	E	F	G	H	I	J
PLATYHELMINTHES	-	-	-	-	-	-	-	-	-	-
OLIGOCHAETA	5	35	15	10	10	35	40	10	20	15
HIRUDINEA	-	-	-	-	-	-	-	-	-	-
GASTROPODA	-	-	-	-	-	-	-	-	-	-
SPHAERIIDAE	-	-	-	10	-	-	-	-	-	-
ASELLIDAE	5	10	-	10	10	10	10	50	-	5
GAMMARIDAE	-	-	-	-	-	10	-	10	-	-
<u>Isonychia</u>	-	-	-	-	-	-	-	-	-	-
BAETIDAE	-	10	10	5	-	-	-	-	5	-
HEPTAGENIIDAE	10	10	10	-	-	-	-	-	-	-
LEPTOPHLEBIIDAE	-	-	-	-	-	-	-	-	-	-
EPHEMERELLIDAE	-	-	-	-	-	-	-	-	5	-
<u>Caenis</u>/<u>Tricorythodes</u>	-	-	-	-	-	-	-	-	-	-
PLECOPTERA	-	-	-	-	-	-	-	-	-	-
<u>Psephenus</u>	-	-	-	-	-	-	-	-	-	-
<u>Optioservus</u>	-	-	-	-	-	-	-	-	5	-
<u>Promoresia</u>	-	-	-	-	-	-	-	-	-	-
<u>Stenelmis</u>	15	-	10	10	-	-	-	-	-	-
PHILOPOTAMIDAE	-	-	-	-	-	-	-	-	-	-
HYDROPSYCHIDAE	45	-	10	10	10	-	-	10	5	-
HELICOPSYCHIDAE/ BRACHYCENTRIDAE/ RHYACOPHILIDAE	-	-	-	-	-	-	-	-	-	-
SIMULIIDAE	-	-	-	-	-	-	-	-	-	-
<u>Simulium vittatum</u>	-	-	-	25	10	35	-	-	5	5
EMPIDIDAE	-	-	-	-	-	-	-	-	-	-
CHIRONOMIDAE										
Tanypodinae	-	5	-	-	-	-	-	-	5	5
<u>Cardiocladius</u>	-	-	-	-	-	-	-	-	-	-
<u>Cricotopus</u>/ <u>Orthocladius</u>	-	10	15	-	-	10	10	-	5	5
<u>Eukiefferiella</u>/ <u>Tvetenia</u>	-	-	10	-	-	-	-	-	-	-
<u>Parametriocnemus</u>	-	-	-	-	-	-	-	-	-	-
<u>Chironomus</u>	-	-	-	-	-	-	10	-	-	60
<u>Polypedilum aviceps</u>	-	-	-	-	-	-	-	-	-	-
<u>Polypedilum</u> (all others)	10	10	10	10	60	-	30	10	5	5
Tanytarsini	10	10	10	10	-	-	-	10	40	-
TOTAL	100	100	100	100	100	100	100	100	100	100

	SILTATION					IMPOUNDMENT									
	A	B	C	D	E	A	B	C	D	E	F	G	H	I	J
PLATYHELMINTHES	-	-	-	-	-	-	10	-	10	-	5	-	50	10	-
OLIGOCHAETA	5	-	20	10	5	5	-	40	5	10	5	10	5	5	-
HIRUDINEA	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-
GASTROPODA	-	-	-	-	-	-	-	10	-	5	5	-	-	-	-
SPHAERIIDAE	-	-	-	5	-	-	-	-	-	-	-	-	5	25	-
ASELLIDAE	-	-	-	-	-	-	5	5	-	10	5	5	5	-	-
GAMMARIDAE	-	-	-	10	-	-	-	10	-	10	50	-	5	10	-
Isonychia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BAETIDAE	-	10	20	5	-	-	5	-	5	-	-	5	-	-	5
HEPTAGENIIDAE	5	10	-	20	5	5	5	-	5	5	5	5	-	5	5
LEPTOPHLEBIIDAE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPHEMERELLIDAE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caenis/Tricorythodes	5	20	10	5	15	-	-	-	-	-	-	-	-	-	-
PLECOPTERA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Psephenus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
Optioservus	5	10	-	-	-	-	-	-	-	-	-	-	-	5	-
Promoresia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stenelmis	5	10	10	5	20	5	5	10	10	-	5	35	-	5	10
PHILOPOTAMIDAE	-	-	-	-	-	5	-	-	5	-	-	-	-	-	30
HYDROPSYCHIDAE	25	10	-	20	30	50	15	10	10	10	10	20	5	15	20
HELICOPSYCHIDAE/ BRACHYCENTRIDAE/ RHYACOPHILIDAE	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-
SIMULIIDAE	5	10	-	-	5	5	-	5	-	35	10	5	-	-	15
EMPIDIDAE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHIRONOMIDAE															
Tanypodinae	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-
Cardiocladius	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cricotopus/ Orthocladius	25	-	10	5	5	5	25	5	-	10	-	5	10	-	-
Eukiefferiella/ Tvetenia	-	-	10	-	5	5	15	-	-	-	-	-	-	-	-
Parametriocnemus	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-
Chironomus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polypedilum aviceps	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polypedilum (all others)	10	10	10	5	5	5	-	-	20	-	-	5	5	5	5
Tanytarsini	10	10	10	10	5	5	10	5	30	-	-	5	10	10	5
TOTAL	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

APPENDIX XI. MACROINVERTEBRATE COMMUNITY PARAMETERS FOR SANDY STREAMS

Stream habitats dominated by slow current speeds and smaller overall sediment particle size, mostly gravel, sand, and silt, require different methods of data analysis compared to streams with rubble/gravel riffles. The criteria used to interpret the invertebrate data and assess water quality were selected to account for habitat influences in order to separate water quality influences. The following indices and scales were used:

1. Species richness. This is the total number of species or taxa found in the sample. Expected ranges for 100-specimen subsamples of kick samples are: greater than 21, non-impacted; 17-21, slightly impacted; 12-16, moderately impacted; less than 12, severely impacted.

2. EPT richness. EPT denotes the total number of species of mayflies (Ephemeroptera), stoneflies (Plecoptera), and caddisflies (Trichoptera) found in an average 100-organism subsample. The scale for navigable waters was also used for this index. Expected ranges are: greater than 5, non-impacted; 4-5, slightly impacted; 2-3, moderately impacted; and 0-1, severely impacted.

3. Biotic index. The Hilsenhoff Biotic Index, the average tolerance value for all the organisms in the sample, ranges from intolerant (0) to tolerant (10). The scale of expected values set for slow sandy streams is: 0-5.50, non-impacted; 5.51-7.00, slightly impacted; 7.01-8.50, moderately impacted; and 8.51-10.00, severely impacted.

4. NCO richness. NCO denotes the total number of species of organisms other than those in the groups Chironomidae and Oligochaeta. Since Chironomidae and Oligochaeta are generally the most abundant groups in impacted communities, NCO taxa are considered to be less pollution tolerant, and their presence would be expected to be more indicative of good water quality. The scale used for slow sandy streams is: greater than 10, non-impacted; 6-10, slightly impacted; 2-5, moderately impacted; and 0-1, severely impacted.

These scales were developed using Long Island data in addition to data from several statewide sites with habitats similar to the Long Island streams. The scales were adjusted to make the indices corroborative, leading to accurate water quality assessments. Overall water quality is assigned by normalizing the four index values on a common ten-scale, and calculating the average of the four indices. Percent model affinity was not selected as an index, because there was no single prevailing community composition among the sites.

APPENDIX XII. EFFECTS OF LAKE OUTLETS AND IMPOUNDMENTS ON AQUATIC INVERTEBRATE COMMUNITIES

Lakes, ponds, and impoundments have pronounced effects on the invertebrate faunas of their outflows. Although each outflow is dependent on the characteristics of the lake, most outflows share the following traits:

1. Species richness is nearly always lower below lake outlets. Due primarily to the lack of upstream communities to provide a resource for colonization and drift, lake outlet communities often have only about 60% of the number of species found in comparable non-impacted segments. EPT richness is often only 30% of that found at non-impacted sites. Biotic index values and percent model affinity values are also depressed (see below).

2. Several types of invertebrate communities are found downstream of impoundments. Invertebrates which are commonly numerous below lake outlets include *Simulium* (black fly larvae), *Cheumatopsyche* or *Hydropsyche* (filter-feeding caddisflies), *Nais* (worms), *Gammarus* (crustacean), *Rheotanytarsus* (midges), *Stenelmis* (riffle beetles) *Sphaerium* (fingernail clams), or Platyhelminthes (flatworms). To date, 10 community types have been identified from streams in New York State.

3. A marked succession of species often occurs over a short distance. Productivity may be initially high below the lake, but usually decreases a short distance downstream. Plankton carried downstream from the lake increases the biomass immediately downstream, primarily of organisms which feed by filtering plankton, such as certain caddisflies, black flies, and midges. This enriching effect does not persist very far downstream, as the plankton is diminished, and communities below this may have very low productivity.

4. Lakes with cold-water hypolimnion releases limit the fauna additionally by interference with life cycles of aquatic insects such as mayflies, stoneflies, and caddisflies. Because the temperature of hypolimnetic releases is usually very cold, the downstream communities are often limited to midges, worms, black flies, snails, and sowbugs.

5. Water quality assessments of impoundment-affected sites usually indicate slight or moderate impact. Of 25 lake-affected stream sites across New York State, the following index means and ranges were obtained: species richness: 17 (7-24); EPT richness: 4 (0-12); Hilsenhoff biotic index: 5.83 (4.48-8.22); Percent Model Affinity: 45 (24-67). Correct interpretation of these assessments should reflect that although the resident fauna is affected, the impact is usually not a pollutional impairment. However, faunal effects caused by hypolimnion releases should be considered temperature-related and anthropogenic.

6. Corrective action for data judged to be affected by lake outlets is the adjustment of the water quality assessment up one category (e.g., slightly impacted to non-impacted) to reflect genuine water quality.

APPENDIX XIII. MULTIPLATE SAMPLING FOR MACROINVERTEBRATES.

1. Rationale: Multiplates (multiple-plate samplers) are a type of artificial-substrate sampling device. They are used in flowing waters that are too deep for kick sampling. Artificial substrates collect a macroinvertebrate sample by providing a substrate for macroinvertebrate colonization for a fixed exposure period, after which the sampler is retrieved and the attached organisms are harvested. The use of artificial substrate samplers allows the comparison of results from different locations and times by providing uniformity of substrate type, depth, and exposure period.

2. Site selection: Sites should have comparable current speed to both upstream and downstream sites to the degree possible. The specific sampling location is preferably a pool or run, rather than a riffle.

3. Sampler construction: The sampler design is 3 square hardboard plates, separated by spacers, mounted on a turnbuckle. Three square plates of tempered hardboard (smooth on both sides) are cut to the size of 6 inches (15 cm) on each side. A 1/4 inch hole is drilled through the center of each. The top plates are separated by the single spacer, and the bottom plates are separated by the triple spacer. The total exposed surface area of the sampler is 0.14 square meters (1.55 square feet).

4. Sampler placement: Two sampling units are placed at each site during routine monitoring to increase the chances of recovering at least one sample in case of vandalism, washout, or mishandling during retrieval. If navigation buoys are used, samplers are suspended with plastic-coated cable attached to a suitable above-water portion of the buoy. Samplers are installed 1.0 meter below the water surface. If navigation buoys are not available and stream depth is greater than 0.5 meters deep, the sampler is suspended from a float constructed of a two-liter plastic bottle filled with styrofoam chips. The float is anchored with a three-holed concrete block, 4 x 8 x 16 inches.

5. Sampler retrieval: Samplers are retrieved 5 weeks after placement. The sampler is removed from the water and placed in a bucket of stream water, then is disassembled using pliers and/or screwdrivers. All accumulated organisms and other material are scraped from the plates with a 3-inch wide paint scraper into the water in the bucket. The resultant slurry is poured into a U.S. no. 30 standard sieve, the residue rinsed with river water, and placed in a 4-ounce glass jar. 95% ethyl alcohol is added to fill the jar

6. Sample sorting and subsampling:. The sample with the most accumulated material is selected for processing. A quarter subsample is examined under a dissecting stereo-microscope and the organisms are removed from the debris. As they are removed, they are sorted into major groups, placed in vials containing 70% ethyl alcohol, and counted. All identified specimens are archived.

7. Organism identification: organisms are identified as for kick sampled. Chironomidae are subsampled for 100 individuals, and Oligochaeta are subsampled for 50 individuals.

8. Assessment: Four indices are used: SPP (species richness), HBI (Hilsenhoff Biotic Index), EPT (EPT richness), and DIV (species diversity). Values from the four indices are converted to a common 0-10 scale and averaged.

APPENDIX XIV. PONAR SEDIMENT SAMPLING FOR MACROINVERTEBRATES.

1. Rationale: The use of the Ponar grab sampler or Petite Ponar grab sampler provides a quantitative sample of soft sediments in rivers or lakes. The sampler is designed to penetrate the substrate by its own weight, and enclose a portion of the bottom by means of a gravity-activated closing mechanism. The standard Ponar measures nine inches on each side, enclosing a surface area of 0.56 square feet (0.052 square meters). The Petite Ponar measures six inches on each side, enclosing a surface area of 0.25 square feet (0.023 square meters).

2. Site selection: Substrates in rivers and lakes that may be sampled with a Ponar grab sampler include: gravel, sand, silt, and clay. Substrates with larger rocks or wood may be difficult or impossible to sample, since these objects may block the jaws during closing, causing loss of part of the sample.

3. Time of sampling: The preferred sampling time for Ponar sampling is May-October. In cases where samples are being taken to compare with previous collections, the sampling time should concur with the previous time-of-year.

4. Sampling: Sampling is usually conducted from a boat. The sampler is lowered over the side of the boat with a cable or rope, and is lowered to the bottom of the waterbody. Lowering in the final meter above the bottom should be a freefall, to allow the sampler to penetrate the bottom. Upon reaching the bottom, the closing mechanism is activated, and the sampler is retrieved. After the sampler breaks the water surface, a bucket or tub is placed beneath to catch any escaping materials. The sampler is then opened, and the contents are sieved in a bucket with a U.S. Standard No. 30 mesh sieve (0.590 mm openings). The residue may then be examined, and the major groups of organisms are recorded, usually on the ordinal level (e.g., stoneflies, mayflies, caddisflies). Larger rocks, sticks, and plants may be removed from the sample if organisms are first removed from them. The contents of the sieve are then transferred to a quart jar. The sample is then preserved with 95% ethyl alcohol.

5. Sample sorting and subsampling: In the laboratory the sample is rinsed with tap water in a U.S. No. 40 standard sieve to remove any fine particles left in the residues from field sieving. The sample is transferred to an enamel pan and distributed homogeneously over the bottom of the pan. A small amount of the sample is randomly removed with a spatula and placed in a petri dish with water. This portion is examined under a dissecting stereomicroscope and 100 organisms are removed from the debris. As they are removed, they are sorted into major groups, placed in vials containing 70 percent alcohol, and counted.

6. Organism Identification: All organisms are identified to the species level whenever possible. Chironomids and oligochaetes are slide-mounted and viewed through a compound microscope; most other organisms are identified as whole specimens using a dissecting stereomicroscope. The number of individuals in each species, and the total number of individuals in the sample is recorded on a data sheet.

7. Assessment: Five indices are used: SPP (species richness), HBI (Hilsenhoff Biotic Index), DOM3 (Dominance-3), PMA (Percent Model Affinity), and DIV (species diversity). Values from the five indices are converted to a common 0-10 scale and averaged.