New York State
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Water

Upper Mohawk River Coliform Bacteria Monitoring Project

Portions 12 and 13 in the Utica-Rome Area

June 2012 - September 2012

November 2013
(Revised January 2014)

EXECUTIVE SUMMARY

This report presents the results of coliform bacteria monitoring conducted by the New York State Department of Environmental Conservation (NYSDEC) from June through September 2012 in portions 12 and 13 of the Mohawk River (see Figure 2). Water sampling was conducted at two stations: Mohawk River in West Schuyler (Portion 12) and Mohawk River near Oriskany (Portion 13). Twenty-two samples per station were collected and analyzed for total and fecal coliform bacteria. Field parameters of dissolved oxygen, specific conductance, pH and temperature were also measured at each station during sampling.

Portions 12 and 13 of the Mohawk River are listed in the *Final 2012 Section 303(d) List, Part 1 - Individual Waterbody Segments with Impairment Requiring Total Maximum Daily Load (TMDL) Development*. Pollutants and water quality indicators listed in the Section 303(d) list include floatables (aesthetics), pathogens and dissolved oxygen/oxygen demand. Pollution sources contributing to impairment include Combined Sewer Overflows (CSOs), Sanitary Sewer Overflows (SSOs), and urban stormwater runoff.

The goal of the project was to collect and test samples for coliform frequently enough to satisfy the requirements of New York State Water Quality Standards (at least five samples per month). NYSDEC uses coliform bacteria as an indicator of pathogens. The water quality standard for coliform is based on a minimum of five examinations within a calendar month for Class B and C waterbodies. Portion 12 is designated Class C water and Portion 13 is designated Class B water.

Previous coliform studies by NYSDEC have consisted of long-term trend monitoring on a statewide level. With more than 80,000 miles of streams and rivers, it would not be practical to collect and test water samples for coliform on a statewide level at the minimum frequency needed to comply with the water quality standard. Therefore, NYSDEC periodically conducts studies like this one on specific waterbody portions.

The water quality standard for fecal coliform states that the monthly geometric mean from a minimum of five examinations shall not exceed 200 numbers/100 mL during all periods when disinfection is practiced. Project results confirmed that portions 12 and 13 of the Mohawk River exceeded the water quality standard for numbers of fecal coliform as follows:

West Schuyler (Station 12010101) - The water quality standard for fecal coliform was exceeded during all four months at this station on Portion 12 of the Mohawk River, downstream of the significant discharge points. The geometric mean of all samples collected was 1,146 numbers/100 mL.

Oriskany (Station 12010116) - The water quality standard for fecal coliform was exceeded during three of four months at this station on Portion 13 of the Mohawk River, upstream of the significant discharge points. The geometric mean of all samples collected in 2012 was 273 numbers/100 mL.

The current restoration strategy for the upper Mohawk River includes the elimination of the SSO at the Sauquoit Creek Pumping Station and implementation of a CSO Long-Term Control Plan

by the City of Utica. However, project results suggest that, even after the current restoration strategy has been implemented, water quality standards for fecal coliform may not be achieved. Relatively high fecal coliform results at the downstream station during periods of dry weather indicate that sources of pollution in addition to SSOs, CSOs and urban stormwater runoff are contributing to impairment of the upper Mohawk River. Therefore, in order to comply with the Clean Water Act, a TMDL pollution reduction plan must be developed for the upper Mohawk River.

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New York State
Department of Environmental Conservation
Division of Water
Region 6
207 Genesee Street
Utica, New York 13501-2885

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TABLE OF CONTENTS

1. INTRODUCTION 1
2. BACKGROUND 2
3. MONITORING PROJECT 6
   A. Monitoring Locations 6
   B. Quality Assurance 9
4. FIELD PARAMETER RESULTS 11
   A. Dissolved Oxygen 11
   B. Specific Conductance 12
   C. pH 13
   D. Water Temperature 14
5. COLIFORM TEST RESULTS 15
   A. Total Coliform 17
   B. Fecal Coliform 19
   C. Baseline Fecal Coliform Levels 20
6. COMPARISON WITH PREVIOUS STUDIES 22
7. CONCLUSIONS 25
8. RECOMMENDATIONS 26
9. REFERENCES 28
APPENDIX A. MONITORING RESULTS 30

LIST OF FIGURES

Figure 1. Upper Mohawk River Watershed 5
Figure 2. Location of Upper Mohawk River Monitoring Stations in 2012 6
Figure 3. Upper Mohawk River Monitoring Stations in 2012 8
Figure 4. Upper Mohawk River Sampling Schedule in 2012 8
Figure 5. Upper Mohawk River Dissolved Oxygen Measurements in 2012 12
Figure 6. Upper Mohawk River Specific Conductance Measurements in 2012 13
Figure 7. Upper Mohawk River pH Measurements in 2012 14
Figure 8. Upper Mohawk River Temperature Measurements in 2012 15
Figure 9. Upper Mohawk River Median Total Coliform Results in 2012 18
Figure 10. Upper Mohawk River Total Coliform Percent Exceedance in 2012 18
Figure 11. Upper Mohawk River Fecal Coliform Results in 2012 19
Figure 12. Fecal Coliform Distribution Curve for Mohawk River in West Schuyler 21
Figure 13. Fecal Coliform Distribution Curve for Mohawk River near Oriskany 22
Figure 14. Mohawk River Monitoring Stations 24
Figure 15. Upper Mohawk River Watershed Fecal Coliform Results for 2001 - 2012 25

LIST OF TABLES

Table 1. Upper Mohawk River Monitoring Stations in 2012 6
Table 2. Analytical Specifications 9
Table 3. Summary of Field Parameter Results for Mohawk River in West Schuyler 11
Table 4. Summary of Field Parameter Results for Mohawk River near Oriskany 11
Table 5. Upper Mohawk River Coliform Results in 2012 17
Table 6. Upper Mohawk River Watershed Monitoring Stations from 2001 - 2012 23

LIST OF ACRONYMS

CFR	Code of Federal Regulations
CSO	Combined Sewer Overflow
DO	Dissolved Oxygen
EPA	See USEPA
LTCP	Long-Term Control Plan
NYCRR	New York State Code of Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
QAPP	Quality Assurance Project Plan
RIBS	Rotating Integrated Basin Studies
SPDES	State Pollutant Discharge Elimination System
SSO	Sanitary Sewer Overflow
TMDL	Total Maximum Daily Load
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WI/PWL	Waterbody Inventory/Priority Waterbodies List

1. INTRODUCTION

The Federal Clean Water Act requires states to periodically assess and report on the quality of waters of the state. Section 305(b) of the Act requires states to submit a report on the quality of the waters of the state every two years. Section 303(d) of the Act requires states to identify, compile and submit every two years a list of "impaired waters," or waters for which designated uses are not fully supported. In order to restore and protect the designated uses of impaired waters, states must consider the development of a Total Maximum Daily Load (TMDL) pollution reduction strategy, or another strategy that reduces the input of the specific pollutant(s) that restrict uses.

In order to fulfill the requirements of Section 305(b) of the Federal Clean Water Act, New York State Department of Environmental Conservation (NYSDEC) initiated a Statewide Water Monitoring Program that provides regular, periodic assessments of the quality of the water resources in the state and their ability to support specific uses. These assessments reflect monitoring and water quality information drawn from a number of programs and sources, both within and outside NYSDEC.

NYSDEC maintains information on how well waters support their designated uses, including which waters are impaired and which have lesser water quality impacts. This information is compiled in the Waterbody Inventory/Priority Waterbodies List (WI/PWL) database. The Waterbody Inventory refers to a listing of all waters, identified as specific individual waterbodies or "assessment units," within the state. The WI/PWL assessments provide the foundation for the Section 305(b) Water Quality Report on all waters of the state, and the Section 303(d) List of waters not meeting water quality standards nor supporting water uses.

A core component of the Statewide Water Monitoring Program is the Rotating Integrated Basin Studies (RIBS) Program. Water quality information collected through the RIBS program is used to support water quality assessments made through the WI/PWL. The RIBS program is designed such that all major drainage basins in the state are monitored every five years for selected monitoring stations.

The Mohawk River is divided into several assessment units. Portions 12 and 13 of the Mohawk River are listed in the *Final 2012 Section 303(d) List, Part 1 - Individual Waterbody Segments with Impairment Requiring TMDL Development*. Pollutants and water-quality indicators listed include floatables (aesthetics), pathogens and dissolved oxygen/oxygen demand.

Water quality regulations, classifications and standards of quality and purity are promulgated under Title 6 of the *Official Compilation of Codes, Rules and Regulations of the State of New York, Chapter X, Parts700-706 (6 NYCRR Parts 700-706)*. Water quality standards for coliform bacteria are found 6 NYCRR Part 703.4. NYSDEC uses coliform bacteria as an indicator of pathogens.

Water quality standards for coliform are based on a minimum of five examinations within a calendar month. However, coliform samples collected through the RIBS program are typically

collected at a frequency of one sample per month during April through October for watersheds scheduled for intensive sampling. For the Mohawk River watershed, this most recently occurred in 2001, 2006, and 2011. With thousands of streams and rivers covering more than 80,000 miles in New York State, it would not be practical to collect coliform samples at a minimum frequency of five per month on a statewide basis.

The purpose of this project was to focus on testing pathogen-impaired segments of the Mohawk River for coliform by collecting coliform samples at a minimum frequency of five per month as required by water quality standards. The months from June through September were specifically selected because this is the period when municipal wastewater treatment plants are required to disinfect treated wastewater being discharged to Portions 12 and 13 of the Mohawk River.

In addition to testing for coliform, field parameters of dissolved oxygen, specific conductance, pH and water temperature were measured at the time of sample collection.

This project will contribute to the Statewide Water Monitoring Program and assist in the overall development of water management strategies to protect and improve New York State's natural resources. Specific uses of the data generated by this project include:

- Confirming that the designated uses of the Mohawk River are not fully supported.
- Establishing baseline conditions for evaluating the effectiveness of NYSDEC regulatory activities, which in part require that the City of Utica implement a Combined Sewer Overflow (CSO) Long-Term Control Plan (LTCP) and that Oneida County eliminate wet weather Sanitary Sewer Overflow (SSO) at the Sauquoit Creek Pumping Station.
- Providing additional water quality data should further studies be conducted on portions 12 and 13 of the Mohawk River.
- Supporting NYSDEC State Pollutant Discharge Elimination System (SPDES) permitting and compliance activities.
- Providing water quality data to stakeholders and the general public.

Funding for this project is made possible through the Clean Water Act Section 106 Monitoring Initiative, administered by U. S. Environmental Protection Agency (EPA).

2. BACKGROUND

The Mohawk River extends from its headwaters in Central New York State to its eastern confluence with the Hudson River. It has a drainage area of 3,470 square miles. From its headwaters in southern Lewis County at Mohawk Hill, it flows 30 miles south towards Rome. At Rome, the river turns east and flows 130 miles until it reaches its confluence with the Hudson River in Cohoes.

The upper Mohawk River at the end point of Portion 12 drains an area of 570 square miles. The three largest tributaries include Oriskany Creek, Ninemile Creek and Sauquoit Creek. 178,000 people (Census, 2001) live in this section of the drainage basin. Population centers along the main stem include the cities of Utica and Rome, and the villages of New York Mills, Yorkville, Whitesboro, New Hartford and Oriskany.

The upper Mohawk River and Erie Canal are separate water courses, except for a short section where they are combined. Flows in the upper Mohawk River are regulated by the New York State Canal Corporation through a complex system that includes Delta Reservoir, feeder canals, locks, guard gates and lateral overflow weirs. During canal navigation season, a small portion the Mohawk River flow is diverted out of the Mohawk Basin at Rome and flows west towards Oneida Lake to supply water for canal lockages.

Historically, the upper Mohawk River was used for wastewater disposal and had become severely polluted. Sanitary and industrial wastes from the City of Utica were discharged raw and several adjoining municipalities discharged either raw or partially treated wastewater (Joint Municipal Survey Committee, 1964). In 1965, the Oneida County Sewer District was formed to provide a common solution to the wastewater problems in the Utica area. Construction of the Oneida County Water Pollution Control Plant began in 1968 and the plant became operational in 1971. In 1984, significant upgrades were initiated that expanded the overall treatment capacity as well as providing advanced treatment from June through October. Currently, the facility serves 15 municipalities within the sewer district. The facility is required to disinfect its treated effluent during the months of June through September.

Although significant and steady improvement in overall water quality has been made since construction of the regional treatment facility, combined sewer overflows (CSOs) and sanitary sewer overflows (SSOs) continue to contribute to the impairment of the upper Mohawk River (NYSDEC, 2010).

Combined sewer systems are sewers that were originally designed to carry both stormwater and sanitary sewage in the same pipe. During dry weather, flows from combined sewers are transported to a treatment plant where it is treated and then discharged to a receiving waterbody. However, during wet weather, flows often exceed the hydraulic capacity of sewer system and/or treatment plant and the excess flow is diverted to a waterbody without treatment. The discharge of excess flow from combined sewers is considered a CSO and can contain a combination of stormwater, industrial waste and untreated human waste. CSOs are allowed under the Clean Water Act provided that they comply with EPA's 1994 CSO Control Policy which sets national standards for the control of CSO discharges.

About 50 percent of the sewer system serving the City of Utica consists of combined sewers. The city was required to develop a CSO Long-Term Control Plan (LTCP) as a condition of its SPDES permit. CSO simulation modeling conducted by the city suggests that during a typical year, the total volume of CSO discharges to the Mohawk River is approximately 480 million gallons (City of Utica, 2010). The LTCP is scheduled to be fully implemented by 2021 and will increase the annual capture and treatment of CSO volume from 68 to 90 percent.

An SSO is an overflow, spill or release of raw or partially treated sanitary sewage that results in discharge to a waterbody prior to reaching a wastewater treatment plant. A major distinction between SSOs and CSOs is that SSOs occur in systems where storm sewers and sanitary sewers are not connected. SSOs are typically caused by undersized treatment works, equipment failures, excessive inflow/infiltration into a sanitary sewer system, and plugged sewer pipes. SSOs are prohibited under Clean Water Act.

The Sauquoit Creek Pumping Station is owned and operated by Oneida County Department of Water Quality and Water Pollution Control. It serves nine municipalities upstream of the City of Utica. During wet weather, flows can exceed the capacity of the pump station force main. The pump station runs the excess sewage through screens and then discharges the screened sewage directly into the Mohawk River. SSO simulation modeling conducted by Oneida County suggests that during a typical year, the volume of SSO discharges to the Mohawk River totals approximately 332 million gallons (Oneida County, 2010). Oneida County is currently under a NYSDEC issued consent order requiring that it eliminate SSOs by 2021.

Other sources of pollution believed to be affecting the Mohawk River include urban stormwater runoff and historic/past industrial discharges (NYSDEC, 2010). PCB's from contaminated sediment have led to a fish consumption advisory by New York State Department of Health (NYSDOH) along the Mohawk River from Oriskany Creek to West Canada Creek, and for Sauquoit Creek (NYSDOH, 2012). A number of inactive hazardous waste sites in the area may also be affecting water quality (NYSDEC, 2010).

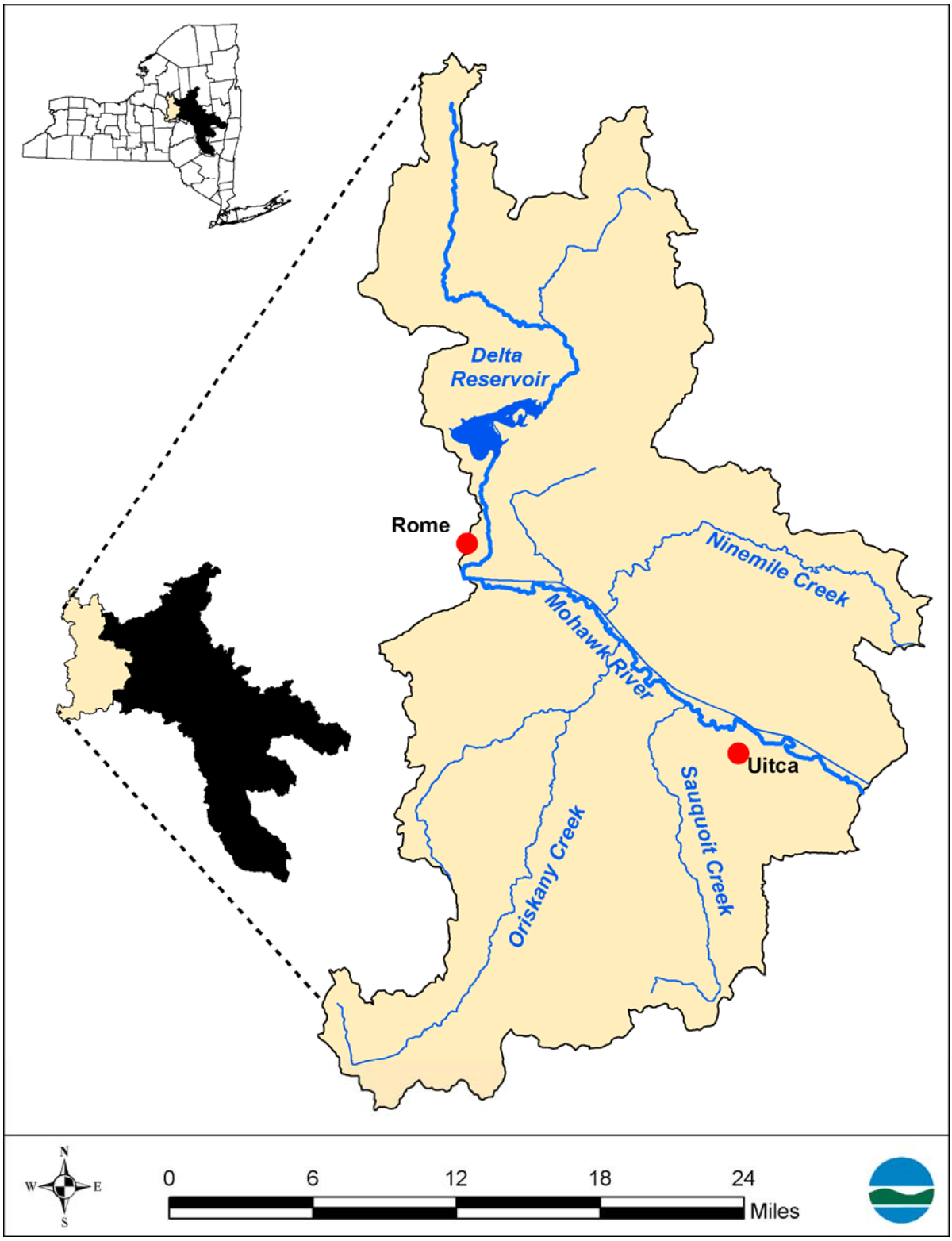


Figure 1. Upper Mohawk River Watershed

3. MONITORING PROJECT

A. Monitoring Locations

The two monitoring stations for this project are provided in Table 1 and Figure 2. The stations were chosen based on the sampling suitability, physical location, and availability of previously collected data.

Table 1. Upper Mohawk River Monitoring Stations in 2012

Station Id	Station Name	Latitude	Longitude
12010101	Mohawk River in West Schuyler	43.09083	-75.15722
12010116	Mohawk River near Oriskany	43.16500	-75.32558

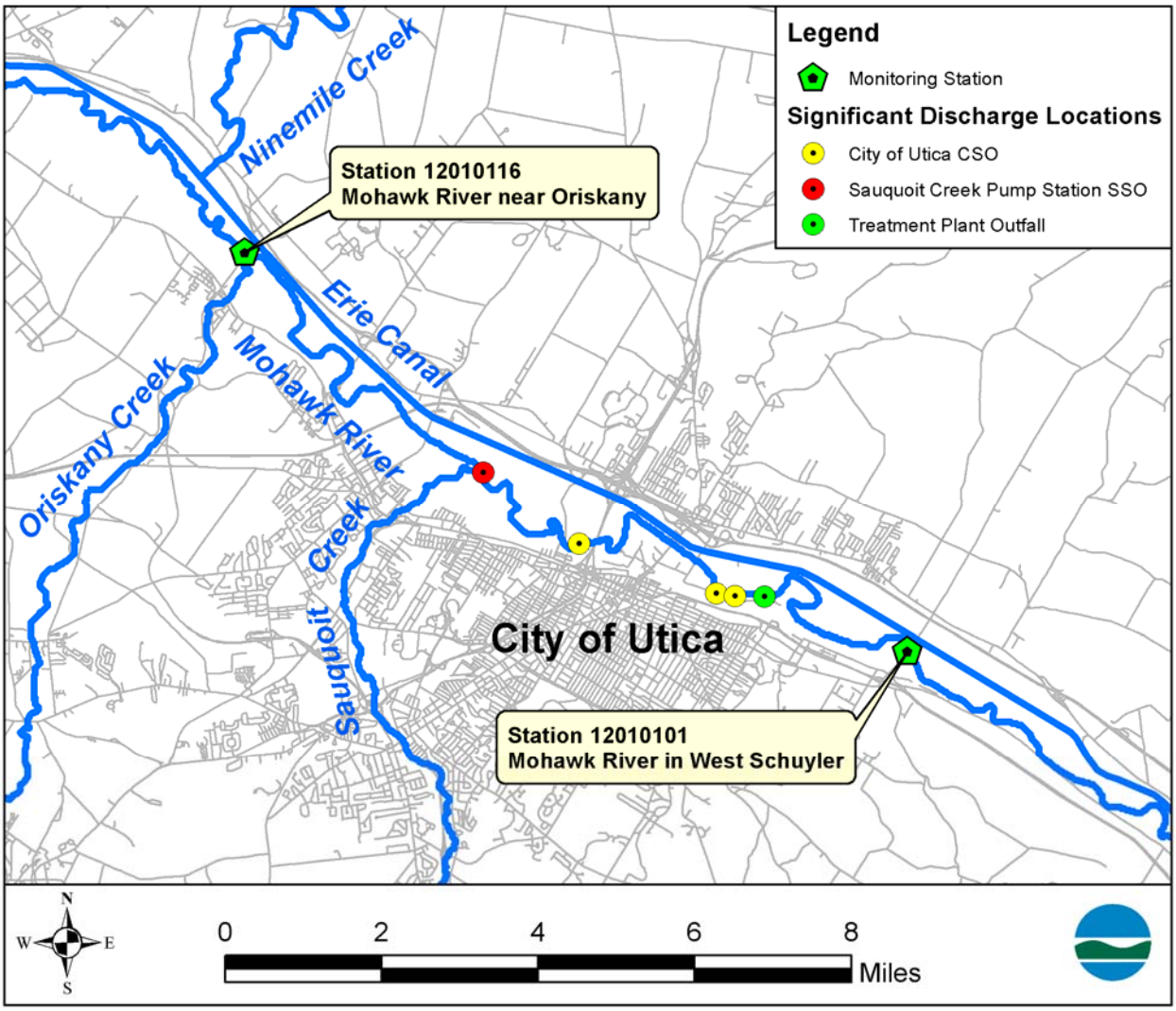


Figure 2. Location of Upper Mohawk River Monitoring Stations in 2012

Station 12010101, Mohawk River in West Schuyler, is located off of Dyke Road near the Oneida/Herkimer County boundary. The station is 3.9 river miles downstream from the City of Utica measured from the Genesee Street Bridge. The station is located in Portion 12 of the Mohawk River, which is the 13.6 mile segment between Sauquoit Creek in the Town of Whitestown, and Bonny Brook in the Town of Frankfort.

Portion 12 is classified as Class C fresh surface water. The best usage of Class C water is fishing. These waters shall be suitable for fish, shellfish and wildlife propagation and survival. The water quality shall be suitable for primary contact recreation (swimming) and secondary contact recreation (boating), although other factors may limit their use for these purposes.

The site in West Schuyler was selected because it is a routine RIBS monitoring station that is sampled every year for basic water quality parameters and every five years during intensive sampling that includes additional water quality parameters.

The U. S. Geologic Survey (USGS) maintains flow gage station USGS 01342602, Mohawk River near Utica NY. This gage is located on the Dyke Road Bridge. During this project, NYSDEC staff manually took flow measurements here by lowering a weighted wire until it met the water's surface and reading the corresponding distance, indicating flow height, off a distance meter. A flow rating curve for various height measurements was provided by USGS. Having accurate stream flow data that corresponds with water quality information is critical for data analysis and DEC appreciates USGS's support and use of its monitoring station.

Station 12010116, Mohawk River near Oriskany, is located off of River Street in the Town of Whitestown. The station is 10.5 river miles upstream from the City of Utica measured from the Genesee Street Bridge. This station is located in Portion 13 of the Mohawk River just above the confluence with Oriskany Creek. Portion 13 is the 7.6 mile segment between the Floyd-Marcy Town line to Sauquoit Creek in the Town of Whitestown.

Portion 13 is classified as Class B fresh surface water. The best usages of Class B fresh surface waters are primary and secondary contact recreation, and fishing. These waters shall be suitable for fish, shellfish, and wildlife propagation and survival.

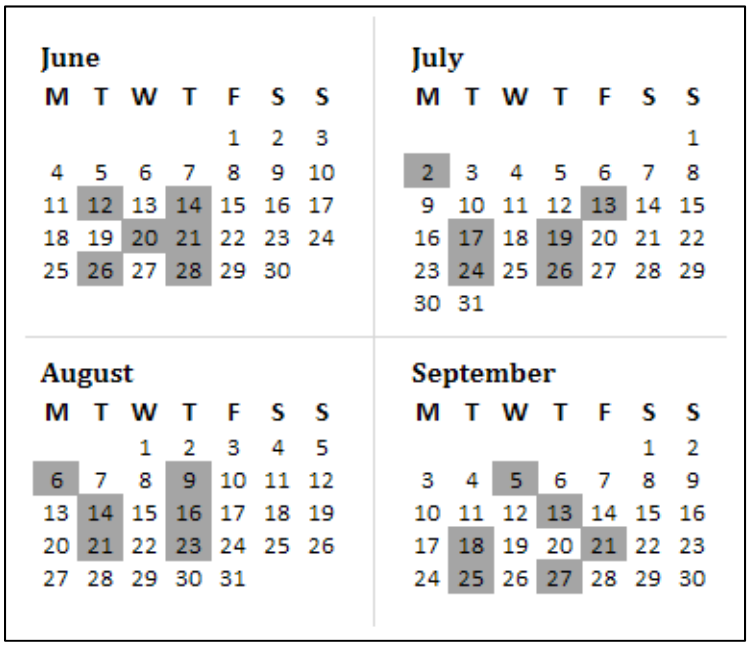
The Oriskany site, located in the Oriskany Flats Wildlife Management Area, was selected because it is easily accessible and upstream of SSO/CSO discharges. NYSDEC collected additional water quality data here during 2010 as part of a preliminary study of Portion 14 of the Mohawk River.

Mohawk River in West Schuyler

Mohawk River near Oriskany

Figure 3. Upper Mohawk River Monitoring Stations in 2012

Sample collection was scheduled in advance and did not target specific weather conditions in order to ensure sampling represented average conditions. Samples were scheduled to be collected at a frequency of six per month, allowing the project goal of a minimum of five per month to be met if one sampling occasion was missed due to unforeseen circumstances. Samples were typically scheduled on Tuesdays and Thursdays, however, due to scheduling conflicts and work load demand, field staff found it necessary to make adjustments to the schedule as needed. The sampling schedule as performed for this project is provided in Figure 4. Samples were always collected in the same order, with the station in West Schuyler being sampled first.



June

M	T	W	T	F	S	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

July

M	T	W	T	F	S	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

August

M	T	W	T	F	S	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

September

M	T	W	T	F	S	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

Figure 4. Upper Mohawk River Sampling Schedule in 2012

B. Quality Assurance

Quality assurance included the development and approval of a quality assurance project plan (QAPP) prior to starting the project and preparation of a data validation report when the project was finished. Both the QAPP and data validation reports are available upon request. By following documented quality control procedures, a level of confidence in the data set, and interpretations and conclusions drawn from it, can be established.

Sampling procedures and equipment calibration followed NYSDEC Division of Water standard operating procedures (SOPs). Field parameters of temperature, dissolved oxygen, pH and specific conductance were measured when samples were collected using a YSI 556 multi-parameter handheld meter.

Samples were analyzed for fecal and total coliform by Verona Laboratory, Incorporated. Verona Laboratory is a commercial facility certified by the NYSDOH Environmental Laboratory Approval Program (ELAP). Verona Laboratory was responsible for maintaining internal quality control as a part of its quality assurance plan and in accordance with the NYSDOH ELAP certification manual.

Analytical methods for this project were in accordance with *Title 40 of the Code of Federal Regulation, Part 136, Guidelines Establishing Test Procedures for the Analysis of Pollutants* (40 CFR Part 136). Specific analytical methods and criteria for precision, accuracy and detection limits are listed in Table 2.

Table 2. Analytical Specifications

Parameter	Analytical Lab	Standard Method	Precision	Accuracy	Calibration	Method Detection Limit	Reporting Limit
Total Coliform	Verona	9222B	--	--	--	1 CFU/100 mL	20. CFU/100 mL
Fecal Coliform	Verona	9221E	--	--	--	1 MPN/100 mL	20. MPN/100 mL
Temperature	Field Analysis	2550 B	± 1°C	± 1.5°C	Factory Set	± 0.1°C	± 0.1°C
Dissolved Oxygen	Field Analysis	4500-O G	± 1%	± 2%	Daily	± 0.1 mg/L	± 0.1 mg/L
pH	Field Analysis	4500-H^+ B	± 0.05 SU	± 0.05 SU	Weekly	± 0.1 SU	± 0.1 SU
Specific Conductance	Field Analysis	2510 B	± 1 µs/cm	± 1%	Weekly	± 1 µmhos/cm	± 10 µmhos/cm

Data validation is the review process used to qualify or reject data based on the established quality control procedures set forth by the project QAPP. Data validation for this project included data review, collecting duplicate and "field blank" samples, and determining the "percent completeness" of the samples collected in order to qualify the data as meeting the quality objectives of the project (See below for further explanation of data validation methods.). Twenty percent of the samples collected during the project were used for quality control.

Data Review

Calibration logs were reviewed to ensure that the monitoring equipment was operated in accordance with the project's analytical specifications. Field parameter results were reviewed to determine whether the values that were obtained were within expected ranges. Results were found to be consistent with surface water monitoring and no outliers were identified. Laboratory analysis reports for the coliform results were also reviewed to ensure that the allowable holding time of six hours, as specified in the QAPP, was not exceeded.

Duplicate Samples

Data precision was assessed by collecting duplicate samples. Duplicate samples were collected once a month at each site and analyzed for precision by calculating the relative percent difference (RPD) between them. It is unlikely that both samples would be identical due to natural variation, but to be considered valid, the relative percent difference between the two samples must be equal to or less than twenty percent (20%) when using the following formula:

$$RPD = \frac{(c_1 - c_2) \times 100\%}{(c_1 + c_2)/2}$$

where:

RPD	=	relative percent difference
c_1	=	larger of the two observed values
c_2	=	smaller of the two observed values

The total coliform sample collected on 06/20/2012 and the fecal coliform sample collected on 08/14/2012 were flagged as not meeting the quality assurance criteria for RPD. Sampling results for those two days were omitted from the final results.

Field Blank Samples

Field blanks were collected at each site once a month. Field blanks are used to check for sample contamination during collection and handling procedures. Blanks are sterile distilled water that is obtained from a newly opened bottle and transferred to an empty sterile sampling container. After a sample is collected from the waterbody being tested, the field blank is handled and transported in the same manner as the waterbody sample. Field blanks were analyzed for total and fecal coliform. No coliform was found in any of the field blanks.

Percent Completeness

Percent completeness is the number of samples *actually* collected and analyzed divided by the number of samples originally *intended* to be collected and analyzed, expressed as a percentage.

Percent completeness varies depending on the number of samples considered necessary to accomplish a project's goals and objectives. For this project, six samples were scheduled to be collected per month and the completeness requirement of a minimum of five collections per month, or 83% was met.

4. FIELD PARAMETER RESULTS

Tables 3 and 4 provide a statistical summary of the field parameters measured at each monitoring station in 2012.

Table 3. Summary of Field Parameter Results for Mohawk River in West Schuyler

	Temperature (ºC)	**Dissolved Oxygen (mg/L)**	**pH (SU)**	**Specific Conductance (umhos/cm)**
Number of Samples	22	22	22	22
Maximum	25.0	9.4	7.6	506
Minimum	15.9	6.3	6.1	409
Mean	21.3	7.7	7.1	453
Median	21.7	7.5	7.2	453
Standard Deviation	2.77	0.9	0.4	27.5

Table 4. Summary of Field Parameter Results for Mohawk River near Oriskany

	Temperature (ºC)	**Dissolved Oxygen (mg/L)**	**pH (SU)**	**Specific Conductance (umhos/cm)**
Number of Samples	22	22	22	22
Maximum	24.0	9.8	7.6	293
Minimum	15.7	6.6	6.3	213
Mean	20.5	8.2	7.2	256
Median	21.4	8.2	7.3	259
Standard Deviation	2.41	0.9	0.4	25.5

Results and comparisons of field parameters are presented in the following sections.

A. Dissolved Oxygen

The amount of dissolved oxygen in water is expressed in milligrams of oxygen per liter of water (mg/L). Dissolved oxygen (DO) is critical to the survival of all forms of aquatic life and is a good indicator of overall stream health. New York State's water quality standard for DO is defined in 6 NYCRR Part 703.3. For the Mohawk River, minimum daily average DO shall not be less than 5.0 mg/L, and at no time shall DO be less than 4.0 mg/L.

Many physical and biological factors can influence the level of DO in rivers and streams. Sources that contribute to DO levels include atmospheric replenishment, photosynthesis from aquatic plants, the churning of rapidly moving water, waterfalls and flow over dams. Sources that consume oxygen include aquatic animals, algal respiration, and decomposition of organic

material. Sources of organic material can include, but are not limited to particles contained in sediment, decaying aquatic plants, treated wastewater from sewage treatment plants, failing septic systems, CSO and SSO discharges, and stormwater runoff.

DO levels in streams will fluctuate over a 24-hour period and will vary with water temperature. Cold water has the ability to hold more oxygen than warmer water because of the solubility properties of oxygen in water.

DO results from this project are presented in Figure 5. Water quality standards for dissolved oxygen were maintained throughout the project. Overall, DO values were lower at the downstream monitoring station.

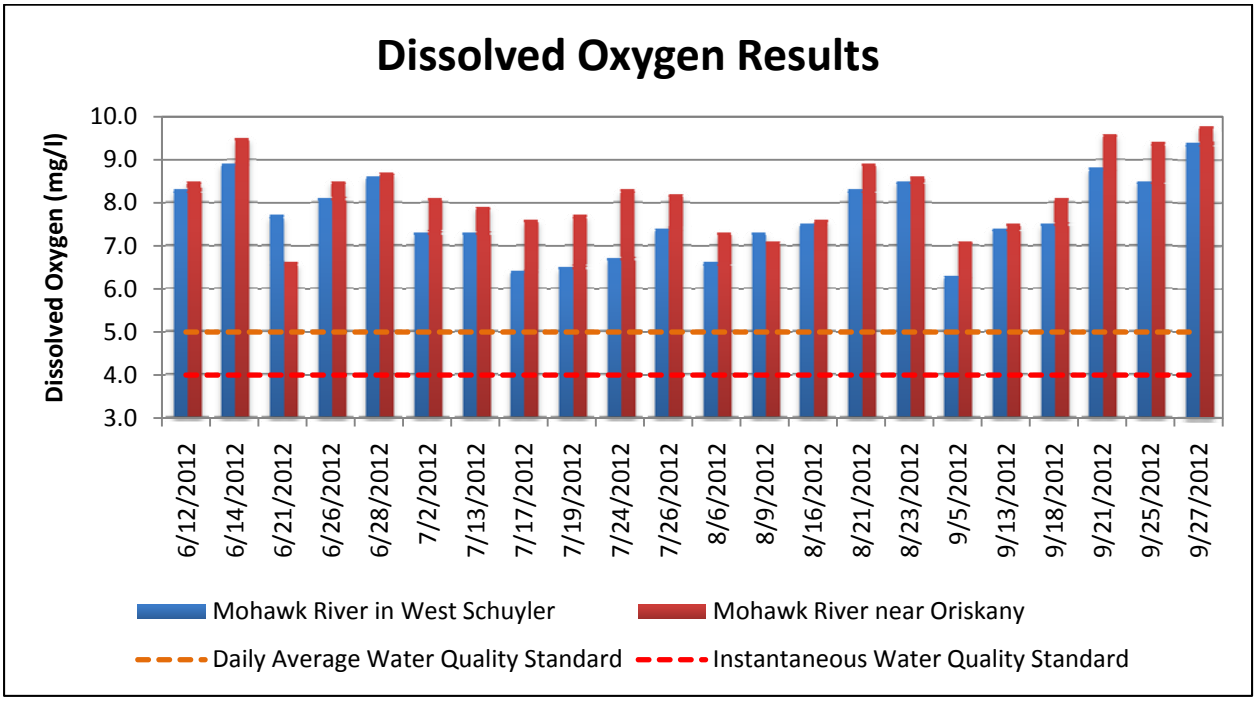


Figure 5. Upper Mohawk River Dissolved Oxygen Measurements in 2012

B. Specific Conductance

Specific conductance is used as an indicator of the impurities in water. Pure water conducts electricity very poorly and needs dissolved inorganic solids that carry either a negative or a positive charge in order to pass an electrical current. Specific conductance was measured in micromhos per centimeter (umhos/cm) compensated to 25 degrees Celsius. The higher the specific conductance, the higher the dissolved inorganic solids content in the water. New York State does not have a water quality standard for specific conductance.

Specific conductance in lakes and streams can be affected by natural conditions, such as the geological makeup of the area and soil erosion. Sources of water pollution, such as stormwater runoff and point source discharges, could also affect specific conductance of a waterbody.

Studies indicate that fresh water streams supporting good mixed fisheries have specific conductance ranging between 150 and 500 umhos/cm (USEPA, 1997). Specific conductance outside this range could indicate that the water is not suitable for certain species of fish and aquatic macroinvertebrates.

Specific conductance results for this project are shown in Figure 6. Results were relatively constant at each station, with the downstream station being noticeably higher than upstream station. Results indicate that overall impurities in the Mohawk River almost doubled between the two monitoring stations.

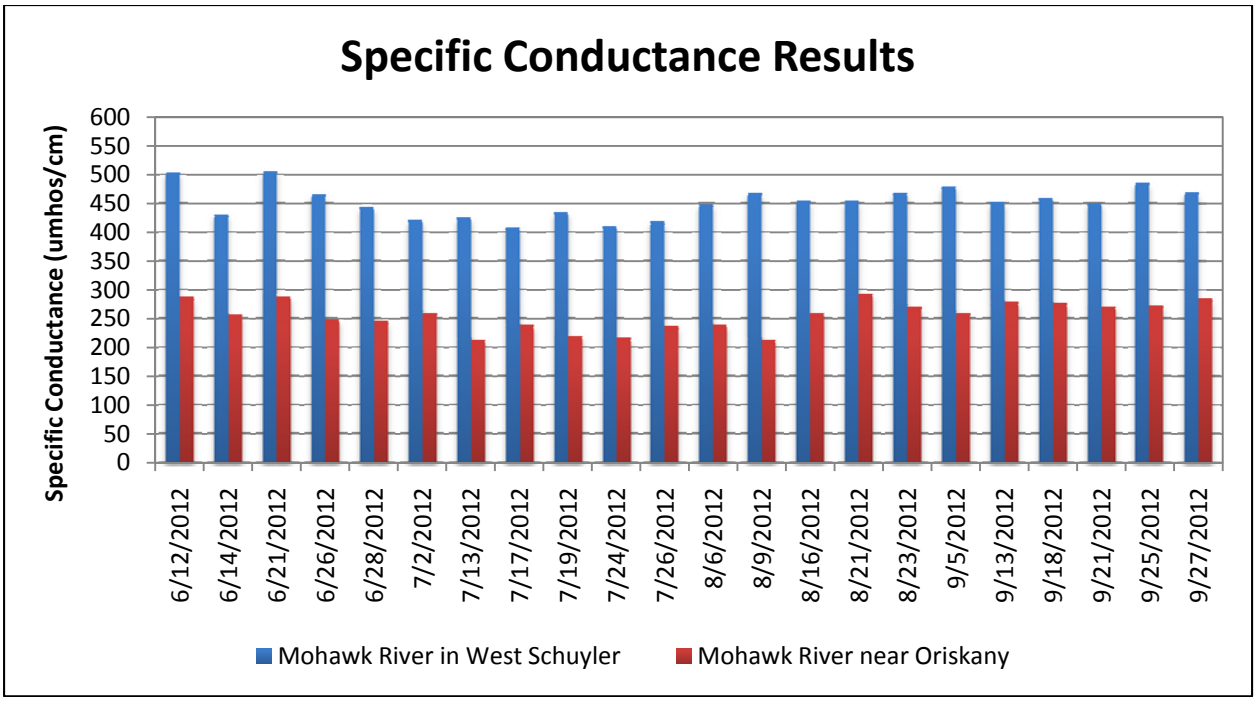


Figure 6. Upper Mohawk River Specific Conductance Measurements in 2012

C. pH

The pH of water is a measure of its acidity, neutrality or alkalinity. The pH of water is expressed in standard units (SU) ranging from 0 through 14. Water with a pH less than 7 is acidic, a pH of 7 is neutral, and a pH greater than 7 is alkaline. Because pH is measured using a logarithmic scale, water with a pH of 5.0 is 10 times more acidic than water with a pH of 6.0.

The water quality standard per New York State regulation 6 NYCRR Part 703.3 states that pH shall not be less than 6.5 or greater than 8.5 in the Mohawk River. The pH of surface waters can influence natural chemical and biological processes, including the solubility of many substances and their toxic effects. For example, certain metals become more toxic in waters with a lower pH because they become more soluble.

Atmospheric deposition/acid rain and watershed geology are major sources of substances affecting pH levels in lakes and streams in New York State. The pH levels in streams can fluctuate daily and seasonally.

The pH results for the project are provided in Figure 7. Both stations had fairly consistent pH levels that were close to neutral. Each station had one pH measurement that was below the water quality standard. No explanation was found for the two measurements that were below the water quality standard.

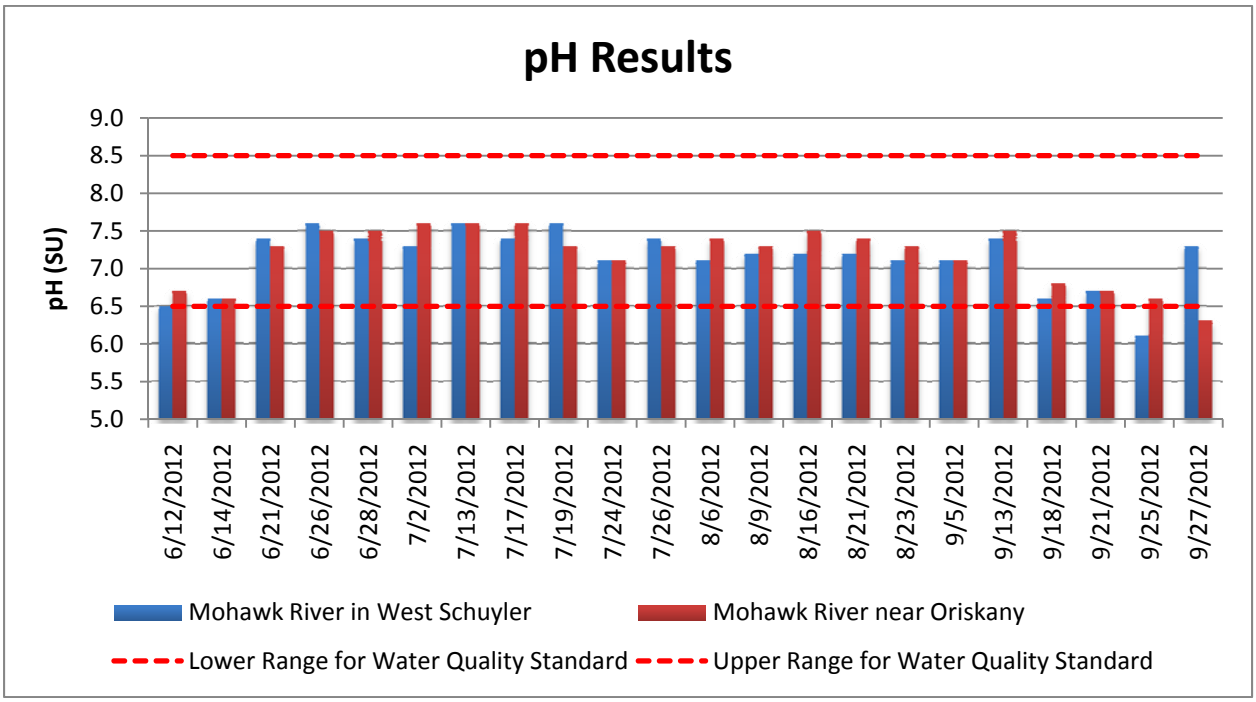


Figure 7. Upper Mohawk River pH Measurements in 2012

D. Water Temperature

Temperature is a measure of the thermal energy in water and is typically measured in either degrees Celsius (°C) or Fahrenheit (°F). Temperature affects the reaction rates of many chemical and biological processes in surface waters. The rate of many chemical reactions will increase as water temperature increases. Temperature also affects the amount of dissolved oxygen water can hold. As its temperature increases, water's ability to hold dissolved oxygen decreases.

Water temperature plays a critical role in the type of aquatic species that inhabit a particular surface water. Optimal temperatures for aquatic life depend on the species. For example, rainbow trout are intolerant of water temperatures above 70°F, while channel catfish can tolerate water temperatures in excess of 90°F (Smith, 1995). Sport fish found in the Mohawk River in the Utica/Rome area include largemouth and smallmouth bass, walleye and northern pike, tiger muskellunge, yellow perch and brown bullhead.

Sources of thermal pollution that can influence water temperature include point-source discharges of heated water from industrial operations. The removal of trees and vegetation along stream banks, and urban stormwater runoff can also increase the water temperature of rivers and streams.

New York State water quality standards for water temperature apply to the source of a thermal discharge. A thermal discharge is any discharge that results, or would result, in a temperature change in the receiving water. Thermal discharges from point sources are regulated through SPDES discharge permits. New York State water quality standards governing thermal discharges can be found in 6 NYCRR Part 704.

Water temperature results for the project are provided in Figure 8. Average water temperature was slightly warmer at the downstream station, but water temperature does not appear to be an environmental threat for Portions 12 and 13 of the Mohawk River.

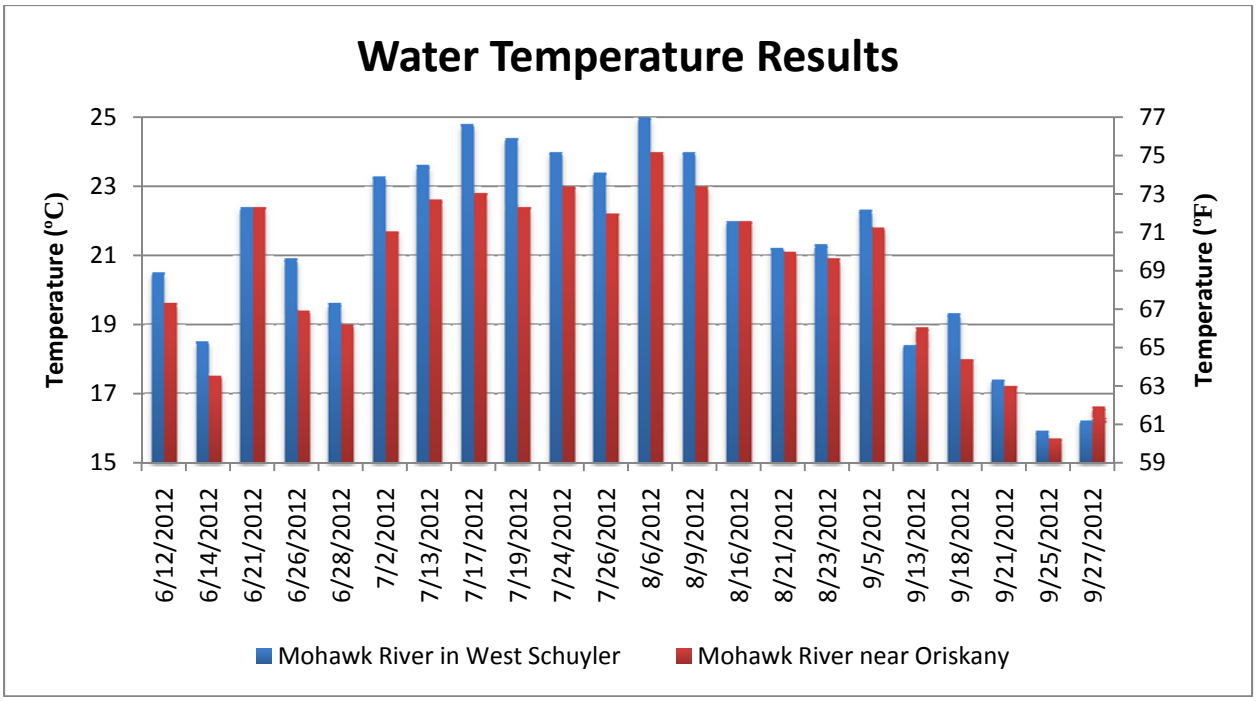


Figure 8. Upper Mohawk River Temperature Measurements in 2012

5. COLIFORM TEST RESULTS

A pathogen is any disease-producing agent that can cause illness in its host. Pathogens can include bacteria, viruses, protozoa, parasitic worms, and other microorganisms. Waterborne diseases such as campylobacteriosis, cryptosporidiosis, giardiasis, shigellosis and other gastrointestinal diseases can be transmitted through contact with, or consumption of, waters contaminated with pathogens (USEPA, 1993).

Testing water samples for all the possible types of pathogens would be time consuming, complex, and very expensive. As a more practical alternative, samples are tested for coliform bacteria because coliform are derived, or introduced into a waterbody, from the same sources of contamination as pathogenic organisms, so their presence is an indicator that pathogens may also be present.

Pathogenic contamination in surface waters can be attributed to a wide variety of sources including sanitary and combined sewer overflows, inadequately treated sewage, failing onsite septic systems, stormwater runoff, domestic and wild animal wastes, and manure spreading and other agricultural activities.

Pathogenic contamination due to untreated or inadequately treated human sewage discharged to surface waters is both a public health and environmental concern. The EPA estimates that the volume of combined sewer overflows discharged nationally is 850 billion gallons per year and the volume of sanitary sewer overflows is between 3 to 10 billion gallons per year (USEPA, 2004).

To test water for possible pathogenic contamination, two types of coliform tests are conducted: total coliform and fecal coliform. Total coliform includes bacteria found naturally in the environment, such as bacteria in soil and plants, as well as in feces. Fecal coliform is a subset of total coliform. Fecal coliform are bacteria present in the intestines and feces of warm blooded animals, including humans.

Total coliform test results were based on the membrane filter method (SM 9222B) with laboratory results being reported as the number of colony forming units per 100 milliliters (CFU/100 mL). Fecal coliform test results were based on the multiple fermentation tube method (SM 9221E) with laboratory results being reported as the most probable number per 100 milliliters (MPN/100 mL).

Coliform test results for this project are presented in Table 5. Also included in Table 5 are precipitation totals observed 72 hours prior to each sampling event. Hourly precipitation was obtained for Griffiss Airfield in Rome, NY (NOAA, 2012b). Supplemental daily precipitation was obtained for Delta Dam in Rome, NY (NOAA, 2012a) when the gage at Griffiss was not operational.

Table 5. Upper Mohawk River Coliform Results in 2012

Date	Mohawk River in West Schuyler		Mohawk River near Oriskany		Previous Precipitation (inches)		
	Total Coliform (CFU/100 mL)	Fecal Coliform (MPN/100 mL)	Total Coliform (CFU/100 mL)	Fecal Coliform (MPN/100 mL)	0-24 hrs	24-48 hrs	48-72 hrs
06/12/2012	4,700	1,300	5,400	130			
06/14/2012	5,700	2,400	3,900	2,400		0.76	
06/21/2012	1,400	300	880	130	0.26		
06/26/2012	3,900	500	1,500	140		0.06	0.90
06/28/2012	4,000	1,300	1,600	110			
07/02/2012	3,100	500	3,000	80			
07/13/2012	2,600	300	3,200	300			
07/17/2012	2,800	300	3,500	1,100		0.05	
07/19/2012	2,700	230	3,100	170			
07/24/2012	>17,000	16,000	4,800	1,700	1.85(1)		
07/26/2012	5,700	800	3,300	230	0.30(1)	0.03(1)	1.85(1)
08/06/2012	17,000	16,000	5,700	230	0.23(1)		
08/09/2012	3,300	1,300	2,400	170			
08/16/2012	3,500	300	2,900	300	0.03	0.86	0.04
08/21/2012	3,700	3,000	2,700	110			
08/23/2012	2,600	2,400	2,200	110			
09/05/2012	11,000	9,000	2,100	500	0.49	0.05	
09/13/2012	1,900	800	1,500	500			
09/18/2012	1,700	170	1,300	500	0.10		
09/21/2012	5,000	2,400	1,600	230	0.01	.01	1.16
09/25/2012	3,000	1,700	2,000	300			0.44
09/27/2012	2,900	1,100	2,200	300		0.26	0.05

(1) Hourly precipitation unavailable; daily totals from Delta Dam

A. Total Coliform

The New York State water quality standard for total coliform has two conditions:
From examination of a minimum of five samples per month;

1. The monthly median value shall not exceed 2,400 numbers/100 mL; and
2. More than 20 percent of the samples shall not exceed 5,000 numbers/100 mL.

Both conditions must be satisfied to demonstrate compliance with the total coliform water quality standard. The standard applies during all periods when wastewater disinfection is practiced at a treatment facility.

Total coliform results compared with water quality standards are provided in Figures 9 and 10. Because five to six examinations were made at each station per month throughout the project, in order to exceed the 20 percent threshold, at least two sampling results within a month must be 5,000 numbers/100 mL or higher.

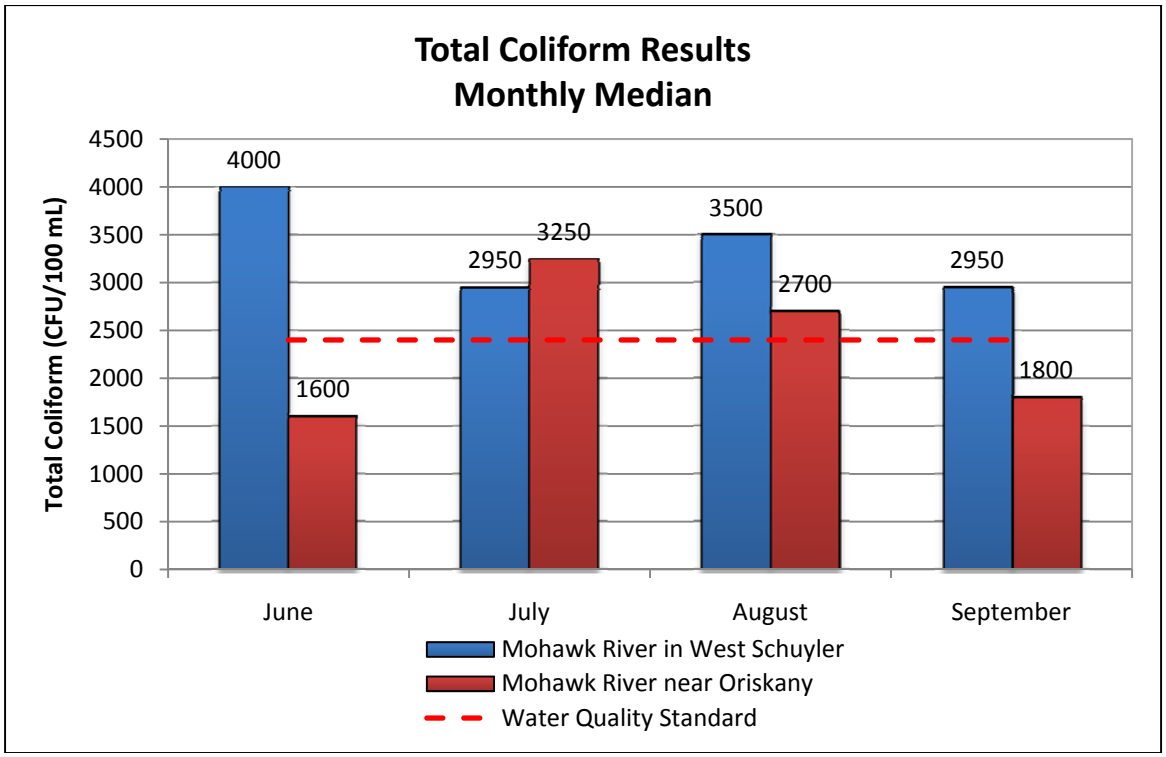


Figure 9. Upper Mohawk River Median Total Coliform Results in 2012

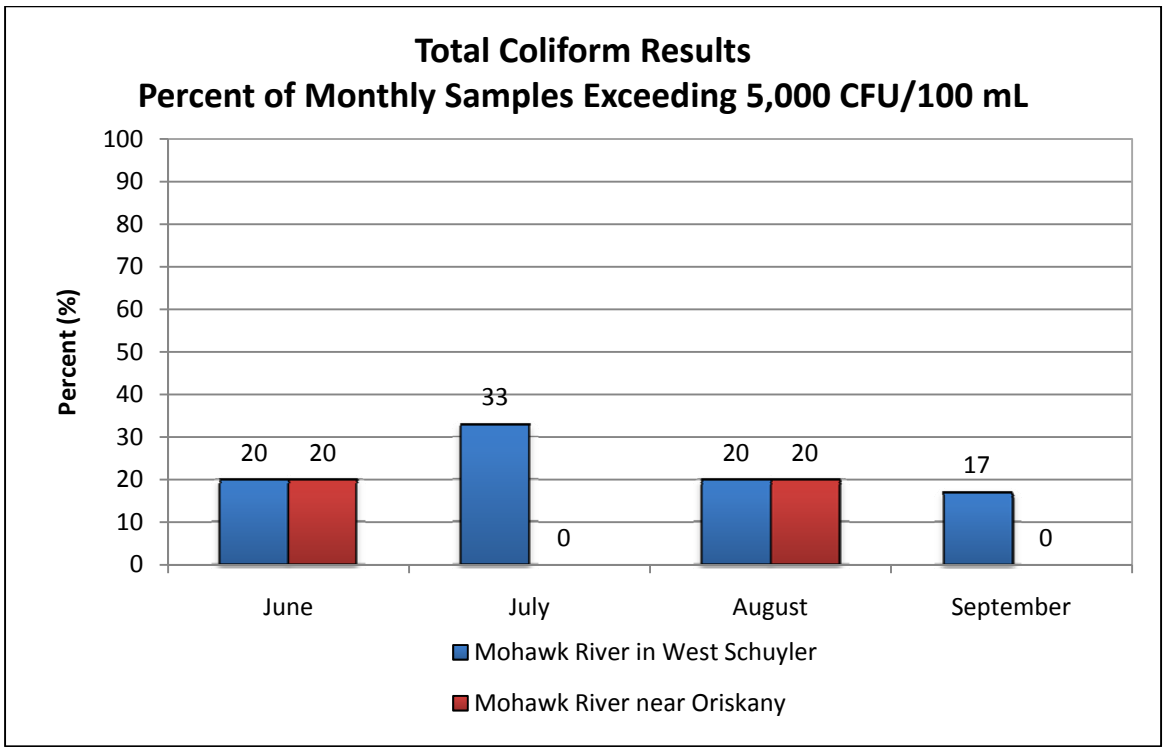


Figure 10. Upper Mohawk River Total Coliform Percent Exceedance in 2012

The total coliform standard was exceeded during all four months at the downstream station in West Schuyler, and during two out of four months at the upstream station near Oriskany.

B. Fecal Coliform

The New York State water quality standard for fecal coliform is that the monthly geometric mean, from examination of a minimum of five samples per month, shall not exceed 200 numbers/100 mL. The standard applies during all periods when wastewater disinfection is practiced at a treatment facility.

Wastewater disinfection is any process designed to kill or inactivate pathogenic microorganisms in treated wastewater, such that bacterial numbers are reduced to a safe level to prevent the spread of waterborne diseases and minimize public health problems. Chlorination, ultraviolet radiation, and ozonation are some of more common forms of disinfection practiced at municipal wastewater treatment plants. Treatment plants discharging to Portions 12 and 13 of the Mohawk River are required to disinfect their effluent (treated wastewater) from June through September.

Unlike a simple arithmetic mean, which can be skewed by unusually high or low numerical values, a geometric mean is a more accurate type of average, indicating the central tendency of a group of numbers.

As shown in Figure 11, the water quality standard for fecal coliform was exceeded during all four months at the downstream station in West Schuyler, and during three out of four months at the upstream station near Oriskany.

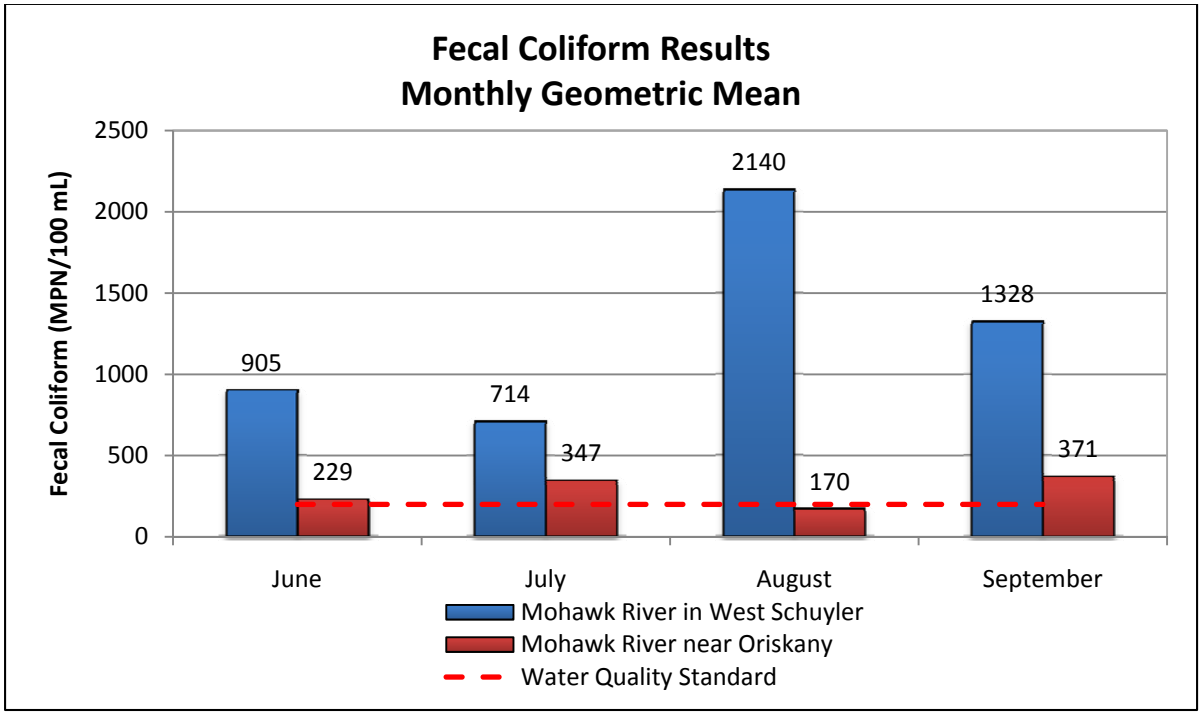


Figure 11. Upper Mohawk River Fecal Coliform Results in 2012

Wet weather had an impact on the overall coliform concentrations as indicated by the results in Table 5. Fecal coliform concentrations were significantly higher when rain of one half inch or more occurred within 24 hours prior to a sampling.

The sampling project captured both dry and wet weather conditions, although it was considerably drier throughout the project compared to the climate normal for the area. Historically, the average precipitation total in the area for the period from June through September is 16.45 inches (NOAA, 2002). During 2012, it was 13.52 inches.

The dry summer of 2012 resulted in no SSO discharges, whereas during June through September from 2005 through 2011, average SSO volume from the Sauquoit Creek Pump Station was 82 million gallons. Similarly, during June through September from 2005 through 2011, the total duration of CSO discharges from the City of Utica at outfall #076 was 203 hours, whereas in 2012, it was 64 hours, a 68 percent reduction (SPDES monitoring data, Oneida County Department of Water Quality and Water Pollution Control). Outfall #076 is estimated to contribute to 85 percent of the total CSO discharge volume from the City of Utica. Only overflow duration (in hours) is monitored at outfall #076.

There were also relatively high fecal coliform counts at the downstream station during periods of dry weather. To be considered a dry weather sampling event, there can be no more than a 0.10 inch of precipitation and no SSO/CSO discharges within 72 hours prior to sample collection. Out of 11 dry weather sampling events at each station, the fecal coliform geometric means were 708 and 209 numbers/100 mL for the downstream and upstream stations, respectively.

Dry weather sampling results suggest that wet weather impacts from SSO/CSO/urban runoff may not be the only source contributing to the increase in fecal coliform levels between the two monitoring stations. Results also indicate that the water quality standard for fecal coliform may not be achieved after the elimination of the SSO at the Sauquoit Creek Pumping Station and implementation of Utica's CSO Long-Term Control Plan (LTCP).

C. Baseline Fecal Coliform Levels

One of the goals of the project was to establish baseline fecal coliform levels for the upper Mohawk River in order to evaluate the effectiveness of NYSDEC's requirement that Oneida County eliminate the SSO at the Sauquoit Creek Pumping Station and that the City of Utica develop and implement a CSO LTCP.

Based on all samples collected, the overall geometric mean was 1,146 numbers/100 mL for Portion 12 (West Schuyler Station) and 273 numbers/100 mL for Portion 13 (Oriskany Station). Because the 22 samples collected at each station is a relatively small sample size, using the overall geometric mean to establish a single background value for each station is not scientifically sound due to the variance of the data. It is more appropriate to express the background level as a range based on confidence limits of the data. In order to assess the confidence limits, the data at each station was fitted to a log-normal distribution. The log-normal distribution was selected because a geometric mean is the 50% probability of the distribution and that water quality data is often found to be log-normally distributed.

As shown in Figures 12 and 13, the sampling results fit the distribution reasonably well. Based on the analysis, baseline fecal coliform levels within the 5 and 95 percent confidence limits are 713 to 1840 numbers/100 mL for Portion 12 and 197 to 379 numbers/100 mL for Portion 13 of the Mohawk River. Baseline fecal coliform levels represent the geometric mean of the data set from June through September, when disinfection is required.

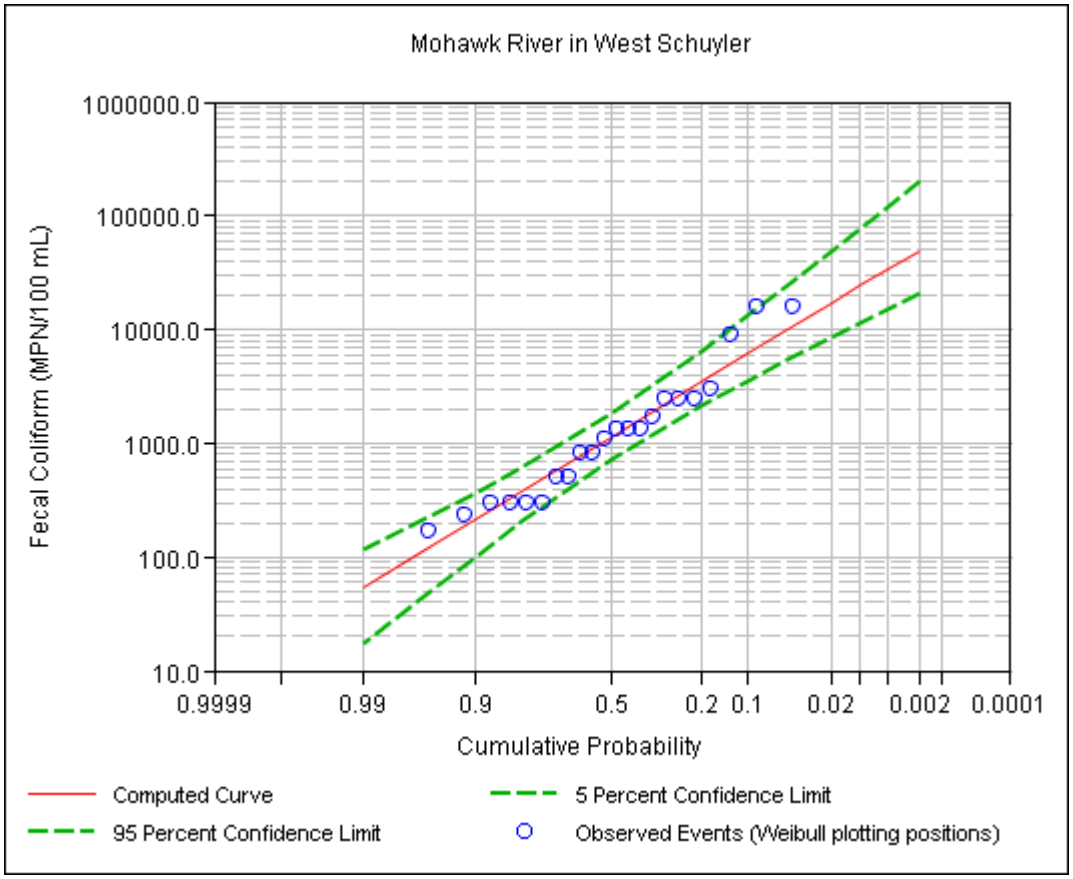


Figure 12. Fecal Coliform Distribution Curve for Mohawk River in West Schuyler

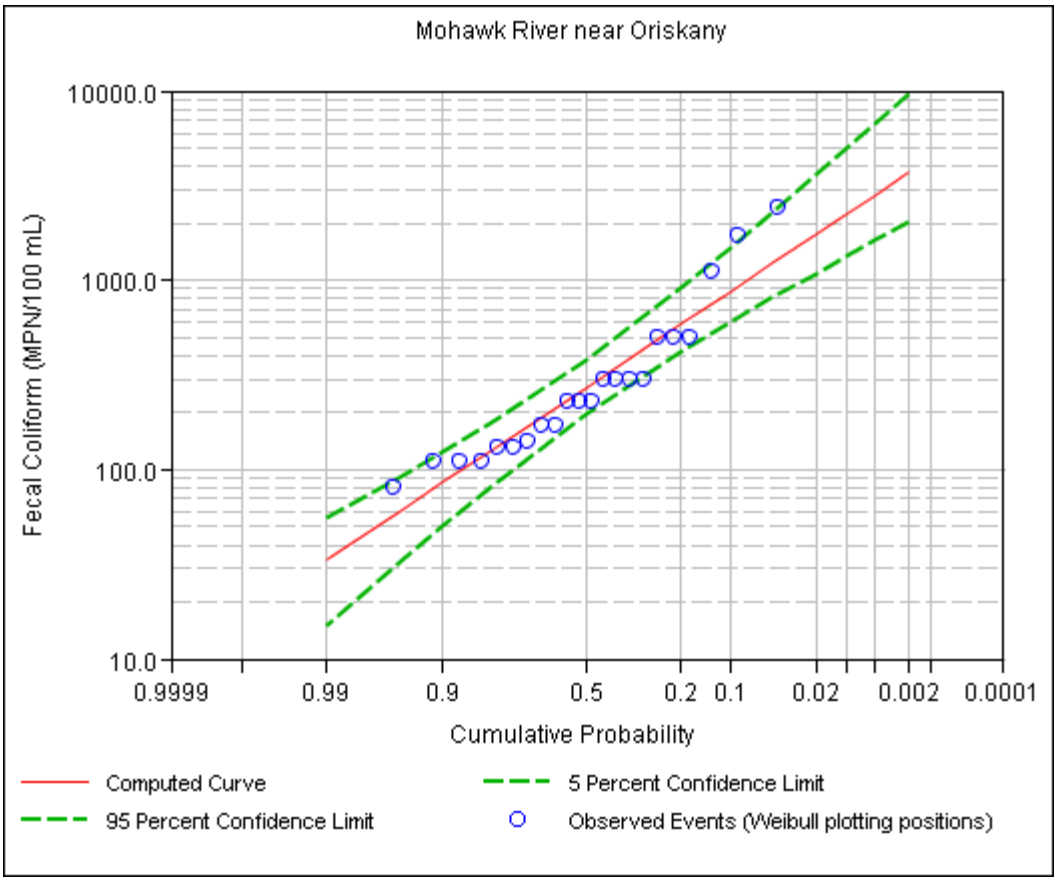


Figure 13. Fecal Coliform Distribution Curve for Mohawk River near Oriskany

6. COMPARISON WITH PREVIOUS STUDIES

NYSDEC collects and maintains an extensive inventory of water quality data in New York State. Based on 2,681 samples at 283 stations collected through the RIBS program since 2001, the statewide fecal coliform geometric mean is 140 numbers/100 mL.

Fecal coliform data collected from this project was compared to RIBS data collected since 2001 for monitoring stations in the upper Mohawk River watershed. Monitoring stations are listed in Table 6 and locations are shown in Figure 14. Only those stations which were tributary to Portion 12 of the Mohawk River were used for the comparison.

Table 6. Upper Mohawk River Watershed Monitoring Stations from 2001 - 2012

Station ID	Station Name	Drainage Area (SQ MI)	Program ID	Years Sampled	Number of Samples
12010101	Mohawk River in West Schuyler	553	DEC-RIBS	2001, 2006, 2011	14
12010101	Mohawk River in West Schuyler	553	DEC-2012	2012	22
12010108	Mohawk River in Utica	528	DEC-RIBS	2006	9
12010116	Mohawk River near Oriskany	300	DEC-2012	2012	22
12010142	Mohawk River in North Western	92	DEC-RIBS	2001, 2006, 2011	28
12011401	Sixmile Creek in Floyd	12	DEC-RIBS	2011	9
12011501	Ninemile Creek in Marcy	70	DEC-RIBS	2001	9
12011B14	Ninemile Creek in South Trenton	20	DEC-RIBS	2011	10
12012002	Sauquoit Creek in Whitesboro	62	DEC-RIBS	2006, 2011	19
12041001	Oriskany Creek in Oriskany	149	DEC-RIBS	2001, 2006, 2011	28
12042103	Deans Creek in Westmorland	18	DEC-RIBS	2006	9
12011A00	Lansing Kill in Hillside	28	DEC-RIBS	2011	10

One set of RIBS results for all samples collected on 9/25/2001 and 9/26/2001 was omitted because several stations had very high outliers. An extreme storm event delivered over 3 inches of precipitation to the area prior to the sampling events. Although the data points are valid, the results are not representative of normal stream conditions. For example, the Oriskany Creek station had fecal coliform result of 95,600 numbers/100 mL on 9/25/2001, which is over 200 times higher than the station geometric mean.

Fecal coliform geometric means were used in the comparison to be consistent with water quality standards. However, the results are based on all values for each station and not on a minimum of five samples taken within a month. The water quality standard is being included for reference purposes only in Figure 15.

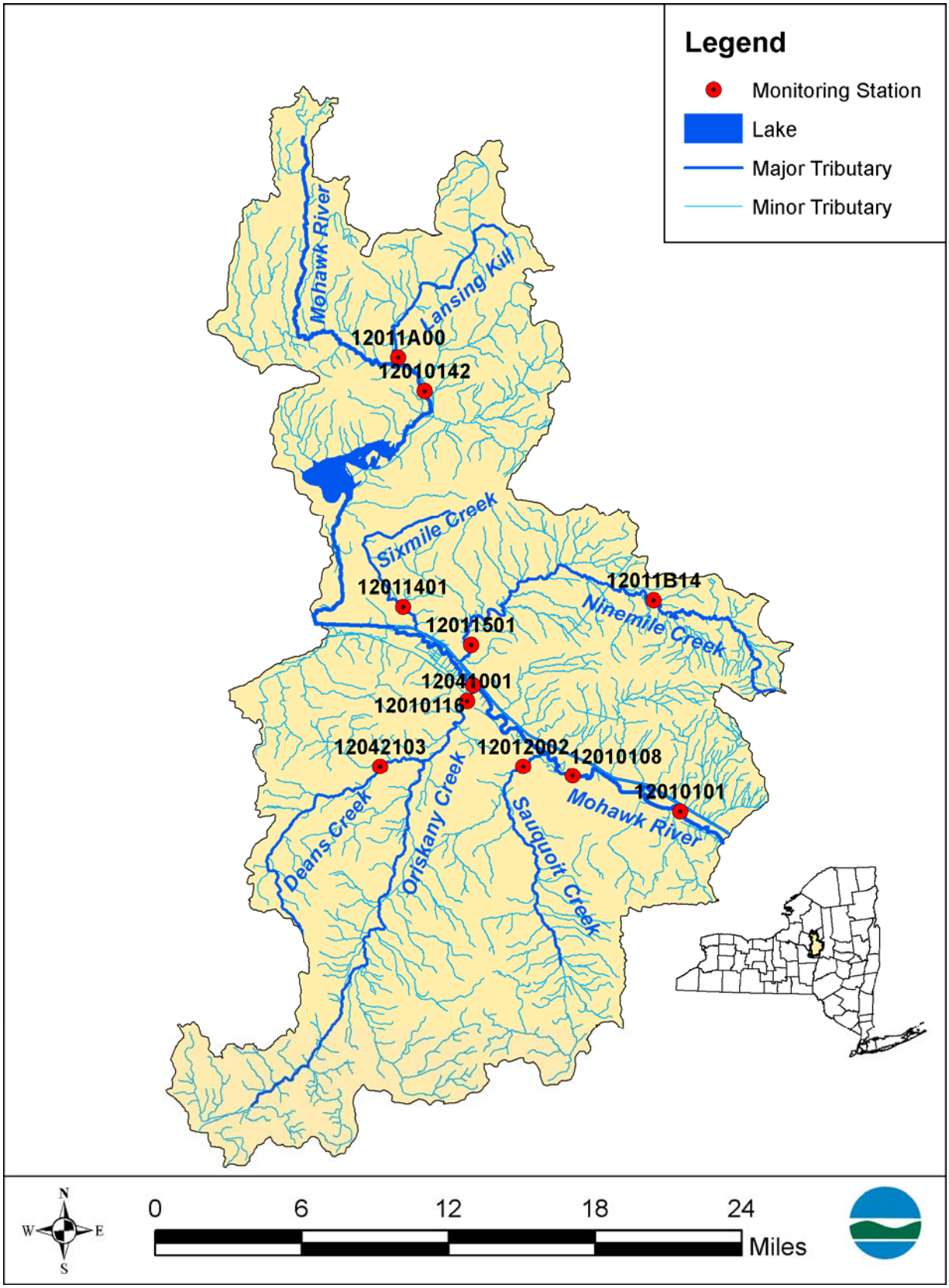


Figure 14. Mohawk River Monitoring Stations

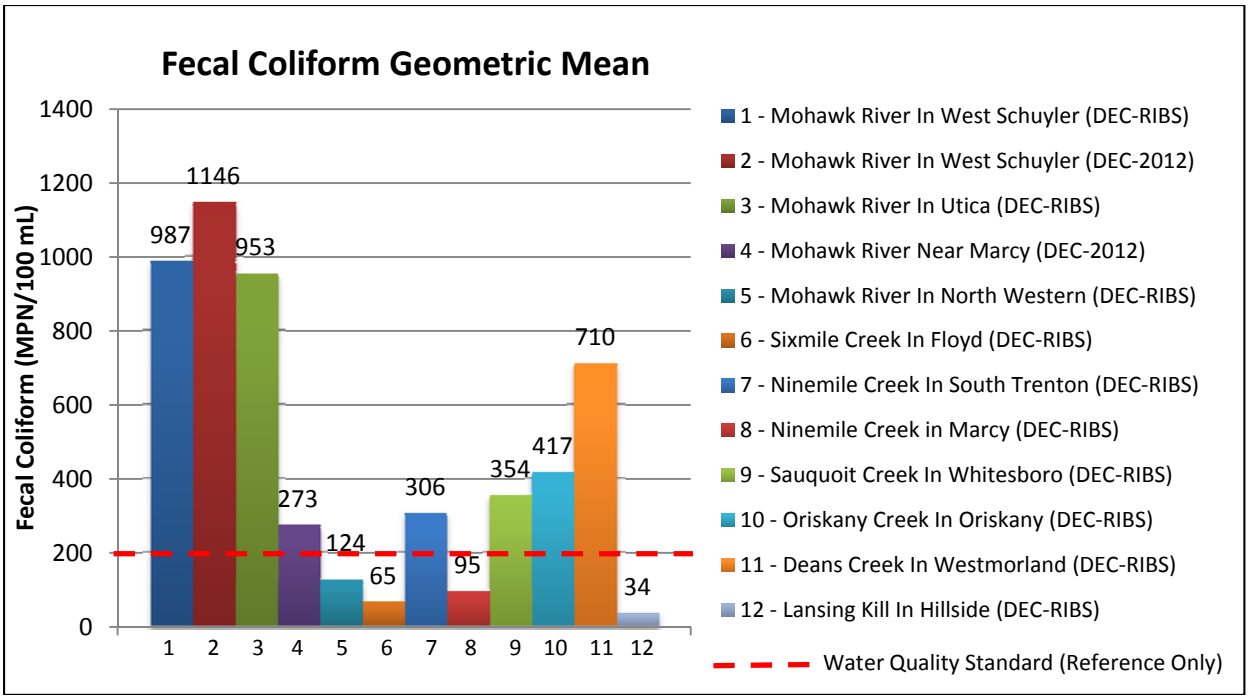


Figure 15. Upper Mohawk River Watershed Fecal Coliform Results for 2001 - 2012

The comparison shows fecal coliform concentrations for Portion 12 of the Mohawk River are significantly higher compared to the rest of the watershed. Mohawk River in West Schuyler and Mohawk River in Utica are both located on Portion 12.

Between the two monitoring stations used in this project, Oriskany Creek and Sauquoit Creek watersheds account for 75 percent of the total contributing drainage area. RIBS results for Oriskany Creek and Sauquoit Creek indicated fecal coliform geometric means of 417 and 354 numbers/100 mL, based on 28 and 19 samples, respectively. This suggests that pollutant sources in the remaining 25% of the watershed could be significantly contributing to the impairment of the upper Mohawk River.

Results of the comparison also show that fecal coliform concentrations for the West Schuyler station collected through this project were not substantially different compared to long-term trend monitoring data collected through the RIBS program.

7. CONCLUSIONS

Based on the monitoring results from a total of 44 coliform samples collected at two stations during June through September 2012, the following conclusions can be made:

- New York State Water Quality Standard for total coliform was exceeded during all four months in Portion 12 of the Mohawk River at the downstream station in West Schuyler.

- New York State Water Quality Standard for fecal coliform was exceeded during all four months in Portion 12 of the Mohawk River at the downstream station in West Schuyler.

- New York State Water Quality Standard for total coliform was exceeded during two of four months in Portion 13 of the Mohawk River at the upstream station in Oriskany.

- New York State Water Quality Standard for fecal coliform was exceeded during three of four months in Portion 13 of the Mohawk River at the upstream station in Oriskany.

- Fecal coliform geometric means are approximately four times higher at the downstream station compared to the upstream station.

- Fecal coliform concentrations were significantly higher at both stations when precipitation events of one-half inch or more occurred within 24 hours prior to a sampling event.

- Baseline fecal coliform concentrations established for Portion 12 of the Mohawk River range from 713 to 1840 numbers/100 mL. The geometric mean of all samples collected in 2012 was 1146 numbers/100 mL.

- Baseline fecal coliform concentrations established for Portion 13 of the Mohawk River range from 197 to 379 numbers/100 mL. The geometric mean of all samples collected in 2012 was 273 numbers/100 mL.

- Relatively high fecal coliform counts at the downstream station during periods of dry weather indicate unidentified sources, in addition to SSO/CSO/urban runoff, may be contributing to the impairment of the Mohawk River.

- Fecal coliform concentrations measured at the downstream station were comparable to long-term trend monitoring conducted by NYSDEC.

8. RECOMMENDATIONS

For waters listed as impaired, the Federal Clean Water Act requires states to consider the development of a Total Maximum Daily Load (TMDL) or some other pollution control strategy to reduce the input of the specific pollutant(s) that restrict waterbody uses.

The current restoration strategy for the upper Mohawk River includes requiring Oneida County to eliminate the SSO at the Sauquoit Creek Pumping Station and requiring the City of Utica to implement a CSO LTCP. Both projects are being coordinated together and scheduled to be completed in 2021.

Dry weather sampling results indicate that additional sources of pollution may be contributing to fecal coliform levels in the upper Mohawk River such that fecal coliform standards may not be

fully achieved, even after the elimination of the SSO and implementation of the CSO LTCP. Therefore, in order to fulfill the requirements of the Clean Water Act, a TMDL must be developed for Portions 12 and 13 of the Mohawk River.

TMDL is the maximum pollutant loading that a waterbody can receive without violating water quality standards. It is the sum of nonpoint-source pollutant loads and natural background conditions (load allocations or LA), plus point-source pollutant loads (waste load allocations or WLA), plus a margin of safety (MOS). TMDL can be represented by the following formula:

$$TMDL = \Sigma LA + \Sigma WLA + MOS$$

where:

TMDL	=	Total Daily Maximum Load: The maximum pollutant loading that a waterbody can receive without violating water quality standards.
LA	=	Load Allocation: The portion of TMDL allocated to nonpoint sources of pollutants and natural background conditions.
WLA	=	Waste Load Allocation: The portion of TMDL allocated to point sources of pollutants.
MOS	=	Margin of Safety: The portion of TMDL allocated to the uncertainty about the relationship between pollutant loads and receiving water quality.

One of the challenges in developing a TMDL is establishing the linkage between water quality and pollutant sources. Analytical methods for linking water quality and pollutant sources must be scientifically based and often involves water quality modeling. Methods used must be appropriate for the waterbody, the number and type of pollutant sources, and must produce justifiable results.

Pollutant sources contributing to impairment must also be clearly identified and quantified in order to establish the linkage to water quality. In addition to known sources, such as CSOs, SSOs and urban stormwater, sampling results indicate additional unidentified sources between the two monitoring stations are contributing to high fecal coliform levels during periods of dry weather. Additional data may be needed to identify these unknown sources. A coliform track down study and microbial source tracking (MST) could be useful in identifying additional pollutant sources. It is recommended that additional monitoring be considered only after a screening-level analysis is performed and its results indicate the need for additional data.

EPA estimates of TMDL development costs for a watershed area of 570 square miles range from $350,000 to $1,000,000 (2012 Dollars), depending on factors such as the complexity of the methodology/modeling used, additional data needs, and the number and type of pollutant sources (USEPA, 1996).

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APPENDIX A. MONITORING RESULTS

2012 Upper Mohawk River Coliform Monitoring Project

Station ID	Station Name	Date	Time	Parameter	Result	Units	Analytical Method	Lab Name
12010101	Mohawk River in West Schuyler	06/12/2012	0830	Dissolved Oxygen	8.3	mg/L	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	06/12/2012	0830	Specific Conductance	504	umhos/cm	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	06/12/2012	0830	pH	6.5	SU	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	06/12/2012	0830	Temperature	20.5	Deg C.	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	06/12/2012	0830	Fecal Coliform	1,300	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010101	Mohawk River in West Schuyler	06/12/2012	0830	Total Coliform	4,700	CFU/100mL	SM 18 9222-B	Verona Laboratory
12010101	Mohawk River in West Schuyler	06/12/2012	0830	Stream Flow	463	cfs	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	06/12/2012	0830	Gage Height	11.80	ft	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	06/12/2012	1030	Dissolved Oxygen	8.5	mg/L	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	06/12/2012	1030	Specific Conductance	287	umhos/cm	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	06/12/2012	1030	pH	6.7	SU	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	06/12/2012	1030	Temperature	19.6	Deg C.	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	06/12/2012	1030	Fecal Coliform	130	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010116	Mohawk River near Oriskany	06/12/2012	1030	Total Coliform	5,400	CFU/100mL	SM 18 9222-B	Verona Laboratory
12010101	Mohawk River in West Schuyler	06/14/2012	0900	Dissolved Oxygen	8.9	mg/L	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	06/14/2012	0900	Specific Conductance	431	umhos/cm	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	06/14/2012	0900	pH	6.6	SU	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	06/14/2012	0900	Temperature	18.5	Deg C.	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	06/14/2012	0900	Fecal Coliform	2,400	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010101	Mohawk River in West Schuyler	06/14/2012	0900	Total Coliform	5,700	CFU/100mL	SM 18 9222-B	Verona Laboratory
12010101	Mohawk River in West Schuyler	06/14/2012	0900	Stream Flow	759	cfs	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	06/14/2012	0900	Gage Height	12.45	ft	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	06/14/2012	0945	Dissolved Oxygen	9.5	mg/L	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	06/14/2012	0945	Specific Conductance	256	umhos/cm	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	06/14/2012	0945	pH	6.6	SU	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	06/14/2012	0945	Temperature	17.5	Deg C.	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	06/14/2012	0945	Fecal Coliform	2,400	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010116	Mohawk River near Oriskany	06/14/2012	0945	Total Coliform	3,900	CFU/100mL	SM 18 9222-B	Verona Laboratory

APPENDIX A. MONITORING RESULTS

2012 Upper Mohawk River Coliform Monitoring Project

Station ID	Station Name	Date	Time	Parameter	Result	Units	Analytical Method	Lab Name
12010101	Mohawk River in West Schuyler	06/21/2012	0800	Dissolved Oxygen	7.7	mg/L	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	06/21/2012	0800	Conductivity	506	umhos/cm	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	06/21/2012	0800	pH	7.4	SU	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	06/21/2012	0800	Temperature	22.4	Deg C.	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	06/21/2012	0800	Fecal Coliform	300	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010101	Mohawk River in West Schuyler	06/21/2012	0800	Total Coliform	1,400	CFU/100mL	SM 18 9222-B	Verona Laboratory
12010101	Mohawk River in West Schuyler	06/21/2012	0800	Stream Flow	357	cfs	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	06/21/2012	0800	Gage Height	11.58	ft	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	06/21/2012	0830	Dissolved Oxygen	6.6	mg/L	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	06/21/2012	0830	Specific Conductance	288	umhos/cm	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	06/21/2012	0830	pH	7.3	SU	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	06/21/2012	0830	Temperature	22.4	Deg C.	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	06/21/2012	0830	Fecal Coliform	130	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010116	Mohawk River near Oriskany	06/21/2012	0830	Total Coliform	880	CFU/100mL	SM 18 9222-B	Verona Laboratory
12010101	Mohawk River in West Schuyler	06/26/2012	0815	Dissolved Oxygen	8.1	mg/L	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	06/26/2012	0815	Specific Conductance	466	umhos/cm	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	06/26/2012	0815	pH	7.6	SU	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	06/26/2012	0815	Temperature	20.9	Deg C.	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	06/26/2012	0815	Fecal Coliform	500	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010101	Mohawk River in West Schuyler	06/26/2012	0815	Total Coliform	3,900	CFU/100mL	SM 18 9222-B	Verona Laboratory
12010101	Mohawk River in West Schuyler	06/26/2012	0815	Stream Flow	489	cfs	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	06/26/2012	0815	Gage Height	11.85	ft	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	06/26/2012	0900	Dissolved Oxygen	8.5	mg/L	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	06/26/2012	0900	Specific Conductance	248	umhos/cm	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	06/26/2012	0900	pH	7.5	SU	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	06/26/2012	0900	Temperature	19.4	Deg C.	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	06/26/2012	0900	Fecal Coliform	140	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010116	Mohawk River near Oriskany	06/26/2012	0900	Total Coliform	1,500	CFU/100mL	SM 18 9222-B	Verona Laboratory

APPENDIX A. MONITORING RESULTS

2012 Upper Mohawk River Coliform Monitoring Project

Station ID	Station Name	Date	Time	Parameter	Result	Units	Analytical Method	Lab Name
12010101	Mohawk River in West Schuyler	06/28/2012	0800	Dissolved Oxygen	8.6	mg/L	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	06/28/2012	0800	Specific Conductance	444	umhos/cm	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	06/28/2012	0800	pH	7.4	SU	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	06/28/2012	0800	Temperature	19.6	Deg C.	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	06/28/2012	0800	Fecal Coliform	1,300	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010101	Mohawk River in West Schuyler	06/28/2012	0800	Total Coliform	4,000	CFU/100mL	SM 18 9222-B	Verona Laboratory
12010101	Mohawk River in West Schuyler	06/28/2012	0800	Stream Flow	716	cfs	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	06/28/2012	0800	Gage Height	12.35	ft	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	06/28/2012	0830	Dissolved Oxygen	8.7	mg/L	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	06/28/2012	0830	Specific Conductance	245	umhos/cm	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	06/28/2012	0830	pH	7.5	SU	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	06/28/2012	0830	Temperature	19.0	Deg C.	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	06/28/2012	0830	Fecal Coliform	110	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010116	Mohawk River near Oriskany	06/28/2012	0830	Total Coliform	1,600	CFU/100mL	SM 18 9222-B	Verona Laboratory
12010101	Mohawk River in West Schuyler	07/02/2012	0830	Dissolved Oxygen	7.3	mg/L	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	07/02/2012	0830	Specific Conductance	421	umhos/cm	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	07/02/2012	0830	pH	7.3	SU	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	07/02/2012	0830	Temperature	23.3	Deg C.	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	07/02/2012	0830	Fecal Coliform	500	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010101	Mohawk River in West Schuyler	07/02/2012	0830	Total Coliform	3,100	CFU/100mL	SM 18 9222-B	Verona Laboratory
12010101	Mohawk River in West Schuyler	07/02/2012	0830	Stream Flow	370	cfs	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	07/02/2012	0830	Gage Height	11.61	ft	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	07/02/2012	1000	Dissolved Oxygen	8.1	mg/L	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	07/02/2012	1000	Specific Conductance	259	umhos/cm	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	07/02/2012	1000	pH	7.6	SU	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	07/02/2012	1000	Temperature	21.7	Deg C.	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	07/02/2012	1000	Fecal Coliform	80	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010116	Mohawk River near Oriskany	07/02/2012	1000	Total Coliform	3,000	CFU/100mL	SM 18 9222-B	Verona Laboratory

APPENDIX A. MONITORING RESULTS

2012 Upper Mohawk River Coliform Monitoring Project

Station ID	Station Name	Date	Time	Parameter	Result	Units	Analytical Method	Lab Name
12010101	Mohawk River in West Schuyler	07/13/2012	0800	Dissolved Oxygen	7.3	mg/L	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	07/13/2012	0800	Specific Conductance	426	umhos/cm	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	07/13/2012	0800	pH	7.6	SU	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	07/13/2012	0800	Temperature	23.6	Deg C.	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	07/13/2012	0800	Fecal Coliform	300	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010101	Mohawk River in West Schuyler	07/13/2012	0800	Total Coliform	2,600	CFU/100mL	SM 18 9222-B	Verona Laboratory
12010101	Mohawk River in West Schuyler	07/13/2012	0800	Stream Flow	336	cfs	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	07/13/2012	0800	Gage Height	11.54	ft	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	07/13/2012	0845	Dissolved Oxygen	7.9	mg/L	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	07/13/2012	0845	Specific Conductance	213	umhos/cm	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	07/13/2012	0845	pH	7.6	SU	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	07/13/2012	0845	Temperature	22.6	Deg C.	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	07/13/2012	0845	Fecal Coliform	300	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010116	Mohawk River near Oriskany	07/13/2012	0845	Total Coliform	3,200	CFU/100mL	SM 18 9222-B	Verona Laboratory
12010101	Mohawk River in West Schuyler	07/17/2012	0800	Dissolved Oxygen	6.4	mg/L	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	07/17/2012	0800	Specific Conductance	409	umhos/cm	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	07/17/2012	0800	pH	7.4	SU	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	07/17/2012	0800	Temperature	24.8	Deg C.	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	07/17/2012	0800	Fecal Coliform	300	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010101	Mohawk River in West Schuyler	07/17/2012	0800	Total Coliform	2,800	CFU/100mL	SM 18 9222-B	Verona Laboratory
12010101	Mohawk River in West Schuyler	07/17/2012	0800	Stream Flow	336	cfs	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	07/17/2012	0800	Gage Height	11.54	ft	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	07/17/2012	0845	Dissolved Oxygen	7.6	mg/L	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	07/17/2012	0845	Specific Conductance	238	umhos/cm	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	07/17/2012	0845	pH	7.6	SU	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	07/17/2012	0845	Temperature	22.8	Deg C.	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	07/17/2012	0845	Fecal Coliform	1,100	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010116	Mohawk River near Oriskany	07/17/2012	0845	Total Coliform	3,500	CFU/100mL	SM 18 9222-B	Verona Laboratory

APPENDIX A. MONITORING RESULTS

2012 Upper Mohawk River Coliform Monitoring Project

Station ID	Station Name	Date	Time	Parameter	Result	Units	Analytical Method	Lab Name
12010101	Mohawk River in West Schuyler	07/19/2012	0800	Dissolved Oxygen	6.5	mg/L	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	07/19/2012	0800	Specific Conductance	435	umhos/cm	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	07/19/2012	0800	pH	7.6	SU	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	07/19/2012	0800	Temperature	24.4	Deg C.	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	07/19/2012	0800	Fecal Coliform	230	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010101	Mohawk River in West Schuyler	07/19/2012	0800	Total Coliform	2,700	CFU/100mL	SM 18 9222-B	Verona Laboratory
12010101	Mohawk River in West Schuyler	07/19/2012	0800	Stream Flow	330	cfs	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	07/19/2012	0800	Gage Height	11.53	ft	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	07/19/2012	0830	Dissolved Oxygen	7.7	mg/L	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	07/19/2012	0830	Specific Conductance	220	umhos/cm	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	07/19/2012	0830	pH	7.3	SU	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	07/19/2012	0830	Temperature	22.4	Deg C.	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	07/19/2012	0830	Fecal Coliform	170	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010116	Mohawk River near Oriskany	07/19/2012	0830	Total Coliform	3,100	CFU/100mL	SM 18 9222-B	Verona Laboratory
12010101	Mohawk River in West Schuyler	07/24/2012	0800	Dissolved Oxygen	6.7	mg/L	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	07/24/2012	0800	Specific Conductance	410	umhos/cm	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	07/24/2012	0800	pH	7.1	SU	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	07/24/2012	0800	Temperature	24.0	Deg C.	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	07/24/2012	0800	Fecal Coliform	16,000	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010101	Mohawk River in West Schuyler	07/24/2012	0800	Total Coliform	TNC	CFU/100mL	SM 18 9222-B	Verona Laboratory
12010101	Mohawk River in West Schuyler	07/24/2012	0800	Stream Flow	716	cfs	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	07/24/2012	0800	Gage Height	12.35	ft	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	07/24/2012	0845	Dissolved Oxygen	8.3	mg/L	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	07/24/2012	0845	Specific Conductance	216	umhos/cm	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	07/24/2012	0845	pH	7.1	SU	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	07/24/2012	0845	Temperature	23.0	Deg C.	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	07/24/2012	0845	Fecal Coliform	1,700	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010116	Mohawk River near Oriskany	07/24/2012	0845	Total Coliform	230	CFU/100mL	SM 18 9222-B	Verona Laboratory

APPENDIX A. MONITORING RESULTS

2012 Upper Mohawk River Coliform Monitoring Project

Station ID	Station Name	Date	Time	Parameter	Result	Units	Analytical Method	Lab Name
12010101	Mohawk River in West Schuyler	07/26/2012	0800	Dissolved Oxygen	7.4	mg/L	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	07/26/2012	0800	Specific Conductance	418	umhos/cm	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	07/26/2012	0800	pH	7.4	SU	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	07/26/2012	0800	Temperature	23.4	Deg C.	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	07/26/2012	0800	Fecal Coliform	800	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010101	Mohawk River in West Schuyler	07/26/2012	0800	Total Coliform	5,700	CFU/100mL	SM 18 9222-B	Verona Laboratory
12010101	Mohawk River in West Schuyler	07/26/2012	0800	Stream Flow	350	cfs	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	07/26/2012	0800	Gage Height	11.56	ft	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	07/26/2012	0845	Dissolved Oxygen	8.2	mg/L	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	07/26/2012	0845	Specific Conductance	236	umhos/cm	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	07/26/2012	0845	pH	7.3	SU	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	07/26/2012	0845	Temperature	22.2	Deg C.	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	07/26/2012	0845	Fecal Coliform	230	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010116	Mohawk River near Oriskany	07/26/2012	0845	Total Coliform	3,300	CFU/100mL	SM 18 9222-B	Verona Laboratory
12010101	Mohawk River in West Schuyler	08/06/2012	0815	Dissolved Oxygen	6.6	mg/L	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	08/06/2012	0815	Specific Conductance	449	umhos/cm	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	08/06/2012	0815	pH	7.1	SU	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	08/06/2012	0815	Temperature	25.0	Deg C.	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	08/06/2012	0815	Fecal Coliform	16,000	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010101	Mohawk River in West Schuyler	08/06/2012	0815	Total Coliform	17,000	CFU/100mL	SM 18 9222-B	Verona Laboratory
12010101	Mohawk River in West Schuyler	08/06/2012	0815	Stream Flow	514	cfs	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	08/06/2012	0815	Gage Height	11.91	ft	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	08/06/2012	0900	Dissolved Oxygen	7.3	mg/L	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	08/06/2012	0900	Specific Conductance	239	umhos/cm	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	08/06/2012	0900	pH	7.4	SU	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	08/06/2012	0900	Temperature	24.0	Deg C.	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	08/06/2012	0900	Fecal Coliform	230	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010116	Mohawk River near Oriskany	08/06/2012	0900	Total Coliform	5,700	CFU/100mL	SM 18 9222-B	Verona Laboratory

APPENDIX A. MONITORING RESULTS

2012 Upper Mohawk River Coliform Monitoring Project

Station ID	Station Name	Date	Time	Parameter	Result	Units	Analytical Method	Lab Name
12010101	Mohawk River in West Schuyler	08/09/2012	0800	Dissolved Oxygen	7.3	mg/L	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	08/09/2012	0800	Specific Conductance	468	umhos/cm	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	08/09/2012	0800	pH	7.2	SU	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	08/09/2012	0800	Temperature	24.0	Deg C.	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	08/09/2012	0800	Fecal Coliform	1,300	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010101	Mohawk River in West Schuyler	08/09/2012	0800	Total Coliform	3,300	CFU/100mL	SM 18 9222-B	Verona Laboratory
12010101	Mohawk River in West Schuyler	08/09/2012	0800	Stream Flow	302	cfs	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	08/09/2012	0800	Gage Height	11.49	ft	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	08/09/2012	0845	Dissolved Oxygen	7.1	mg/L	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	08/09/2012	0845	Specific Conductance	213	umhos/cm	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	08/09/2012	0845	pH	7.3	SU	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	08/09/2012	0845	Temperature	23.0	Deg C.	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	08/09/2012	0845	Fecal Coliform	170	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010116	Mohawk River near Oriskany	08/09/2012	0845	Total Coliform	2,400	CFU/100mL	SM 18 9222-B	Verona Laboratory
12010101	Mohawk River in West Schuyler	08/16/2012	0800	Dissolved Oxygen	7.5	mg/L	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	08/16/2012	0800	Specific Conductance	455	umhos/cm	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	08/16/2012	0800	pH	7.2	SU	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	08/16/2012	0800	Temperature	22.0	Deg C.	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	08/16/2012	0800	Fecal Coliform	300	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010101	Mohawk River in West Schuyler	08/16/2012	0800	Total Coliform	3,500	CFU/100mL	SM 18 9222-B	Verona Laboratory
12010101	Mohawk River in West Schuyler	08/16/2012	0800	Stream Flow	476	cfs	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	08/16/2012	0800	Gage Height	11.83	ft	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	08/16/2012	0900	Dissolved Oxygen	7.6	mg/L	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	08/16/2012	0900	Specific Conductance	260	umhos/cm	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	08/16/2012	0900	pH	7.5	SU	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	08/16/2012	0900	Temperature	22.0	Deg C.	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	08/16/2012	0900	Fecal Coliform	300	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010116	Mohawk River near Oriskany	08/16/2012	0900	Total Coliform	2,900	CFU/100mL	SM 18 9222-B	Verona Laboratory

APPENDIX A. MONITORING RESULTS

2012 Upper Mohawk River Coliform Monitoring Project

Station ID	Station Name	Date	Time	Parameter	Result	Units	Analytical Method	Lab Name
12010101	Mohawk River in West Schuyler	08/21/2012	0800	Dissolved Oxygen	8.3	mg/L	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	08/21/2012	0800	Specific Conductance	454	umhos/cm	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	08/21/2012	0800	pH	7.2	SU	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	08/21/2012	0800	Temperature	21.2	Deg C.	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	08/21/2012	0800	Fecal Coliform	3,000	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010101	Mohawk River in West Schuyler	08/21/2012	0800	Total Coliform	3,700	CFU/100mL	SM 18 9222-B	Verona Laboratory
12010101	Mohawk River in West Schuyler	08/21/2012	0800	Stream Flow	288	cfs	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	08/21/2012	0800	Gage Height	11.47	ft	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	08/21/2012	0900	Dissolved Oxygen	8.9	mg/L	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	08/21/2012	0900	Specific Conductance	293	umhos/cm	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	08/21/2012	0900	pH	7.4	SU	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	08/21/2012	0900	Temperature	21.1	Deg C.	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	08/21/2012	0900	Fecal Coliform	110	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010116	Mohawk River near Oriskany	08/21/2012	0900	Total Coliform	2,700	CFU/100mL	SM 18 9222-B	Verona Laboratory
12010101	Mohawk River in West Schuyler	08/23/2012	0815	Dissolved Oxygen	8.5	mg/L	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	08/23/2012	0815	Specific Conductance	469	umhos/cm	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	08/23/2012	0815	pH	7.1	SU	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	08/23/2012	0815	Temperature	21.3	Deg C.	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	08/23/2012	0815	Fecal Coliform	2,400	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010101	Mohawk River in West Schuyler	08/23/2012	0815	Total Coliform	2,600	CFU/100mL	SM 18 9222-B	Verona Laboratory
12010101	Mohawk River in West Schuyler	08/23/2012	0815	Stream Flow	232	cfs	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	08/23/2012	0815	Gage Height	11.39	ft	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	08/23/2012	0900	Dissolved Oxygen	8.6	mg/L	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	08/23/2012	0900	Specific Conductance	270	umhos/cm	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	08/23/2012	0900	pH	7.3	SU	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	08/23/2012	0900	Temperature	20.9	Deg C.	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	08/23/2012	0900	Fecal Coliform	110	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010116	Mohawk River near Oriskany	08/23/2012	0900	Total Coliform	2,200	CFU/100mL	SM 18 9222-B	Verona Laboratory

APPENDIX A. MONITORING RESULTS

2012 Upper Mohawk River Coliform Monitoring Project

Station ID	Station Name	Date	Time	Parameter	Result	Units	Analytical Method	Lab Name
12010101	Mohawk River in West Schuyler	09/05/2012	0900	Dissolved Oxygen	6.3	mg/L	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	09/05/2012	0900	Specific Conductance	480	umhos/cm	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	09/05/2012	0900	pH	7.1	SU	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	09/05/2012	0900	Temperature	22.3	Deg C.	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	09/05/2012	0900	Fecal Coliform	9,000	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010101	Mohawk River in West Schuyler	09/05/2012	0900	Total Coliform	11,000	CFU/100mL	SM 18 9222-B	Verona Laboratory
12010101	Mohawk River in West Schuyler	09/05/2012	0900	Stream Flow	390	cfs	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	09/05/2012	1000	Gage Height	11.64	ft	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	09/05/2012	1000	Dissolved Oxygen	7.1	mg/L	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	09/05/2012	1000	Specific Conductance	259	umhos/cm	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	09/05/2012	1000	pH	7.1	SU	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	09/05/2012	1000	Temperature	21.8	Deg C.	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	09/05/2012	1000	Fecal Coliform	500	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010116	Mohawk River near Oriskany	09/05/2012	1000	Total Coliform	2,100	CFU/100mL	SM 18 9222-B	Verona Laboratory
12010101	Mohawk River in West Schuyler	09/13/2012	0815	Dissolved Oxygen	7.4	mg/L	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	09/13/2012	0815	Specific Conductance	452	umhos/cm	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	09/13/2012	0815	pH	7.4	SU	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	09/13/2012	0815	Temperature	18.4	Deg C.	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	09/13/2012	0815	Fecal Coliform	800	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010101	Mohawk River in West Schuyler	09/13/2012	0815	Total Coliform	1,900	CFU/100mL	SM 18 9222-B	Verona Laboratory
12010101	Mohawk River in West Schuyler	09/13/2012	0815	Stream Flow	160	cfs	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	09/13/2012	0815	Gage Height	11.29	ft	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	09/13/2012	0900	Dissolved Oxygen	7.5	mg/L	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	09/13/2012	0900	Specific Conductance	278	umhos/cm	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	09/13/2012	0900	pH	7.5	SU	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	09/13/2012	0900	Temperature	18.9	Deg C.	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	09/13/2012	0900	Fecal Coliform	500	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010116	Mohawk River near Oriskany	09/13/2012	0900	Total Coliform	1,500	CFU/100mL	SM 18 9222-B	Verona Laboratory

APPENDIX A. MONITORING RESULTS

2012 Upper Mohawk River Coliform Monitoring Project

Station ID	Station Name	Date	Time	Parameter	Result	Units	Analytical Method	Lab Name
12010101	Mohawk River in West Schuyler	09/18/2012	0815	Dissolved Oxygen	7.5	mg/L	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	09/18/2012	0815	Specific Conductance	459	umhos/cm	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	09/18/2012	0815	pH	6.6	SU	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	09/18/2012	0815	Temperature	19.3	Deg C.	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	09/18/2012	0815	Fecal Coliform	170	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010101	Mohawk River in West Schuyler	09/18/2012	0815	Total Coliform	1,700	CFU/100mL	SM 18 9222-B	Verona Laboratory
12010101	Mohawk River in West Schuyler	09/18/2012	0815	Stream Flow	225	cfs	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	09/18/2012	0815	Gage Height	11.38	ft	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	09/18/2012	0900	Dissolved Oxygen	8.1	mg/L	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	09/18/2012	0900	Specific Conductance	276	umhos/cm	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	09/18/2012	0900	pH	6.8	SU	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	09/18/2012	0900	Temperature	18.0	Deg C.	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	09/18/2012	0900	Fecal Coliform	500	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010116	Mohawk River near Oriskany	09/18/2012	0900	Total Coliform	1,300	CFU/100mL	SM 18 9222-B	Verona Laboratory
12010101	Mohawk River in West Schuyler	09/21/2012	0800	Dissolved Oxygen	8.8	mg/L	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	09/21/2012	0800	Specific Conductance	451	umhos/cm	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	09/21/2012	0800	pH	6.7	SU	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	09/21/2012	0800	Temperature	17.4	Deg C.	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	09/21/2012	0800	Fecal Coliform	2,400	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010101	Mohawk River in West Schuyler	09/21/2012	0800	Total Coliform	5,000	CFU/100mL	SM 18 9222-B	Verona Laboratory
12010101	Mohawk River in West Schuyler	09/21/2012	0800	Stream Flow	323	cfs	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	09/21/2012	0800	Gage Height	11.52	ft	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	09/21/2012	0830	Dissolved Oxygen	9.6	mg/L	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	09/21/2012	0830	Specific Conductance	271	umhos/cm	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	09/21/2012	0830	pH	6.7	SU	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	09/21/2012	0830	Temperature	17.2	Deg C.	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	09/21/2012	0830	Fecal Coliform	230	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010116	Mohawk River near Oriskany	09/21/2012	0830	Total Coliform	1,600	CFU/100mL	SM 18 9222-B	Verona Laboratory

APPENDIX A. MONITORING RESULTS

2012 Upper Mohawk River Coliform Monitoring Project

Station ID	Station Name	Date	Time	Parameter	Result	Units	Analytical Method	Lab Name
12010101	Mohawk River in West Schuyler	09/25/2012	0815	Dissolved Oxygen	8.5	mg/L	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	09/25/2012	0815	Specific Conductance	486	umhos/cm	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	09/25/2012	0815	pH	6.1	SU	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	09/25/2012	0815	Temperature	15.9	Deg C.	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	09/25/2012	0815	Fecal Coliform	1,700	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010101	Mohawk River in West Schuyler	09/25/2012	0815	Total Coliform	3,000	CFU/100mL	SM 18 9222-B	Verona Laboratory
12010101	Mohawk River in West Schuyler	09/25/2012	0815	Stream Flow	281	cfs	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	09/25/2012	0815	Gage Height	11.46	ft	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	09/25/2012	0915	Dissolved Oxygen	9.4	mg/L	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	09/25/2012	0915	Specific Conductance	273	umhos/cm	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	09/25/2012	0915	pH	6.6	SU	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	09/25/2012	0915	Temperature	15.7	Deg C.	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	09/25/2012	0915	Fecal Coliform	300	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010116	Mohawk River near Oriskany	09/25/2012	0915	Total Coliform	2,000	CFU/100mL	SM 18 9222-B	Verona Laboratory
12010101	Mohawk River in West Schuyler	09/27/2012	0800	Dissolved Oxygen	9.4	mg/L	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	09/27/2012	0800	Specific Conductance	470	umhos/cm	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	09/27/2012	0800	pH	7.3	SU	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	09/27/2012	0800	Temperature	16.2	Deg C.	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	09/27/2012	0800	Fecal Coliform	1,100	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010101	Mohawk River in West Schuyler	09/27/2012	0800	Total Coliform	2,900	CFU/100mL	SM 18 9222-B	Verona Laboratory
12010101	Mohawk River in West Schuyler	09/27/2012	0800	Stream Flow	430	cfs	DEC-Field	DEC-Field
12010101	Mohawk River in West Schuyler	09/27/2012	0800	Gage Height	11.73	ft	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	09/27/2012	0900	Dissolved Oxygen	9.8	mg/L	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	09/27/2012	0900	Specific Conductance	285	umhos/cm	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	09/27/2012	0900	pH	6.3	SU	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	09/27/2012	0900	Temperature	16.6	Deg C.	DEC-Field	DEC-Field
12010116	Mohawk River near Oriskany	09/27/2012	0900	Fecal Coliform	300	MPN/100mL	SM 18 9221-E	Verona Laboratory
12010116	Mohawk River near Oriskany	09/27/2012	0900	Total Coliform	2,200	CFU/100mL	SM 18 9222-B	Verona Laboratory