Susquehanna River Basin Commission

Upper Susquehanna Subbasin Year-1 Survey

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The Susquehanna River Basin Commission (SRBC) conducted a water quality and biological survey of the Upper Susquehanna Subbasin from June to September 2007. This survey is part of SRBC's Subbasin Survey Program, which is funded in part by the United States Environmental Protection Agency (USEPA). The Subbasin Survey Program consists of two-year assessments in each of the six major subbasins (Figure 1) on a rotating schedule. This report summarizes the Year-1 survey, which consists of point-in-time water chemistry, macroinvertebrate, and habitat data collection and assessments of the major tributaries and areas of interest throughout the Upper Susquehanna Subbasin. The Year-2 survey will be conducted in the Tioughnioga River over a one-year period beginning in summer 2008. The Year-2 survey is part of a larger monitoring effort associated with an environmental restoration effort at Whitney Point Lake. Previous SRBC surveys of the Upper Susquehanna Subbasin were conducted in 1998 (Stoe, 1999) and 1984 (McMorran, 1985).

Description of the Upper Susquehanna Subbasin

The Upper Susquehanna Subbasin is an interstate subbasin that drains approximately 4,950 square miles of southcentral New York and a small portion of northeastern Pennsylvania. Three larger watersheds, the Unadilla, Chenango, and Tioughnioga Rivers, and many smaller watersheds, feed into the mainstem Susquehanna River as it travels from its headwaters at Otsego Lake, N.Y., to the confluence of the Susquehanna and Chemung Rivers near Athens, Pa. The primary counties in this subbasin are Broome, Chenango, Cortland, Delaware, Madison, Otsego, and Tioga in New York, and Bradford and Susquehanna in Pennsylvania. The one major population center in this subbasin is Binghamton, N.Y. Some of the towns in the subbasin include Cooperstown, Cortland, Norwich, Oneonta, Sayre, and Sidney. Land use in the Upper Susquehanna Subbasin is depicted in Figure 2. The primary land uses are natural vegetated areas and cultivated land. Lakes and reservoirs dot the landscape, especially in the northeast portion of the subbasin.

Methods Used in the 2007 Upper Susquehanna Subbasin Survey

During summer 2007, SRBC staff collected samples from 82 sites throughout the Upper Susquehanna Subbasin. The appendix contains a list with the sample site number, the station name (designated by approximate stream mile), a description of the sampling location, the latitude and longitude, the drainage size, and reference category. The reference category designation was based on drainage areas, which were divided into small (<100 square miles), medium (100 - 500 square miles), and large (>500 square miles). Staff sampled the sites once during the Year-1 effort to provide a point-in-time picture of stream characteristics throughout the whole subbasin. Water quality was assessed by examining field and laboratory parameters that included nutrients, major ions, and metals. A list of the field and laboratory parameters and their units is found in Table 1. Staff compared the data collected to water chemistry levels of concern based on current state and federal regulations, background levels of stream chemistry, or references for approximate tolerances of aquatic life (Table 2).

Full report with interactive maps and data available on the Internet at www.srbc.net/pubinfo/techdocs/Publication_260/techreport260.htm

Summary Report

Upper Susquehanna Subbasin Survey: A Water Quality and Biological Assessment June - September 2007

Report by Susan Buda, Aquatic Ecologist

Figure 1. *The Susquehanna Subbasin*

Staff collected macroinvertebrate samples and conducted habitat assessments using a slightly modified version of USEPA's Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers (RBP III) (Barbour and others, 1999). Additional detailed methods for sampling can be found in the entire report on SRBC's web site at *www.srbc.net/pubinfo/techdocs/Publication_260/techreport260.htm.*

Results/Discussion

Water quality, biological (macroinvertebrate) community, and habitat site conditions for each sampling site in 2007 throughout the Upper Susquehanna Subbasin are depicted in Figure 3. Eleven sites, BUTT 2.8, CEBR 0.1, EMUD 1.2, GENE 15.3, OAKS 2.0, OTGO 13.1, OTSL 23.1, OTSL 8.7, STAR 0.9, SUSQ 395.5, and WHAR 0.6, demonstrated the best overall conditions in each category with nonimpaired macroinvertebrates, "higher" water quality, and excellent habitat.

The parameters that exceeded levels of concern at the largest number of sites were total nitrogen (16) and water temperature (14) (Table 3). The highest number of levels of concern exceeded at a single site was four, occurring at only two sites, SUSQ 442 and TIOF 28.7. The highest or lowest value for each parameter is printed in bold in Table 3. Aluminum was the only metal to exceed levels of concern, with a value of 1,110 µg/l, occurring at only one site (KORT 0.7). The highest values for nitrogen forms were 2.78 mg/l for total nitrogen, 2.4 mg/l for nitrate-n, and 0.11 mg/l for nitrite-n. Total phosphorus and orthophosphate maximum values were 0.497 mg/l and 0.32 mg/l, respectively. The highest sodium value was 53.5 mg/l, and total suspended solids and water temperature were 30 mg/l and 27.9 °C, respectively. The lowest alkalinity was 17.2 mg/l (Table 3).

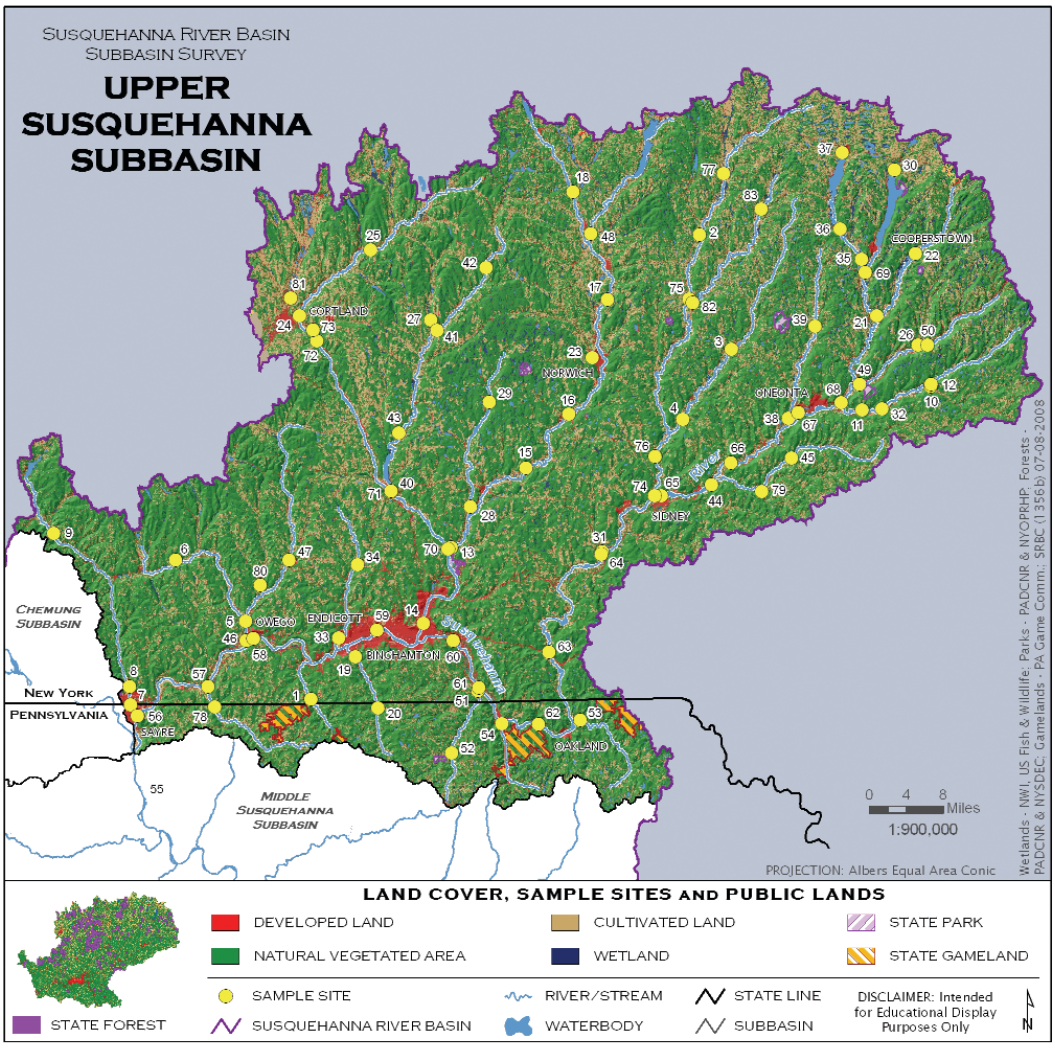

Figure 2. *Land Cover, Sample Sites, and Public Lands in the Upper Subbasin*

HEADWATERS SECTION

The headwaters section of the Upper Susquehanna Subbasin included glacial lakes in the headwaters, in particular, Otsego Lake and Canandarago Lake. This section had three sites that demonstrated the best overall conditions in each category and six sites that had nonimpaired biological conditions. These good quality conditions were located in Oaks Creek, Center Brook, Charlotte Creek, Schenevus Creek, Otego Creek, and the Susquehanna River.

Table 1. *Water Quality Parameters Sampled in the Upper Subbasin Survey*

Field Parameters	
Flow, instantaneous cfs[a]	Conductivity, µmhos/cm[c]
Temperature, °C	Alkalinity, mg/l
pH	Acidity, mg/l
Dissolved Oxygen, mg/l[b]	
Laboratory Analysis	
Alkalinity, mg/l	Total Magnesium, mg/l
Total Suspended Solids, mg/l	Total Sodium, mg/l
Total Nitrogen, mg/l	Chloride, mg/l
Nitrite - N, mg/l	Sulfate - IC, mg/l
Nitrate - N, mg/l	Total Iron, µg/l[e]
Turbidity, NTU[d]	Total Manganese, µg/l
Total Organic Carbon, mg/l	Total Aluminum, µg/l
Total Hardness, mg/l	Total Phosphorus, mg/l
Total Calcium, mg/l	Total Orthophosphate, mg/l

[a] cfs = cubic feet per second
[b] mg/l = milligram per liter
[c] µmhos/cm = micromhos per centimeter
[d] NTU = nephelometric turbidity units
[e] µg/l = micrograms per liter

Table 2. *Water Quality Levels of Concern and References*

Parameters	Limits	Reference Code
Temperature	>25 °C	a,f
D.O.	<4 mg/l	a,g,i
Conductivity	>800 µmhos/cm	d
pH	<6.0	i
Acidity	>20 mg/l	m
Alkalinity	<20 mg/l	a,g
TSS	>25 mg/l	h
Nitrogen*	>1.0 mg/l	j
Nitrite-N	>0.06 mg/l	f,i
Nitrate-N	>1.0 mg/l	e,j
Turbidity	>150 NTU	h
Phosphorus	>0.1 mg/l	e,k
TOC	>10 mg/l	b
Hardness	>300 mg/l	e
Calcium	>100 mg/l	m
Magnesium	>35 mg/l	l,i
Sodium	>20 mg/l	i
Chloride	>250 mg/l	a,i
Sulfate	>250 mg/l	a,i
Iron	>1,500 µg/l	a
Manganese	>1,000 µg/l	a
Aluminum	>750 µg/l	n
Orthophosphate	>0.05 mg/l	l,f,j,k

Reference

Code	Reference
a	http://www.pacode.com/secure/data/025/chapter93/s93.7.html
b	Hem (1970) - http://water.usgs.gov/pubs/wsp/wsp2254/
c	Gagen and Sharpe (1987) and Baker and Schofield (1982)
d	http://www.uky.edu/WaterResources/Watershed/KRB_AR/wq_standards.htm
e	http://www.uky.edu/WaterResources/Watershed/KRB_AR/krww_parameters.htm
f	http://www.hach.com/h2ou/h2wtrqual.htm
g	http://sites.state.pa.us/PA_Exec/Fish_Boat/education/catalog/pondstream.pdf
h	http://www.epa.gov/waterscience/criteria/sediment/appendix3.pdf
i	http://www.dec.ny.gov/regs/4590.html
j*	http://water.usgs.gov/pubs/circ/circ1225/images/table.html
k	http://water.usgs.gov/nawqa/circ-1136/NIT
l	http://www.epa.gov/waterscience/criteria/goldbook.pdf
m	based on archived data at SRBC
n	http://www.epa.gov/waterscience/criteria/wqctable/

** Background levels for natural streams*

There were four sites that had moderately impaired biological conditions, potentially due to agriculture, urban, and acid deposition influences. The moderately impaired sites were located in OcQuinous Creek, Schenevus Creek, Kortright Creek, and the Susquehanna River downstream of Cooperstown, N.Y., and Otsego Lake. Water quality values that exceeded levels of concern included total nitrate-n, nitrite-n, nitrogen, phosphorus, orthophosphate, suspended solids, aluminum, and alkalinity. Habitat problems noted in this section were low water level conditions, eroded banks, sediment accumulation, dredging, abundant algae, and cattle access to the stream.

UNADILLA RIVER

The Unadilla River Watershed showed some impairment in the headwaters and improved toward the mouth. The tributaries in this watershed had mostly good quality conditions, which possibly contributed to the improvement on the mainstem Unadilla River. Two sites had the best overall conditions in each category, and four sites had nonimpaired biological conditions. These good quality conditions were located in Butternut Creek, Wharton Creek, and the mainstem Unadilla River at the mouth. Only one site, located in the headwaters of the Unadilla River, had moderately impaired biological conditions. The impairment in this watershed mostly appeared to be due to agriculture. The water quality parameters to exceed levels of concern included total nitrate-n, total nitrogen, and temperature. The slightly high temperature at the sites near the mouth may have been due to low flow conditions. Habitat concerns noted during this survey included erosion, sediment deposition, siltation, abundant algae, and possibly dredging.

GREAT BEND SECTION

In the Great Bend Section, there were four tributaries to the Susquehanna River, all of which had moderately impaired biological conditions, except for Starrucca Creek, which had the best overall conditions in each category. The moderately impaired conditions were found in Kelsey Brook, Salt Lick Creek, and Snake Creek. Despite these moderately impaired tributaries, the Susquehanna River mainstem had two sites with nonimpaired biological conditions. Temperature was the

> *"The parameters that exceeded levels of concern at the largest number of sites were total nitrogen and water temperature."*

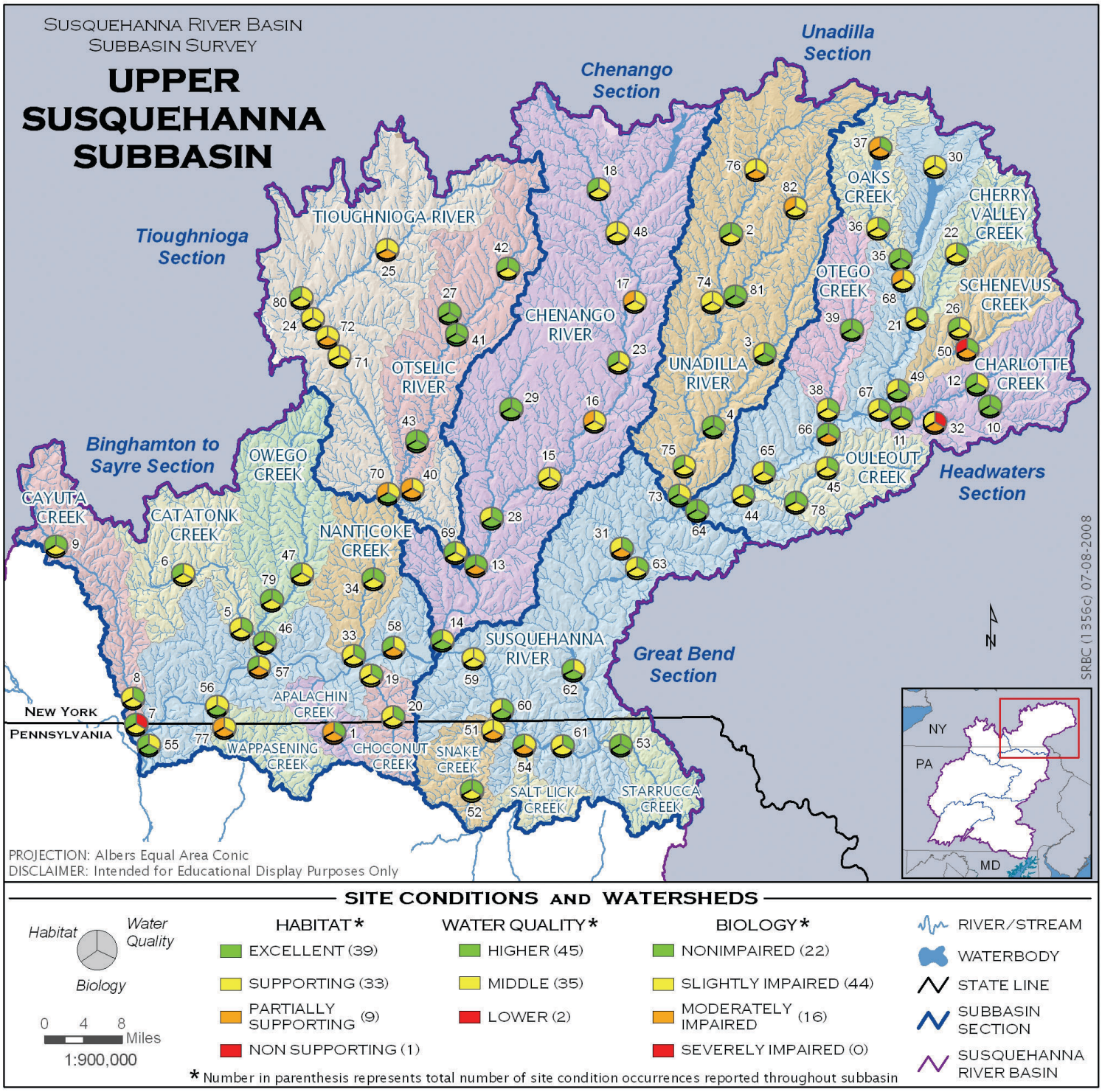

Figure 3. *Water Quality, Biological, and Habitat Conditions in the Upper Subbasin in 2007*

only water quality parameter to exceed levels of concern in the Great Bend Section sites, which may have been due to low flow conditions. Furthermore, the biological impairment in these tributaries also could have been due to these low flow conditions. Habitat issues included sediment deposition and abundant algae.

CHENANGO RIVER

The Chenango River Watershed had similar conditions as the Unadilla River in that conditions improved at the mouth and the only water quality parameters to exceed levels of concern were total nitrogen and temperature. Total nitrogen values were slightly elevated in the upper portion of the Chenango River, and slightly impaired biological conditions were prevalent. One site on the Chenango River had moderately impaired conditions. Nonimpaired conditions were found on Geneganslet Creek and the mouth of the Chenango River. Habitat problems listed in the Chenango River Watershed included erosion, condition of banks, excessive algae, and lack of vegetated riparian area. Low flow was an issue at the time of sampling and may have contributed to the moderately impaired conditions on the Chenango River where the channel was wide.

TIOUGHNIOGA RIVER

Total nitrate-n and total nitrogen were elevated in the headwaters of the Tioughnioga River as in the Chenango and Unadilla River Watersheds. Other water quality concerns in this watershed were elevated sodium, total orthophosphate, and temperature. The site downstream of Whitney Point Lake had elevated temperature. Two sites upstream of Whitney Point Lake on the Otselic River and a tributary, Mud Creek, had overall best conditions in each category. One Tioughnioga River site upstream of the Otselic River also had nonimpaired biological conditions. Three sites had moderately impaired biological conditions: one headwater Tioughnioga River site, one Tioughnioga River site downstream of Cortland, N.Y., and one Otselic River site downstream of Whitney Point Lake. Habitat concerns include channel alteration, lack of riffle, lack of vegetated riparian areas, and sediment deposition. Some of the impacts in this section appear to be from agriculture, urbanization, and channel alterations related to the dam at Whitney Point Lake.

BINGHAMTON to SAYRE SECTION

This section contains the largest portion of urban land use. Impacts from urban areas were evident at two sites on the Susquehanna River near Binghamton, N.Y., and at the mouth of Cayuta Creek in Waverly, N.Y. All of the tributary sites sampled in these watersheds had slightly or moderately impaired biological conditions. Moderately impaired conditions were found at the two sites on the Susquehanna River near Binghamton, N.Y., and on Wappasening and Apalachin Creeks. Nonimpaired conditions were found at only two sites on the Susquehanna River, near the mouth of the Upper Susquehanna Subbasin. The following water quality parameters exceeded levels of concern in this section: total nitrate-n, nitrogen, orthophosphate, phosphorus, sodium, and temperature. Sodium was elevated in this section at three sites on the Susquehanna River and on Cayuta and Owego Creeks. Temperature was elevated, possibly due to low flows. Habitat concerns included channel alteration, bank erosion, abundant algae, and very low flow conditions.

Table 3. *Upper Susquehanna Subbasin Sites with Water Quality Values Exceeding Levels of Concern*

Site #	Station	Section	Alkalinity mg/l	Aluminum T µg/l	Nitrate-N T mg/l	Nitrite-NT mg/l	Nitrogen TOT mg/l	Phos T Ortho mg/l	Phosphorus T mg/l	Sodium T mg/l	T Susp Solid mg/l	Water Temperature °C	# Exceeds
6	CATK14.4	Bing. to Sayre			1.17		1.36						**2**
7	CAYT 1.6	Bing. to Sayre						**0.32**	0.349	**53.5**			**3**
12	CHAR 13.2	Headwaters	**17.2**										**1**
14	CHEN 2.4	Chenango										26.4	**1**
15	CHEN 28.6	Chenango					1.09						**1**
16	CHEN 38.6	Chenango					1.22					25.5	**2**
17	CHEN 55.4	Chenango					1.03						**1**
18	CHEN 69.3	Chenango					1.1						**1**
23	CNWT 1.6	Chenango										26.5	**1**
24	EBTF 1.6	Tioughnioga					1.08						**1**
25	EBTF 15.1	Tioughnioga			1.42		1.65						**2**
26	ELKC 0.1	Headwaters			1.22		1.44						**2**
30	HAYD 0.7	Headwaters									**30**		**1**
32	KORT 0.7	Headwaters		**1110**									**1**
40	OTSL 0.1	Tioughnioga										25.2	**1**
47	OWGO 12.4	Bing. to Sayre								21.3			**1**
48	SANG 1.5	Chenango					1.24						**1**
51	SNAK 0.2	Great Bend										**27.9**	**1**
54	STLK 0.5	Great Bend										26.2	**1**
55	SUSQ 291.0	Bing. to Sayre										26.4	**1**
56	SUSQ 299.5	Bing. to Sayre						0.051		20.2		25.6	**3**
57	SUSQ 307.0	Bing. to Sayre							**0.497**	22			**2**
58	SUSQ 325.0	Bing. to Sayre						0.065		24.3			**2**
59	SUSQ 334.5	Great Bend										27	**1**
62	SUSQ 365.0	Great Bend										25.3	**1**
68	SUSQ 442.0	Headwaters				**0.11**	1.12	0.07	0.119				**4**
69	TIOF 0.1	Tioughnioga								22.6		26.3	**2**
70	TIOF 9.5	Tioughnioga								26.2			**1**
71	TIOF 28.7	Tioughnioga			1.18		1.6	0.063		28.8			**4**
72	TRBK 0.1	Tioughnioga					1.05						**1**
73	UNAD 0.3	Unadilla										25.3	**1**
75	UNAD 5.4	Unadilla										25.2	**1**
74	UNAD 26.7	Unadilla					1.23						**1**
76	UNAD 42.7	Unadilla			**2.4**		**2.78**						**2**
77	WAPP 2.5	Bing. to Sayre										25.3	**1**
80	WBTF 3.3	Tioughnioga			1.04		1.29			21.8			**3**
82	WHAR 16.8	Unadilla					1.33						**1**
	# Exceeds		**1**	**1**	**6**	**1**	**16**	**5**	**3**	**9**	**1**	**14**	

Most extreme values for each parameter printed in bold

Comparison of 2007 and 1998 Data

Overall, conditions in 2007 and 1998 were indicative of a healthy Upper Susquehanna Subbasin. The results for the biological, water quality, and habitat conditions in the 1998 Upper Subbasin Survey (Stoe, 1999) are depicted in Figure 4. A comparison of the 2007 and 1998 data suggests that the water quality and habitat condition categories were very similar; however, the biological conditions were different. This difference may have been due to the different processing methods in 1998 compared to 2007 and possibly due to differences in flow conditions, as the low flow conditions in 2007 may have resulted in more sites being impaired. The percentage of sites for each biological condition was quite different between the 2007 and 1998 data (Figures 5 and 6, respectively). Figure 5 of the 2007 data shows 27 percent of the sites were nonimpaired, 53 percent were slightly impaired, and 20 percent were moderately impaired. Figure 6 of the 1998 data shows 56 percent nonimpaired, 43 percent slightly impaired, and one percent with no data for SUSQ 299.5, which was not sampled for macroinvertebrates in 1998. There were no sites that were moderately impaired in the 1998 subbasin survey.

Table 4 shows a comparison of the number of parameter values that exceeded levels of concern for sites that were sampled in both 2007 and 1998. The parameter that exceeded the level of concern most in both 2007 and 1998 data sets was total nitrogen. Sodium also frequently exceeded levels of concern in both years. Nitrate-n exceeded levels of concern more in 1998 and water temperature exceeded levels of concern more in 2007, possibly due to the low flow conditions. Overall, 70 values exceeded levels of concern in 1998, whereas only 57 values exceeded levels in 2007. The largest difference was the number of total nitrogen and nitrate-n values that exceeded levels of concern. This difference may be attributable to higher flow conditions in 1998 than in 2007, since nitrate is water soluble and is more easily leached from soil during high flows. June 1998 was one of the wettest June months on record in New York State (NCDC, 2005), while drought conditions existed in 2007 (NCDC, 2007).

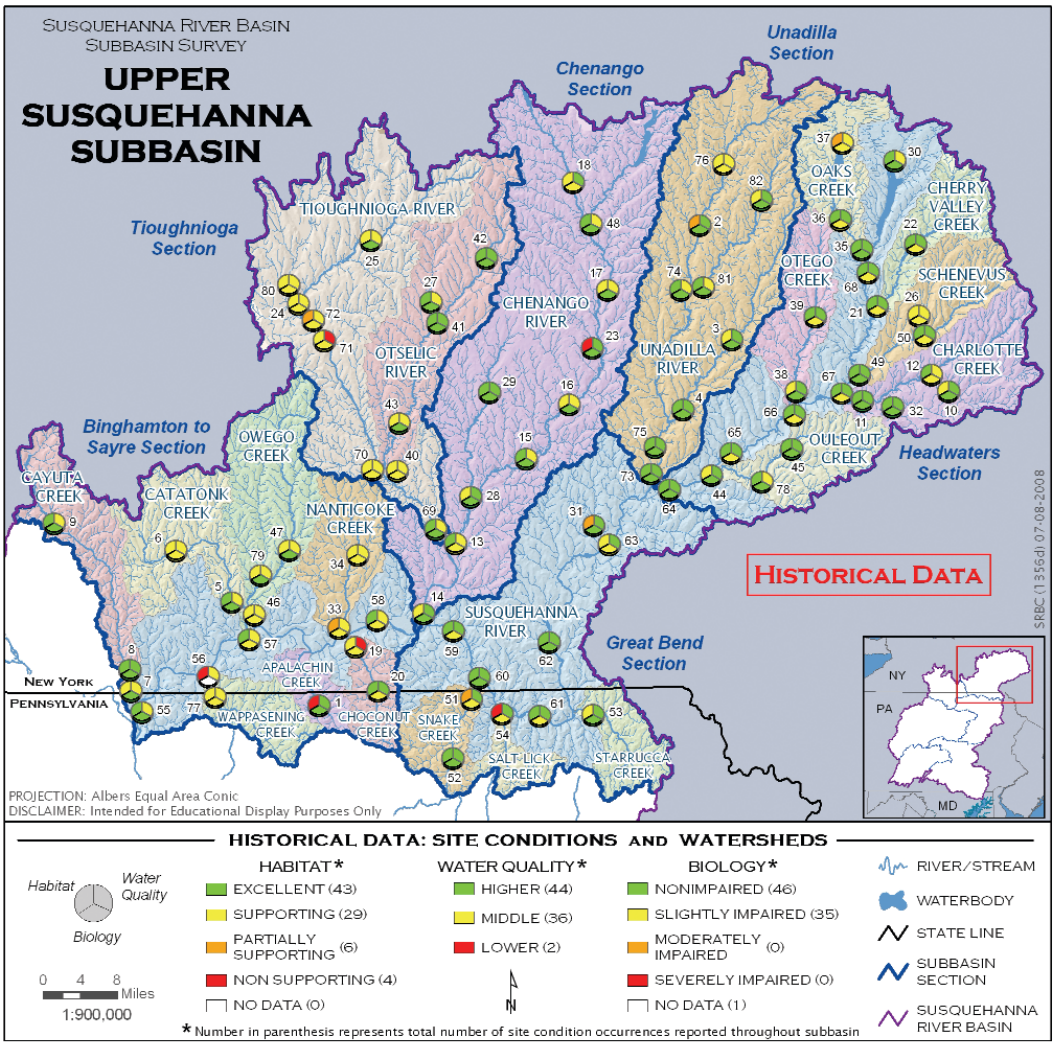

Figure 4. *Water Quality, Biological, and Habitat Conditions in the Upper Subbasin in 1998*

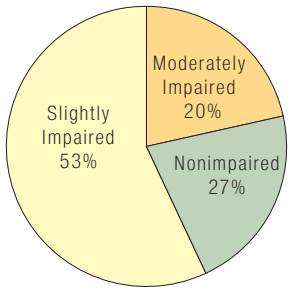

Figure 5. *Summary of Biological Conditions in the Upper Subbasin in 2007*

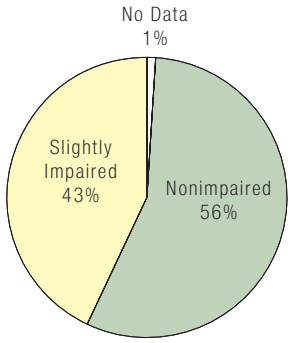

Figure 6. *Summary of Biological Conditions in the Upper Subbasin in 1998*

Table 4. *Number of Water Quality Values Exceeding Levels of Concern for the Same Sites in 1998 and 2007*

	Alkalinity mg/l	Aluminum T µg/l	Nitrate-N T mg/l	Nitrite-N T mg/l	Nitrogen TOT mg/l	Phos T Ortho mg/l	Phosphorus T mg/l	Sodium T mg/l	T Susp Solid mg/l	Water Temperature °C	TOTAL
2007	1	1	6	1	16	5	3	9	1	14	57
1998	2		16		33	3	1	11	3	1	70

Conclusions

Overall, the conditions of the streams and rivers sampled in the Upper Susquehanna Subbasin in 2007 were very good. A majority of the sites had either nonimpaired or slightly impaired biological conditions, while no sites had severely impaired biological conditions. The water quality was very good, with more than 50 percent of the samples receiving "higher" quality ratings, and only two sites receiving a "lower" quality rating. Most of the parameter values that did exceed levels of concern were only slightly higher than the levels of concern. The parameter that most often exceeded levels of concern was total nitrogen; however, the exceeding values were only slightly higher than what is considered natural background levels for streams. The highest total nitrogen value was only 2.78 mg/l. Sodium values also exceeded levels fairly often and appeared to be concentrated in the Tioughnioga River and the lower section of the Susquehanna River (including Cayuta and Owego Creeks). Further study may be needed to determine if this is due to natural geology or to a land use impact. Habitat conditions were not largely impacted, with 88 percent of the sites being rated as excellent or supporting. Only one site had nonsupporting habitat.

Many of the sites that had moderately impaired biological conditions were located in urban or agricultural areas. Some of the urban areas have antiquated municipal sewer systems, and stormwater issues also are a concern. The agricultural areas, mostly located in the headwater areas of the watersheds (Figure 3), may have excess nutrients and erosion problems that could improve with Best Management Practices recommended by local Soil and Water Conservation Districts. This region also is prone to flooding problems due to the unstable nature of the stream substrate and riparian areas. Protecting the streams and providing room for natural flooding may help to alleviate this problem. Preserving or re-establishing wetland areas may reduce and spread out the hydrologic peaks of stormflows. Other disturbances to the stream channel that impact the biological communities include dredging. During this survey, many of the streams and rivers were low due to the dry conditions that later led to a drought in the fall (NCDC, 2007). These low flow conditions also could have negatively impacted the biological community.

Some of the highest quality watersheds sampled in this survey include the Otselic River upstream of Whitney Point, Geneganslet Creek, Butternut Creek, Starrucca Creek, Center Brook, and Otego Creek. Efforts should be made to protect these watersheds from degradation. Some of the most degraded watersheds in this survey were Kortright Creek, Kelsey Brook, Salt Lick Creek, Apalachin Creek, Wappasening Creek, Unadilla River in the headwaters, and portions of the Tioughnioga and Chenango Rivers. Further study is needed as to the source of impairment in some of these watersheds. Restoration efforts are needed in those areas where impairment source and cause are known.

SRBC staff is conducting the Upper Susquehanna Subbasin Survey Year-2 assessment at Whitney Point Lake, focusing on backwater areas of the Tioughnioga River. This Year-2 study is part of a larger monitoring effort associated with an environmental restoration effort at Whitney Point Lake, which will be conducted in cooperation with the U.S. Army Corps of Engineers, NYSDEC, and United States Fish and Wildlife Service, and will include data collection for water flow, water chemistry, fish, macroinvertebrates, wetlands, and submerged aquatic vegetation. More information on this project is available at *www.srbc.net/programs/whitpoint_proj.htm.*

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Appendix

Site #	Station Name	Site Location Description	Latitude	Longitude	Drainage Size	Reference Category
1	APAL 5.3	Apalachin Creek at Harnick Road bridge near South Apalachin, N.Y.	42.00523217	-76.14119272	23.88	Small
2	BEAV 0.7	Beaver Creek downstream of Beaver Creek Road near South Brookfield, N.Y.	42.72668903	-75.30235133	32.57	Small
3	BUTT 13.8	Butternut Creek upstream of Rt. 23 bridge at Morris, N.Y.	42.54537836	-75.23879608	59.66	Small
4	BUTT 2.8	Butternut Creek upstream of Rt. 3 bridge at Copes Corner, N.Y.	42.43692683	-75.34576464	121.86	Medium
5	CATK 0.1	Catatonk Creek at USGS gage on Catatonk Road near Catatonk, N.Y.	42.12888889	-76.27833333	150.66	Medium
6	CATK 14.4	Catatonk Creek at abandoned bridge on dead end road off Rt. 96 near West Candor, N.Y.	42.22537069	-76.42493028	73.10	Small
7	CAYT 1.6	Cayuta Creek near Pa./N.Y. state line at Milltown, Pa.	41.99801867	-76.52182944	140.48	Medium
8	CAYT 3.7	Cayuta Creek at Rt. 34 bridge near Waverly, N.Y.	42.02674289	-76.52407097	136.64	Medium
9	CAYT 24.5	Cayuta Creek upstream of Rt. 224 bridge at fishing access near Cayuta, N.Y.	42.26904642	-76.68273467	50.73	Small
10	CEBR 0.1	Center Brook upstream of Rt. 9 bridge at Butts Corner, N.Y.	42.47979164	-74.81698925	51.53	Small
11	CHAR 3.6	Charlotte Creek upstream of bridge at West Davenport, N.Y.	42.44507592	-74.96367406	167.12	Medium
12	CHAR 13.2	Charlotte Creek upstream of Rt. 9 bridge at Butts Corner, N.Y.	42.48322550	-74.81575686	60.74	Small
13	CHEN 13.5	Chenango River adjacent to intersection of Rts. 12 and 79 at Chenango Forks, N.Y.	42.24101711	-75.84126992	725.16	Large
14	CHEN 2.4	Chenango River adjacent to Otsiningo Park near Binghamton, N.Y.	42.12217153	-75.90172378	1605.54	Large
15	CHEN 28.6	Chenango River at Rt. 32C bridge fishing access near Greene, N.Y.	42.36410436	-75.68069928	545.79	Large
16	CHEN 38.6	Chenango River downstream of Rt. 220/35 bridge at Oxford, N.Y.	42.44795319	-75.58713992	460.17	Medium
17	CHEN 55.4	Chenango River along Tracy Road near North Norwich, N.Y.	42.62736675	-75.50113750	289.06	Medium
18	CHEN 69.3	Chenango River upstream of Middleport Road bridge at Randallsville, N.Y.	42.79777331	-75.57064147	51.84	Small
19	CHOC 1.7	Choconut Creek near Giant store in Vestal, N.Y.	42.07143478	-76.04682264	55.18	Small
20	CHOC 8.4	Choconut Creek at T693 bridge near Choconut, Pa.	41.98986894	-76.00030353	25.38	Small
21	CHRV 0.3	Cherry Valley Creek downstream of Rt. 35 bridge near Milford, N.Y.	42.59325347	-74.92769847	91.81	Small
22	CHRV 10.2	Cherry Valley Creek upstream of Rt. 35 bridge at Middlefield, N.Y.	42.68910250	-74.84244714	65.97	Small
23	CNWT 1.6	Canasawacta Creek downstream of Rt. 10 bridge at Norwich, N.Y.	42.53622006	-75.53602989	60.39	Small
24	EBTF 1.6	East Branch Tioughnioga River at Rt. 81 bridge near park in Cortland, N.Y.	42.60815275	-76.15782294	194.23	Medium
25	EBTF 15.1	East Branch Tioughnioga River upstream of South Hill bridge at Crains Mills, N.Y.	42.71071672	-76.00479019	104.79	Medium
26	ELKC 0.1	Elk Creek upstream of Rt. 7 bridge near Schenevus, N.Y.	42.54510778	-74.84188458	32.94	Small
27	EMUD 1.2	Mud Creek upstream of camp near Hydeville, N.Y.	42.59916667	-75.87805556	29.56	Small
28	GENE 1.6	Geneganslet Creek adjacent to Slater Road near Greene, N.Y.	42.30523631	-75.79880606	104.42	Medium
29	GENE 15.3	Geneganslet Creek upstream of Creek Road bridge downstream of McDonough, N.Y.	42.46916667	-75.75611111	32.69	Small
30	HAYD 0.7	Hayden Creek upstream of Rt. 53 bridge near Smithfield Center, N.Y.	42.82133747	-74.88304508	9.69	Small
31	KELS 0.6	Kelsey Brook upstream of Rt. 7 bridge at Afton, N.Y.	42.23119719	-75.52174725	30.03	Small
32	KORT 0.7	Kortright Creek upstream of Rt. 23 at Davenport Center, N.Y.	42.44676153	-74.92140314	28.16	Small
33	NANT 1.4	Nanticoke Creek at Rt. 26 bridge near West Corners, N.Y.	42.10081553	-76.08114778	111.49	Medium
34	NANT 10.7	Nanticoke Creek at East Main Road bridge near Maine, N.Y.	42.21585856	-76.03964081	46.56	Small
35	OAKS 2.0	Oaks Creek upstream of abandoned bridge near Toddsville, N.Y.	42.68263967	-74.95759272	100.76	Medium
36	OAKS 6.4	Oaks Creek upstream of abandoned bridge near Cattown, N.Y.	42.73045653	-75.00225650	78.39	Small
37	OCQU 1.1	OcQuinous Creek upstream of first bridge above lake at Richfield Springs, N.Y.	42.85103011	-74.99379814	20.58	Small
38	OTGO 0.1	Otego Creek downstream of bridge on Pony Farm Road near Oneonta, N.Y.	42.43472397	-75.12063469	108.91	Medium
39	OTGO 13.1	Otego Creek upstream of Rt. 11b bridge at Mount Vision, N.Y.	42.57851694	-75.06032436	50.68	Small
40	OTSL 0.1	Otselic River downstream of reservoir at Whitney Point, N.Y.	42.33073189	-75.96606856	257.43	Medium
41	OTSL 23.1	Otselic River at fishing access from Rt. 12 bridge at Pitcher, N.Y.	42.58234989	-75.86471975	99.02	Small
42	OTSL 32.7	Otselic River at fishing access near Seventh Day Hollow, N.Y.	42.68041836	-75.75891664	54.01	Small
43	OTSL 8.7	Otselic River at Lander's Corners Fish Access near Landers Corners, N.Y.	42.42268156	-75.94876222	216.59	Medium
44	OULT 0.5	Ouleout Creek downstream of Covered Bridge Road bridge near Unadilla, N.Y.	42.33275164	-75.28770981	109.64	Medium
45	OULT 12.0	Ouleout Creek upstream of Chamberlain Hill Road bridge near Leonta, N.Y.	42.37193381	-75.11599886	37.43	Small
46	OWGO 0.1	Owego Creek upstream of Rt. 17c bridge at Owego, N.Y.	42.09837486	-76.27704669	342.01	Medium
47	OWGO 12.4	Owego Creek at Water Street bridge at Newark Valley, N.Y.	42.22435744	-76.18501936	84.25	Small
48	SANG 1.5	Sangerfield River upstream of Cove Road bridge near Earlville, N.Y.	42.73134028	-75.53432267	62.16	Small
49	SHEN 1.7	Schenevus Creek downstream of Rt. 28 bridge near Colliersville, N.Y.	42.48601189	-74.96890636	118.51	Medium
50	SHEN 11. 5	Schenevus Creek upstream of Elk Creek at fishing access near Schenevus, N.Y.	42.54512158	-74.82178531	51.47	Small
51	SNAK 0.2	Snake Creek upstream of bridges along Rt. 7A at Corbettsville, N.Y.	42.01522383	-75.78871583	75.03	Small
52	SNAK 9.0	Snake Creek upstream of bridge at Franklin Forks, Pa.	41.91780203	-75.84631606	17.98	Small
53	STAR 0.9	Starrucca Creek upstream of SR 1009 bridge near Lanesboro, Pa.	41.96677831	-75.57386614	72.97	Small
54	STLK 0.5	Salt Lick Creek upstream of SR 1010 bridge at Hallstead, Pa.	41.96273106	-75.73948761	39.60	Small
55	SUSQ 291	Susquehanna River upstream of Lockhart Street bridge in Sayre, Pa.	41.98110000	-76.50750000	4758.57	Large
56	SUSQ 299.5	Susquehanna River at fishing access at Barton, N.Y.	42.02656528	-76.35848308	4727.14	Large
57	SUSQ 307	Susquehanna River upstream Rt. 96 bridge at Owego, N.Y.	42.10130308	-76.26112314	4225.09	Large
58	SUSQ 325	Susquehanna River fishing access near Apalachin, N.Y.	42.11260031	-76.00100567	3933.95	Large
59	SUSQ 334.5	Susquehanna River downstream of bridge at Fivemile Point, N.Y.	42.09448400	-75.83935294	2267.35	Large
60	SUSQ 341.5	Susquehanna River at Kirkwood Park in Kirkwood, N.Y.	42.02029292	-75.78629164	2202.18	Large
61	SUSQ 356	Susquehanna River boat launch in Hallstead, Pa.	41.96111111	-75.66194444	1983.35	Large
62	SUSQ 365	Susquehanna River upstream of Rt. 17c bridge at Windsor, N.Y.	42.07444444	-75.63805556	1858.09	Large
63	SUSQ 384	Susquehanna River upstream of Rt. 41 bridge at Afton, N.Y.	42.22722222	-75.52416667	1721.95	Large
64	SUSQ 395.5	Susquehanna River upstream of Rt. 23 bridge at Sidney, N.Y.	42.31750744	-75.39405381	1027.92	Large
65	SUSQ 406	Susquehanna River at abandoned bridge in Wells Bridge, N.Y.	42.36683347	-75.24518542	847.19	Large
66	SUSQ 417	Susquehanna River upstream of Rt. 23 bridge near Oneonta, N.Y.	42.44388889	-75.10000000	680.93	Large
67	SUSQ 422.5	Susquehanna River upstream of Gifford Creek at fishing access near Oneonta, N.Y.	42.45751339	-75.00771781	482.49	Medium
68	SUSQ 442	Susquehanna River downstream of Rt. 11c bridge near Hyde Park, N.Y.	42.66150056	-74.95008417	196.25	Medium
69	TIOF 0.1	Tioughnioga River upstream of Rt. 12 bridge at Chenango Forks, N.Y.	42.23856308	-75.84766769	763.47	Large
70	TIOF 9.5	Tioughnioga River upstream of Rt. 11 bridge at Whitney Point, N.Y.	42.33102006	-75.96704567	458.97	Medium
71	TIOF 28.7	Tioughnioga River upstream of bridge at Fishing Access for Blodgett Mills, N.Y.	42.56839497	-76.12118822	346.43	Medium
72	TRBK 0.1	Trout Brook downstream of Rt. 11 bridge in Pokeville, N.Y.	42.58613125	-76.12942511	40.52	Small
73	UNAD 0.3	Unadilla River upstream of Rt. 7 bridge at Sidney, N.Y.	42.31782472	-75.40879275	562.02	Large
74	UNAD 26.7	Unadilla River downstream of Rt. 80 bridge at New Berlin, N.Y.	42.62592569	-75.32739250	204.61	Medium
75	UNAD 5.4	Unadilla River upstream of Rt. 40 bridge at Rockdale, N.Y.	42.37876228	-75.40636458	519.79	Large
76	UNAD 42.7	Unadilla River upstream of Skaneateles Tpk. Bridge near Leonardsville, N.Y.	42.82187447	-75.24860458	88.49	Small
77	WAPP 2.5	Wappasening Creek at Rt. 187 bridge near Pa./N.Y. state line	41.99384972	-76.34435636	63.13	Small
78	WBHB 0.1	West Branch Handsome Brook at Rt. 357 bridge near Bartlett Hollow, N.Y.	42.32073133	-75.18145669	26.60	Small
79	WBOC 5.4	West Branch Owego Creek upstream of abandoned bridge near Flemingville, N.Y.	42.18534650	-76.24662119	73.54	Small
80	WBTF 3.3	West Branch Tioughnioga River at Water Street pedestrian bridge at Homer, N.Y.	42.63635072	-76.17654339	71.97	Small
81	WHAR 0.6	Wharton Creek at Rt. 18 bridge near New Berlin, N.Y.	42.61992722	-75.31970969	92.71	Small
82	WHAR 16.8	Wharton Creek at Rt. 19 bridge at Beverly Inn Corners, N.Y.	42.76446244	-75.16931603	32.53	Small