



Field Data Report

Lake Ontario Tributaries

2009 - 2010

Participating Personnel:

U.S. Environmental Protection Agency
Paula Zevin, Environmental Engineer
Stephen Hale, Environmental Protection Specialist
Mohamed Amin, Environmental Engineer

Report Prepared by:

Paula Zevin 03/28/11

Paula Zevin, Environmental Engineer
Monitoring Operations Section

Approved for the Director by:

John S. Kushwara 3/28/11

John S. Kushwara, Chief
Monitoring and Assessment Branch

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Background

The Lakewide Management Plan (LaMP) for Lake Ontario has identified six critical pollutants which contribute to lakewide beneficial use impairments due to their toxicity, persistence in the environment, and/or their ability to bioaccumulate. The six critical pollutants are polychlorinated biphenyls (PCBs), mercury, DDT, dieldrin, mirex, and dioxins. Approximately 80% of the surface water flow to Lake Ontario is from the Niagara River. A long term monitoring program conducted by Environment Canada as a component of the Niagara River Toxics Management Plan has provided good estimated loadings of pollutants from the Niagara River and the upstream Great Lakes. However, definitive current information regarding loadings from other U.S. tributaries to Lake Ontario had been lacking. In 2002, the U.S. Environmental Protection Agency (EPA) initiated a program to regularly monitor U.S. tributaries for the critical pollutants. Previous reports have provided program results for 2002 through 2008. This report provides the results from 2009 through 2010, and identifies changes in the monitoring program from prior years..

Monitoring Locations

Beginning in April 2002, ambient water samples were collected two to three times annually from stations located in the downstream portions of each of the following tributaries to Lake Ontario:

- Black River
- Salmon River
- Oswego River
- Genesee River
- Eighteen Mile Creek

The first four tributaries were selected because they are the largest American tributaries to Lake Ontario. They also have U.S. Geological Survey (USGS) gage stations, which provide measurements of flow at the time of sampling. Eighteen Mile Creek, which has no gage station, was selected for monitoring because of its history as a source of PCBs. These five tributaries are referred to collectively as the primary tributaries.

In 2005, monitoring was expanded to include additional tributaries. These streams are smaller, and may not have USGS gage stations. Collectively this set of tributaries is referred to as the secondary tributaries. The secondary tributaries are monitored less frequently, on an irregular schedule. They have been included to expand the base of information regarding sources of critical pollutants. The secondary tributaries are:

- Twelve Mile Creek
- Johnson Creek
- Oak Orchard Creek
- Irondequoit Creek
- Wine Creek
- Sandy Creek



Figure 1 - Tributaries sampling locations

At each tributary, sampling locations were selected to be as far as possible downstream, while also being far enough upstream of the convergence with Lake Ontario to avoid the influence of the lake itself. Practical considerations of access for boat launching and safety also influenced site selection. Occasionally, unusual weather or flow conditions required some minor adjustment of sampling locations. Sampling locations were initially recorded with global positioning system (GPS) equipment. The GPS equipment was used to return to the initial sampling location for subsequent sampling events. Appendix A includes detailed maps showing the sampling location and the associated USGS gage station for each tributary.

In 2007, the sampling location for the Oswego River was moved to a location just downstream of Lock 7. This was done to bring the sampling location within the boundaries of the Oswego Area of Concern (AOC). Appendix A includes a map depicting the pre-2007 and post-2007 sampling locations for the Oswego River.

In 2010, a second sampling location was added on Oak Orchard Creek, upstream of the original site and at a USGS gage station near Shelby, NY. Appendix A includes a map with both sampling stations (Oak Orchard Creek 1 – original and Oak Orchard Creek 2 – new location). The gage was installed by USGS in 2008 for a different purpose and was due to be dismantled in 2009. EPA Region 2 secured funding to allow its continued operation through the end of 2011. Oak Orchard Creek has been used as a reference area for various Beneficial Use Impairment (BUI) projects in the Rochester AOC and more frequent sampling of this tributary would add to the validity of the existing data set. With the USGS gage station in place, toxic pollutant loadings could be estimated for 2009 as well.



Photo 1 - Oak Orchard Creek 2 Sampling Site and USGS Gage Station

Sandy Creek was also sampled twice in 2010 in order to supply more data for the Lake Ontario pollutant loading models and other projects.

The tributaries sampled in 2009 – 2010 are highlighted in bold lettering in Table 1.

Sampling Procedures

Each of the primary tributaries was sampled twice annually (three times in 2003). The secondary tributaries were sampled on a more irregular basis. Sampling dates were varied each year in order to capture a variety of seasonal conditions. Table 1 shows the sampling dates for each stream.

A subset of 40 Polybrominated Diphenyl Ethers (PBDEs) congeners was added to the routine sampling of the tributaries in 2010. PBDEs are Lake Ontario critical pollutants previously identified in the Lake Ontario LaMP and not analyzed until now. The EPA region 2 Laboratory has recently developed the capacity to analyze PBDEs with a suitable sensitivity.

In October 2010, the sampling crew added a sample for Total Dissolved Solids (TDS) on the Black River in anticipation of the Watertown Waste Water Treatment Plant's potential treatment

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of hydro-fracking waters and the anticipated modification of its discharge permit. The most protective New York State Surface Water Standard for TDS is 200 milligrams per liter (mg/L). (<http://www.dec.ny.gov/regs/4590.html#16132>)

At most sampling locations, samples were collected from a small boat anchored at mid-channel. A sonar depth finder was used to locate the deepest part of the stream cross section and to record depth. Where conditions did not permit the use of a boat, the sampling team waded to midstream to collect samples or collected them from a shore location as close as possible to the original sampling site.

At each location, a YSI Model 63 meter was used to measure pH, temperature, and specific conductivity. The meter's probe was lowered to one half meter below the surface, and readings were recorded after stabilization.

All samples for laboratory analyses were collected as direct grab samples. For the collection of mercury samples, a two person "clean hands/dirty hands" sampling team was required. This procedure is based upon EPA Method 1669: Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels. One person was designated as "clean hands" and performed all operations involving direct contact with the sample and containers. The other person was "dirty hands" and was responsible for all other activities not involving direct contact with the samples. To further minimize opportunity for sample contamination, the sampling team wore disposable tyvek lab coats, an inner pair of shoulder length polyethylene gloves, and an outer layer of powder free, non-colored latex gloves. The teflon lined sample containers for mercury samples were precleaned and supplied by the laboratory performing the analyses. At each sampling location, mercury samples were always collected first. Mercury samples were chemically preserved upon receipt by the laboratory, in order to further reduce chances for field contamination.

After collection of the mercury sample, direct grab samples were collected for the remaining parameters. The containers for the parameters other than mercury were new, single use certified precleaned containers.

For each sampling event, field blanks were collected at one sampling location. Procedures have been designed so that the sample containers are the only equipment which comes into direct contact with the samples. The blanks are intended to detect any trace contamination due to sampling procedures, atmospheric contamination, or deficiencies in container cleaning.

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Table 1
Lake Ontario Tributaries Sampling Events

	April 16-18, 2002	September 17-18, 2002	May 6-7, 2003	July 9-10, 2003	October 7-8, 2003	May 11-12, 2004	September 28-29, 2004	May 3-4, 2005	August 30-31, 2005	July 25-26, 2006	September 19-20, 2006	June 26-27, 2007	October 16-17, 2007	August 12-13, 2008	October 21-22, 2008	August 11-12, 2009	October 4-15, 2009	July 7-8, 2010	October 13-14, 2010
Eighteen Mile Creek	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Genesee River	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Oswego River	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Salmon River	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Black River	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Twelve Mile Creek											•				•				
Johnson Creek								•						•					
Oak Orchard Creek 1								•			•		•		•	•	•	•	•
Oak Orchard Creek 2																			•
Irondequoit Creek										•		•				•			
Wine Creek									•			•					•		
Sandy Creek									•	•			•	•				•	•

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Analytical Methods

Analytical methods and laboratories utilized in 2009 and 2010 are summarized below in Table 2.

Table 2
Analytical Methods and Laboratories, 2009-2010

Analyte	Method	Laboratory
pH	EPA 150.1	Field
Temperature	EPA 170.1	Field
Specific Conductivity	EPA 120.1	Field
Total Suspended Solids	EPA 160.2	EPA Region 2
Total Dissolved Solids (*)	SOP C-37 (based on SM 2540C)	EPA Region 2
Mercury	EPA 1631E	Batelle Marine Science Lab
PCBs	EPA 1668A	EPA Region 2
PBDEs (**)	EPA 1614	EPA Region 2

(*) started in October 2010 on the Black River only.

(**) added in 2010, a subset of 40 congeners.

Samples were not analyzed for pesticides (DDT, DDD, DDE, dieldrin, mirex) because several years of analyses had not detected these pesticides in any sample above reporting limits of 2.6-5.5 ng/L. Attempts to use alternative analytical techniques with lower reporting limits experienced numerous quality assurance issues which caused data to be rejected. Consequently, analyses for pesticides were discontinued in 2006.

Findings

Appendix B includes spreadsheets for each tributary, presenting all data collected between 2005 and 2010. The complete data sets for each tributary sampled between 2002 and 2010 are included on the accompanying CD-ROM.

Western New York State (Buffalo and Rochester, Genesee River) experienced severe weather in a 72-hour window prior to the August 2009 sampling, receiving 1.63" of rain in one day and around 1" the following day. The average daily rainfall for this time of year was 0.12". The Oswego area experienced heavy rainfall prior to the October 2010 sampling, about 9 times the average rate of 0.1" per day. These events led to very high flows in certain tributaries and increased pollutant loadings.

(See <http://www.wunderground.com> for historical rainfall data in New York State)



Photo 2 – The Oswego River near Varick Street, October 2010

Blanks

Field blanks were collected by the sampling team for each sampling event. The laboratory(ies) also ran laboratory method blanks with each batch of samples. Analytical data were compared with results for both field blanks and method blanks. If the laboratory ran multiple method blanks, the method blank results would be averaged, and a mean of method blank results would be used for screening purposes. If an analyte was detected in a sample at a concentration less than three times the concentration detected in either blank, the result for that sample was rejected. In this case, the result would be treated as a “non-detect” because the sample concentration could not be distinguished from the blank, or background concentration. If the analyte was found to be present at a concentration more than three times the greatest blank screening concentration, the result was used without further adjustment. In other words, data were screened for blank influence, but data were not blank corrected. For PCBs, blank screenings were done for individual congeners.

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Mercury

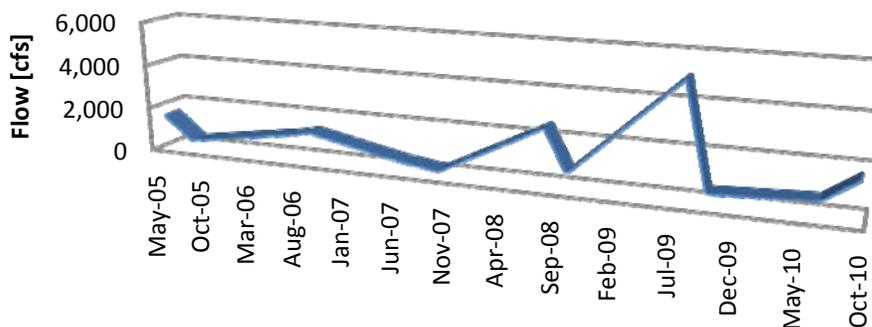
In the previous period (2007-2008) total loadings from the five primary tributaries ranged from 13.9 g/day to 98.6 g/day.

During the 2009/2010 period, combined mercury loadings from the five primary tributaries ranged from 23.55 grams per day (g/day) to at least 285.08 g/day. The highest totals were from the August 2009 and October 2010 sampling events. Because atmospheric transport is a large contributor to mercury loadings, periods of increased precipitation and higher stream flows were associated with higher in-stream mercury concentrations.

The 2005 – 2010 long-term trend charts for the Genesee River illustrate the point.

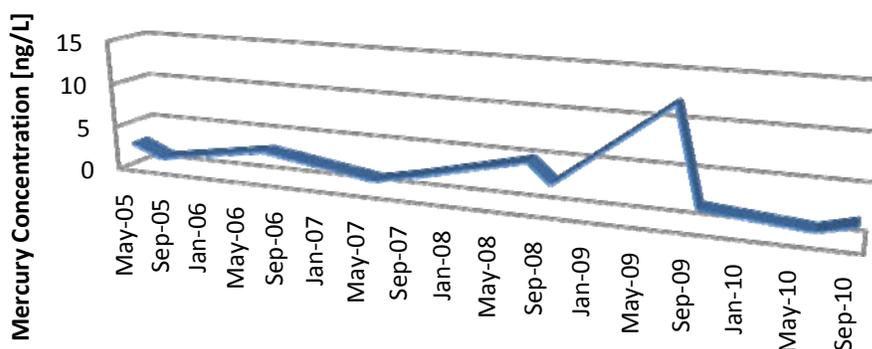
Genesee River 2005 - 2010

Flow



Genesee River 2005 - 2010

Mercury Concentrations



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The new Oak Orchard 2 site near Shelby, NY was ground-truthed in July 2010 and sampled in October 2010 for the first time. As seen in Table 3, the mercury concentration at the site was about 6 times higher than at the original Oak Orchard sampling site. USGS conducted re-sampling of both sites in November 2010 and found that the levels were below 0.005 micrograms per liter (ug/L). However, the October 2010 EPA sample was 0.00315 ug/L, which is below the USGS method detection or reporting limit.

Table 3
Mercury Results

Mercury Concentrations (ng/L)				
	August 2009	October 2009	July 2010	October 2010
Eighteen Mile Creek	3.80	2.62	2.70	1.98
Genesee River	12.2	1.85	0.928	1.91
Oswego River	1.40	0.748	0.884	1.40
Salmon River	1.33	1.72	1.34	2.37
Black River	2.72	2.67	3.16	3.20
Oak Orchard Creek 1	1.28	1.12	0.74	0.48
Oak Orchard Creek 2				3.15
Irondequoit Creek	1.65			
Wine Creek		0.844		
Sandy Creek			1.11	0.74
Mercury Load (g/day)				
Eighteen Mile Creek	0.84	0.58	0.59	0.44
Genesee River	234.94	3.55	2.50	12.31
Oswego River	30.90	4.49	7.30	32.05
Salmon River	0.87	5.52	0.85	5.02
Black River	17.53	24.14	12.31	44.06
Total Load for Primary Tributaries (g/day)	285.08	38.28	23.55	93.88
Oak Orchard Creek 1	0.25	0.28	0.07	0.09
Oak Orchard Creek 2				0.57
Irondequoit Creek		0.43		
Sandy Creek			0.11	0.35

Notes: - Loadings for Eighteen Mile Creek are based upon an estimated flow of 90 cfs.
 - For secondary tributaries, loadings were only calculated if flow could be obtained from a gage.

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PCBs

In the previous period (2007-2008), total loadings from the five primary tributaries ranged from 12.43 g/day to 24.98 g/day.

Samples were analyzed for PCBs by EPA Method 1668, using a one liter sample size. In the first two years (2002-2003), the target list of congeners included 106 of the 209 possible congeners. In 2004, the target list of congeners was expanded to include all 209 congeners.

In calculating total PCBs and the totals for various homolog groups, the concentrations of individual congeners (after screening for blank influence) were summed. Non-detects and results rejected as indistinguishable from background (blank) contamination were treated as zero.

Table 4
PCB Results

PCB Concentrations (pg/L)				
	August 2009	October 2009	July 2010	October 2010
Eighteen Mile Creek	93,000	60,000	43,000	58,000
Genesee River	1,100	870	510	280
Oswego River	93	1,300	130	210
Salmon River (*)	0	80	49	62
Black River	2,200	1,200	3,900	1,700
Oak Orchard Creek 1	220	430	170	280
Oak Orchard Creek 2				42
Irondequoit Creek	280			
Wine Creek		30,000		
Sandy Creek			127	84
PCB Load (g/day)				
Eighteen Mile Creek	20.44	13.19	9.45	12.75
Genesee River	21.18	1.67	1.37	1.80
Oswego River	2.05	7.80	1.07	4.90
Salmon River (*)	0	0.26	0.03	0.13
Black River	14.17	10.85	15.19	23.41
Total Load for Primary Tributaries (g/day)	57.84	33.77	27.11	42.99
Oak Orchard Creek 1	0.04	0.11	0.02	0.05
Oak Orchard Creek 2				0.01
Irondequoit Creek	0.07			
Sandy Creek			2.76E-03	3.87E-02

Notes: - Loadings for Eighteen Mile Creek are based upon an estimated flow of 90 cfs.
 - For secondary tributaries, loadings were only calculated if flow could be obtained from a gage.
 - (*) August 2009, non-detect, treated as zero

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Total loading from the five primary tributaries ranged from 27.11 g/day to 57.84 g/day. The higher figure did not include loadings from the Salmon River because PCBs were below the detection limit in August 2009 and were treated as zero.

As has been the case since the initiation of this project in 2002, the highest PCB concentrations are observed in Eighteen Mile Creek. In 2009 – 2010 PCB concentrations in Eighteen Mile Creek were at least one order of magnitude higher than the concentrations observed in any other tributary, usually two to three orders of magnitude. In 2008 PCB concentrations in Eighteen Mile Creek were more than 40 times greater than the concentration observed in any other stream. Eighteen Mile Creek is a Lake Ontario Area of Concern (AOC), and work is being performed now to identify areas of contaminated sediment so that plans can be made for remediation.

Largely because of PCB contamination, the New York State Department of Health has issued a health advisory cautioning anglers and the general public to eat no fish from Eighteen Mile Creek (NYSDOH, 2008. Chemicals in Sportfish and Game, 2008-2009 Health Advisories. New York State Department of Health, May 2008; for 2011 the advisory can be found at <http://www.health.ny.gov/environmental/outdoors/fish/fish.htm#western>). Eighteen Mile Creek is a very popular fishing location, with excellent public access. In spite of the very strong advisory from the New York State Department of Health, there are no signs at public access locations informing anglers of the consumption advisory. The PCB contamination and associated health risks remain.



Photo 3 - Eighteen Mile Creek fishing trail

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PBDEs

All samples from both rounds of sampling have been analyzed by the EPA Region 2 laboratory. The lab identified issues with apparent blank contamination and the sampling team has been working with the lab to track down and eliminate any possible contamination sources, such as sampling containers. For this reason, the 2010 results are not yet reliable or usable to estimate loadings to Lake Ontario. Sample collection for PBDEs will continue and follow the laboratory's recommendations on sampling technique and types of sample containers.

Total Dissolved Solids (TDS)

The most protective New York State Surface Water Standard for TDS is 200 mg/L. (<http://www.dec.ny.gov/regs/4590.html#16132>) The sample taken in the Black River in October 2010 was well below that limit at 83 mg/L.

Appendix A

Maps of Sampling Locations

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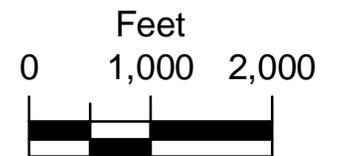
Eighteen Mile Creek

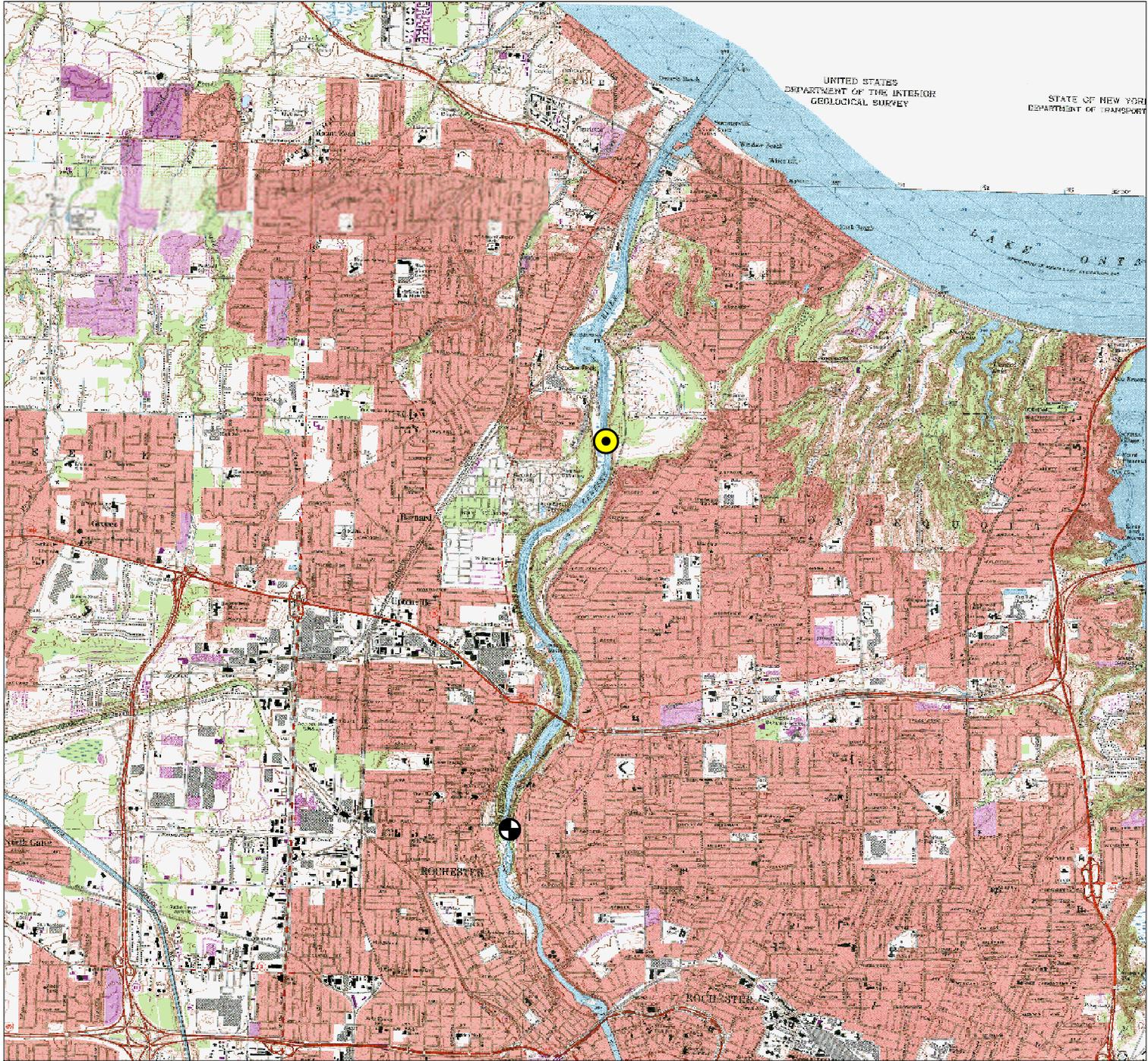
Legend

! Sample Location

Newfane 7.5 USGS Topographic map dated 1978.

Contour interval 5 feet.





Genessee River

Legend

-  Sampling Location
-  USGS Gage Station

Braddock Heights,
Rochester East and
West 7.5 USGS
Topographic map dated
1971.
Photorevised 1978.

Contour interval 5 feet.



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Oswego River

Legend

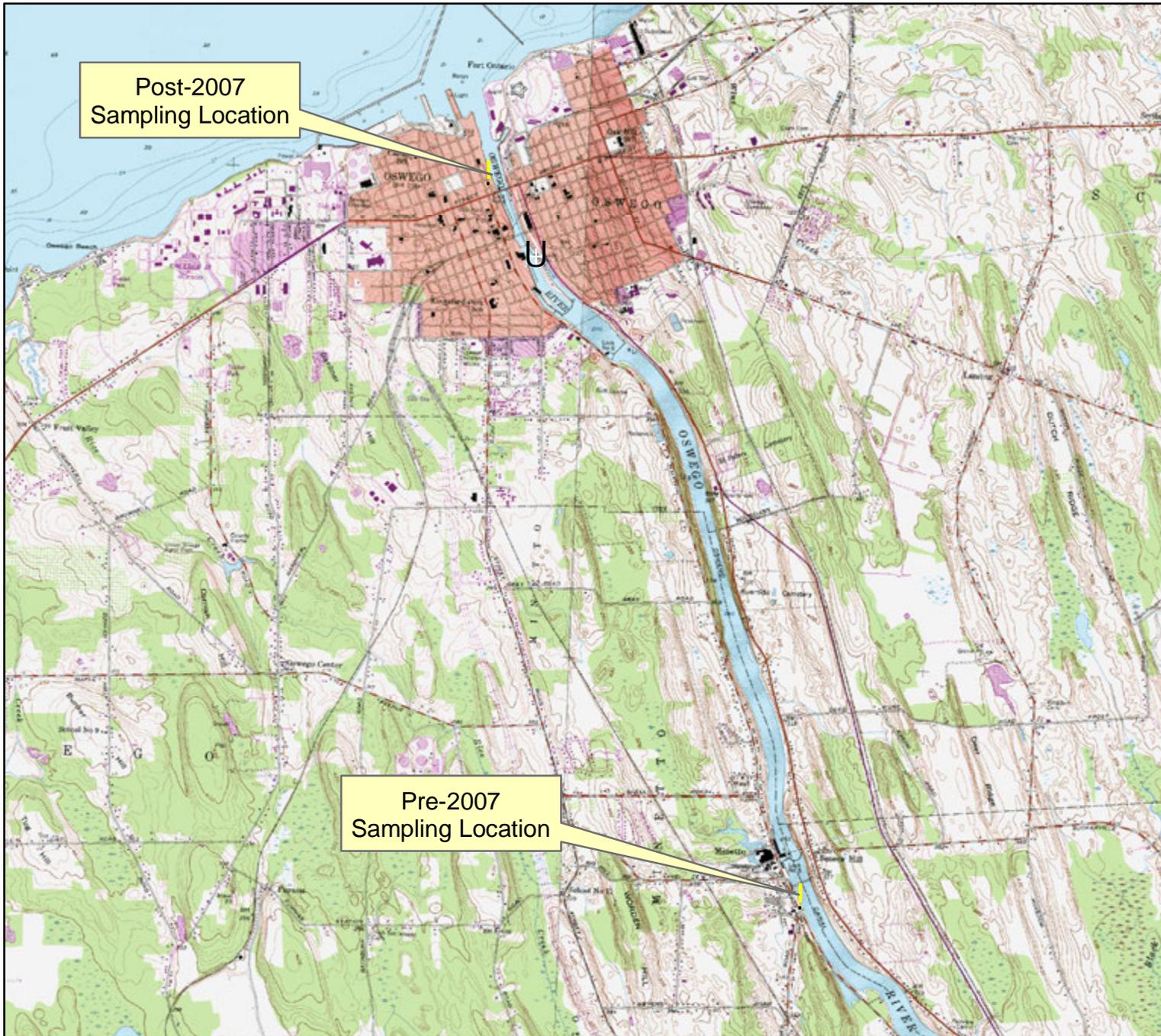
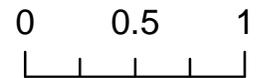
- ! Sampling Location
- U USGS Gage Station

Oswego East and
Oswego West 7.5 USGS
Topographic map
dated 1954.
Photorevised 1978.

Contour interval 10 feet.



Miles



Salmon River

Legend

-  Sampling Location
-  USGS Gage Station

Pulaski and Richland 7.5
USGS Topographic map
dated 1978, 1958.
Photorevised 1980, 1982.

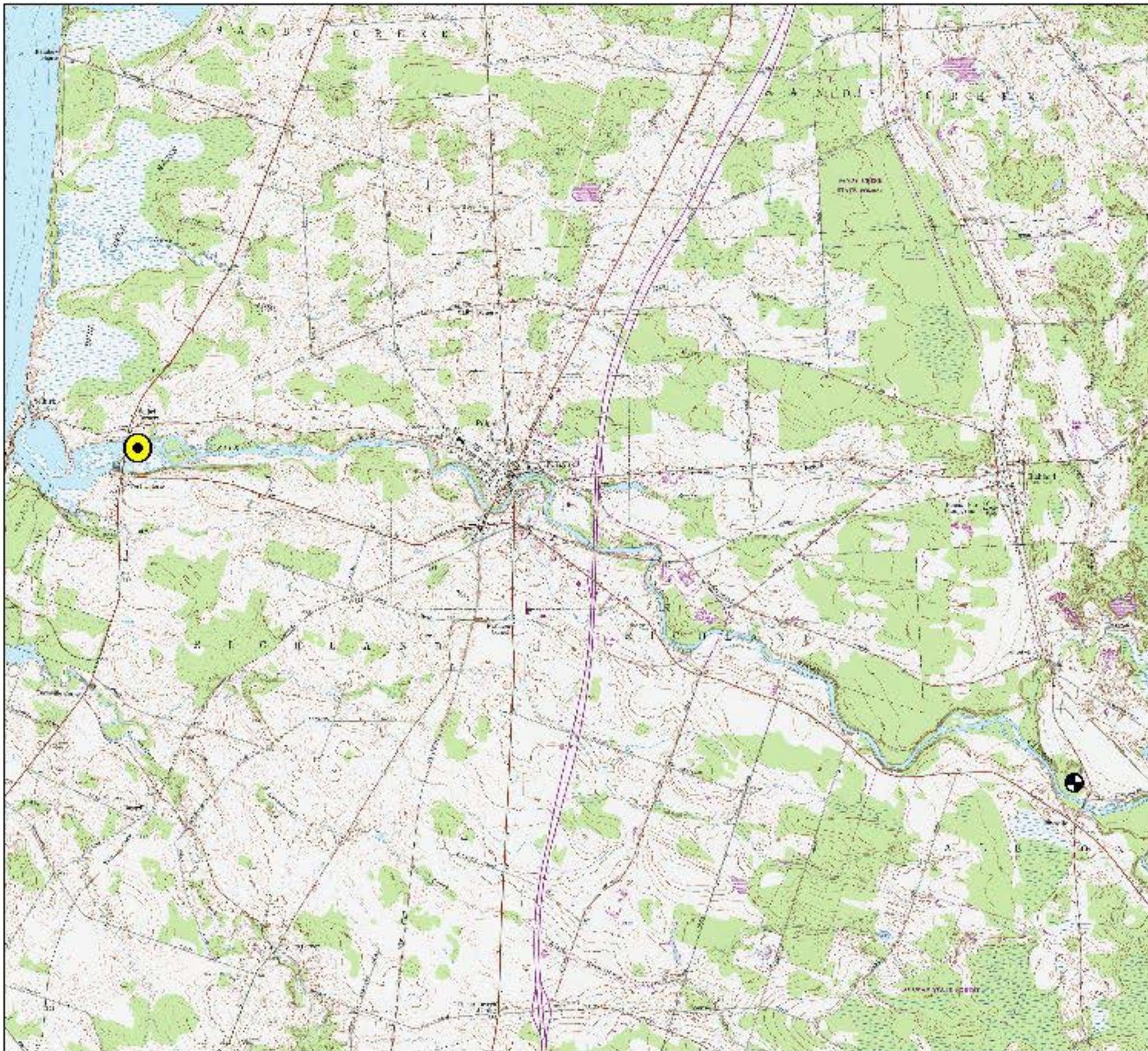
Contour interval 10 feet.

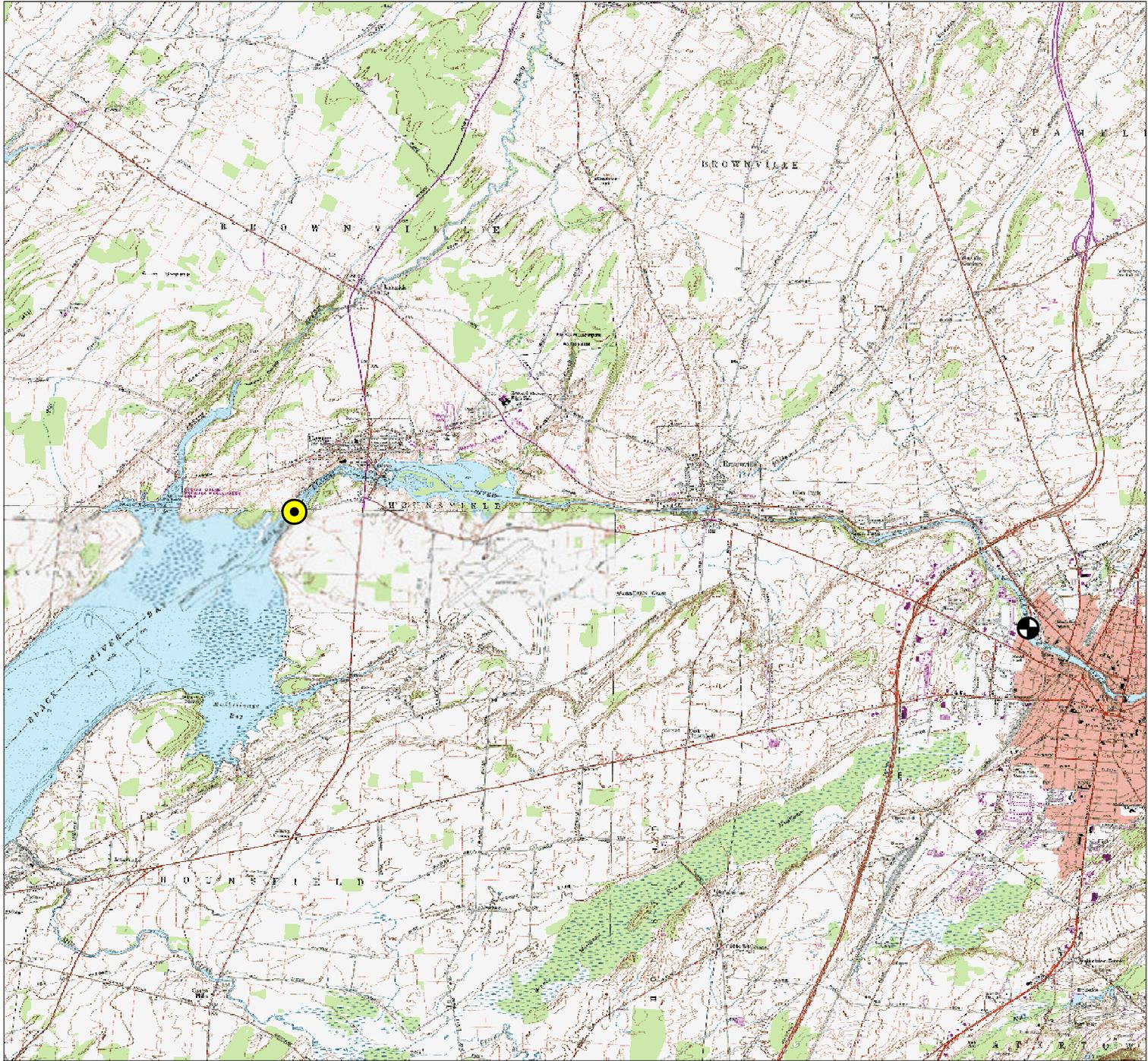


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Black River

Legend

-  Sampling Location
-  USGS Gage Station

Brownville, Dexter, Watertown and Sackets Harbor 7.5 USGS Topographic map dated 1958, 1958, 1959, 1959. All photorevised 1982 except Sackets Harbor

Contour interval 10 feet.

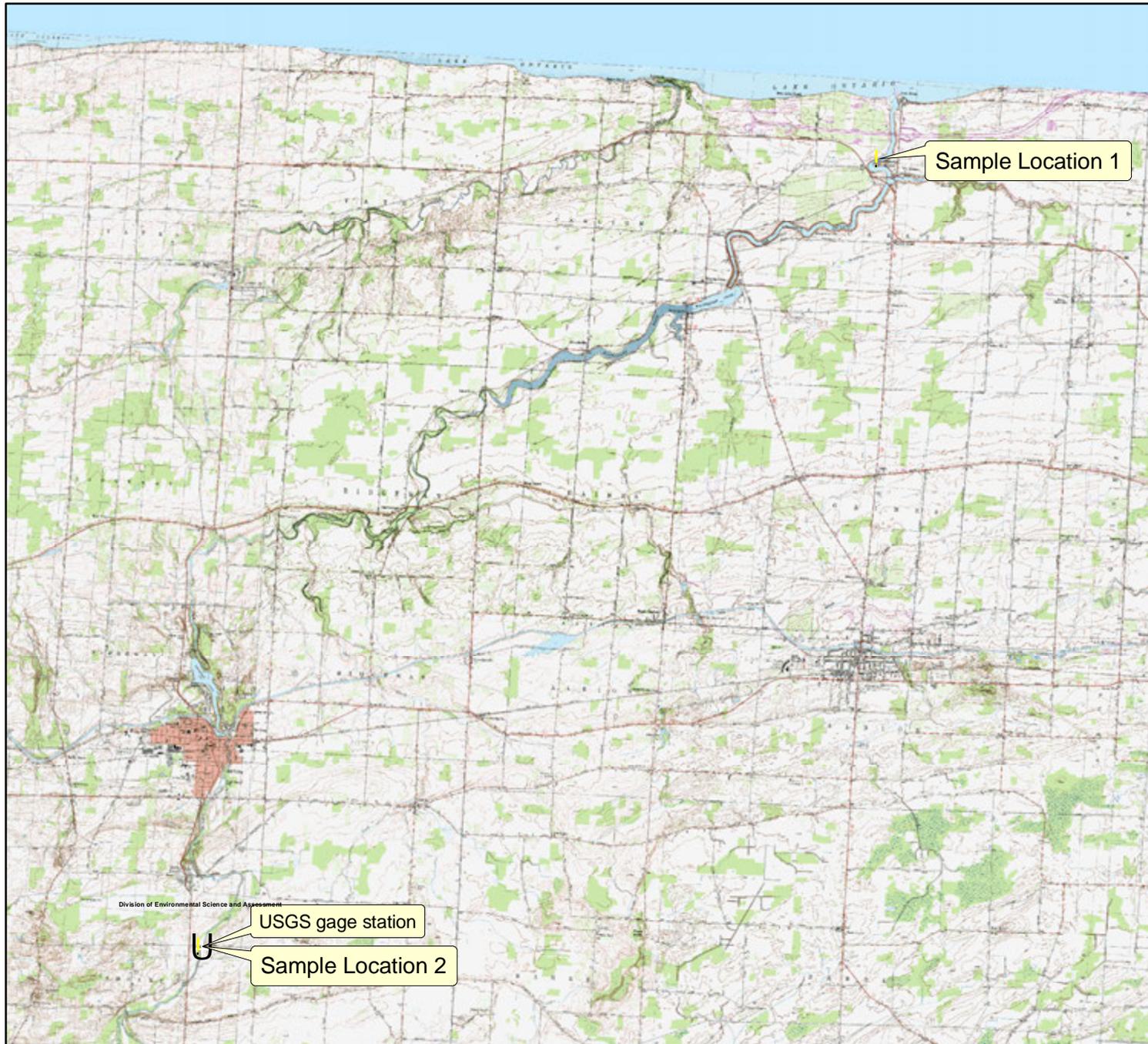


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Oak Orchard Creek



Sample Location 1

USGS gage station
Sample Location 2

Legend

- ! Sampling Locations
- U USGS gage station

Ashland and Kent
7.5' USGS
Topographic maps
dated 1986 and 1965.

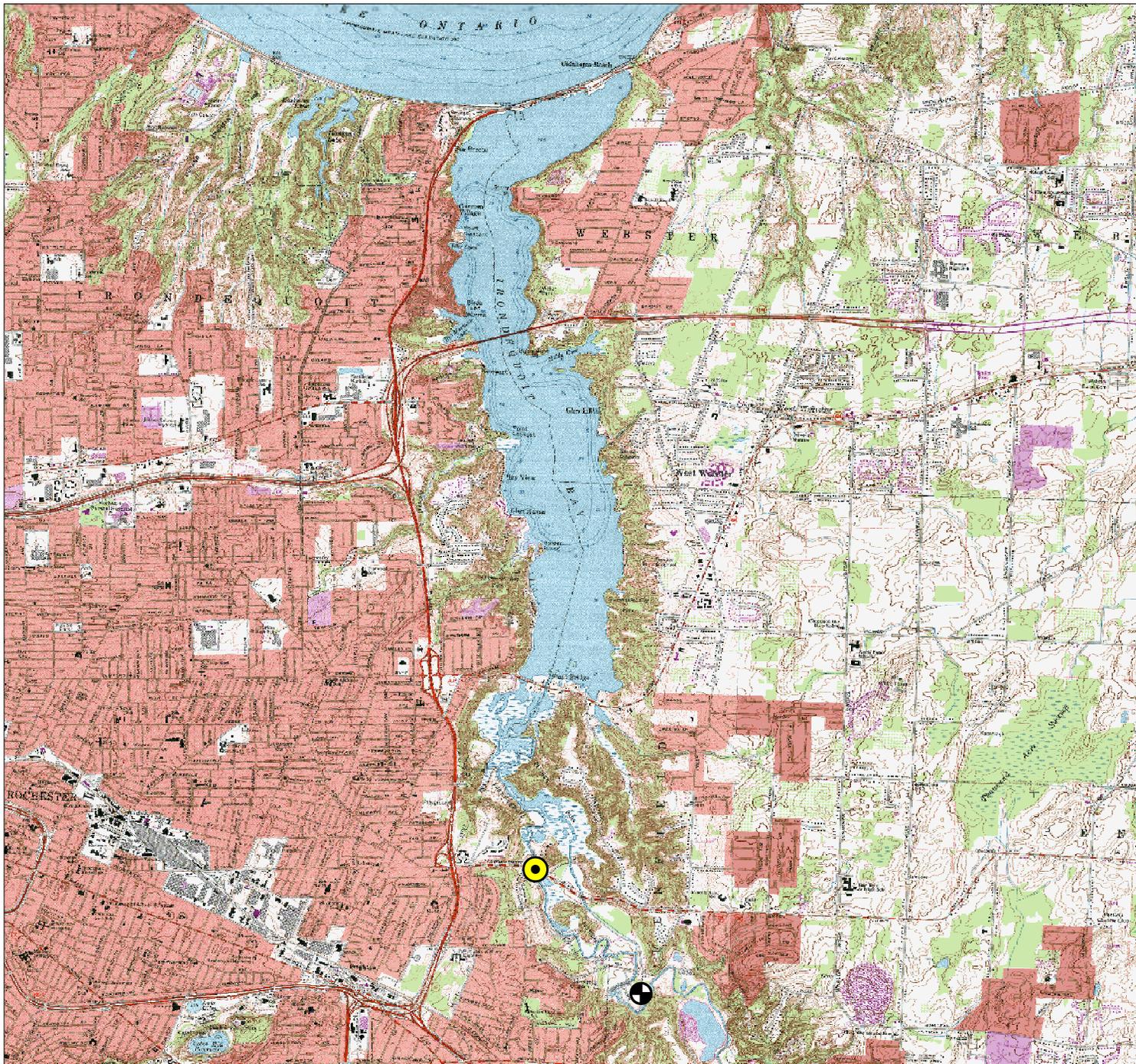
Contour interval 10 feet.



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Irondequoit Creek

Legend

-  Sampling Location
-  USGS Gage Station

Rochester East and
Webster 7.5 USGS
Topographic map dated
1971.
Photorevised 1978.

Contour interval 5 feet.



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Wine Creek

Legend

 Sampling Location

Oswego East and
Oswego West 7.5 USGS
Topographic maps dated
1971.
Photorevised 1978.

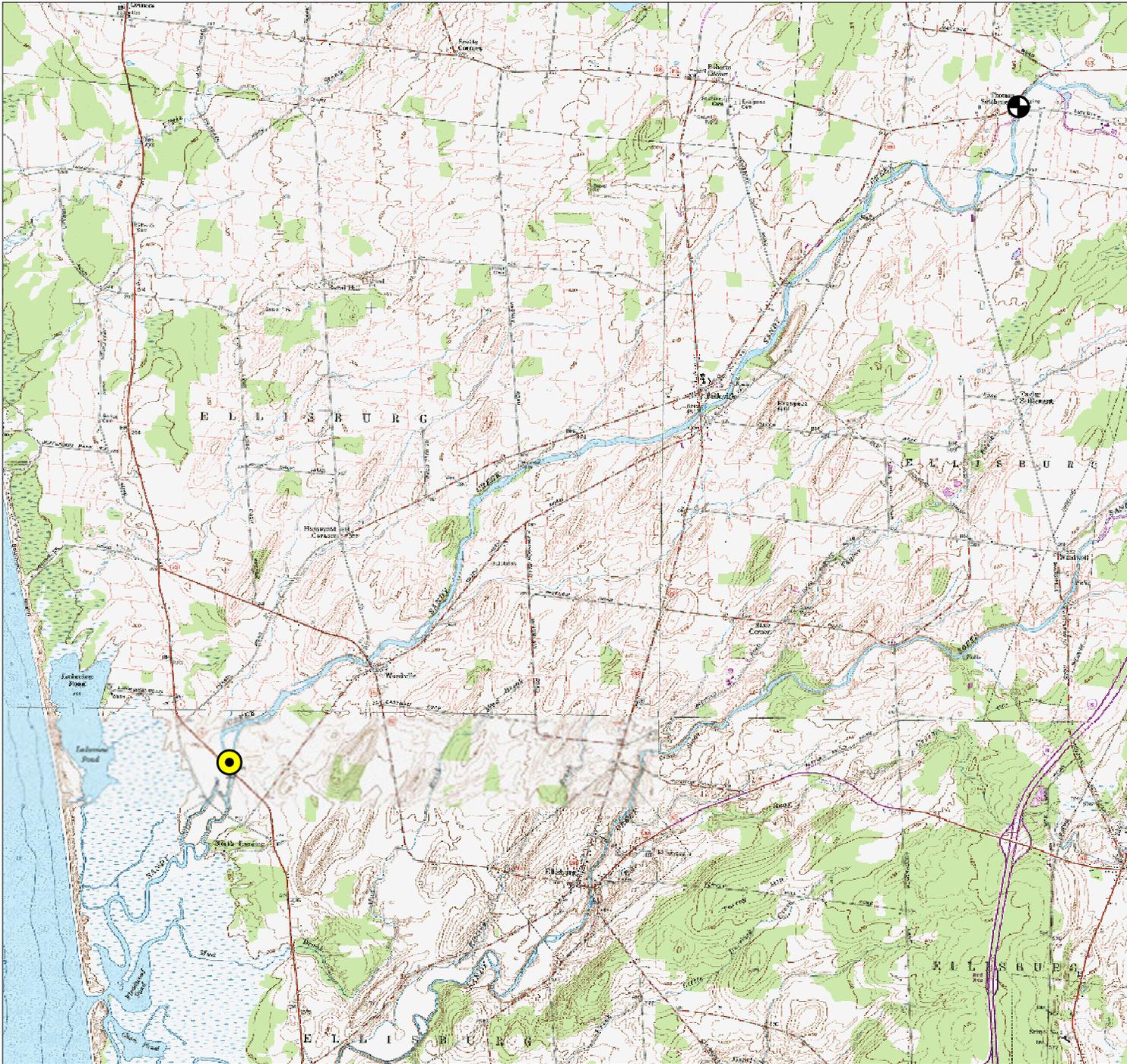
Contour interval 10 feet.



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Sandy Creek

Legend

-  Sampling Location
-  USGS Gage Station

Ellisburg, Sandy Creek, Adams and Henderson
7.5 USGS Topographic maps dated 1958, 1958, 1959, 1959.

Henderson, Adams and Sandy Creek photorevised
1980, 1982, 1982.

Contour interval 10 feet.



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Twelve Mile Creek

Legend

 Sampling Location

Six Mile and Wilson
7.5 USGS
Topographic maps dated
1974 and 1979.

Contour interval 5 feet.



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Johnson Creek

Legend

 Sampling Location

Ashland and Kent
7.5 USGS
Topographic maps
dated 1950 and 1951.

Kent Photorevised 1978.

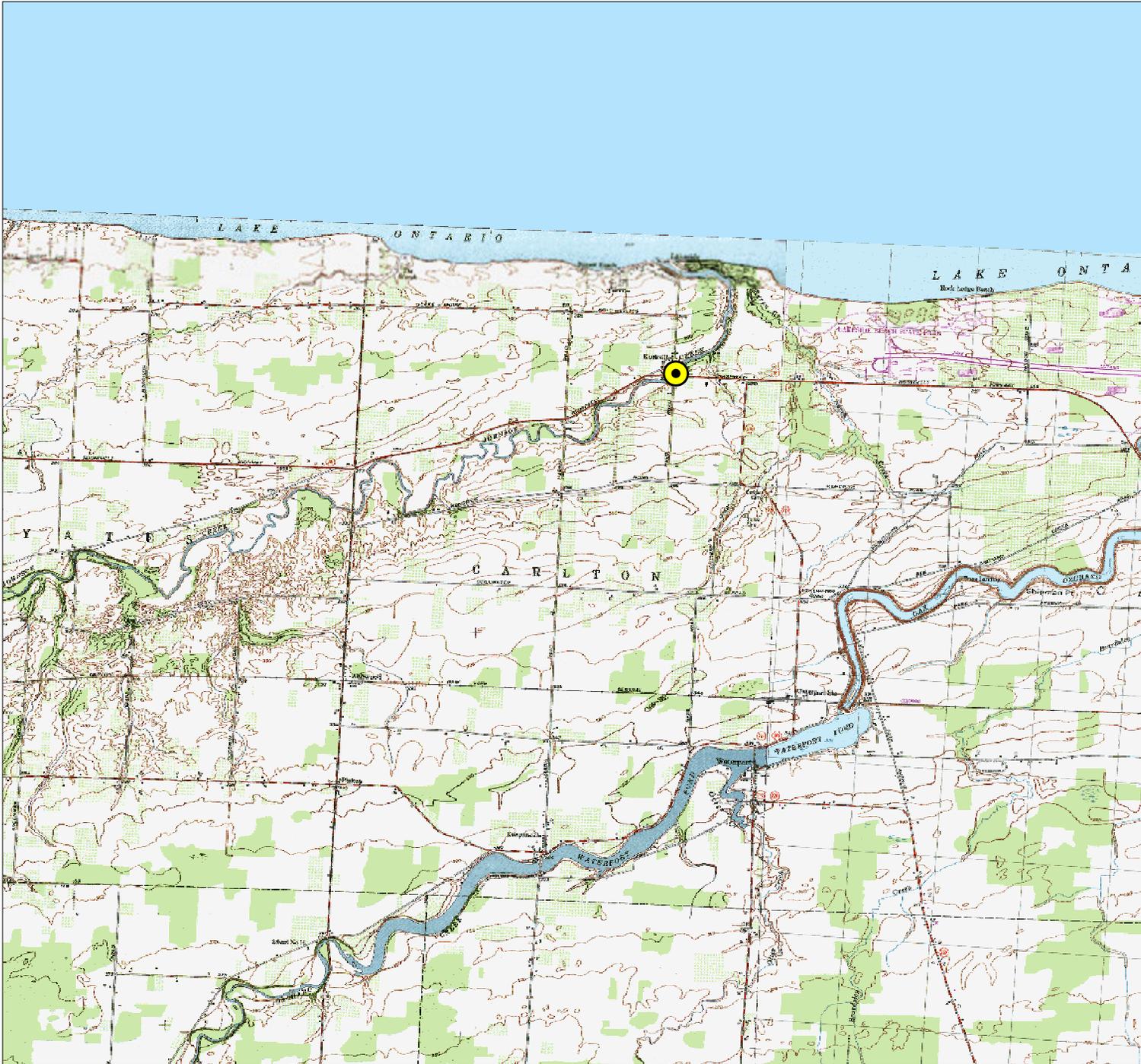
Contour interval 10 feet.



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Appendix B

**Data Tables by Tributary
2005 - 2010**

EIGHTEEN MILE CREEK Latitude 43.33387 Longitude -78.71630 (WGS-84)

DATE >>>		5/3/2005	8/30/2005	7/26/2006	9/19/2006	6/26/2007	10/16/2007	8/12/2008	10/21/2008	8/11/2009	10/14/2009	7/7/2010	10/13/2010
Flow Estimated**	mgd	58	58	58	58	58	58	58	58	58	58	58	58
	cfs	90	90	90	90	90	90	90	90	90	90	90	90
pH	su	8.25	7.7	7.59	7.83	8.29	7.74	7.66	7.87	7.51	7.92	8.02	8.01
Specific Conductivity	uS/cm	740	498	583	462	528	499	577	559	565	692	675	438
Temperature	oC	9.6	22.4	25.2	18.7	23.6	15	21.4	12.6	22.5	10.4	24.6	12.9
TSS	mg/L	4.5	3.2	1.3	3.2	2.0	4.8	1.5	1.8	11	5.5	4.6	4.3
	kg/day	989	703	286	703	440	1,055	330	396	2,418	1,209	1,011	945
Total Mercury	ng/L	3.28	2.07	1.42	5.73	1.03	1.22	1.02	1.48	3.8	2.62	2.7	1.98
	g/day	0.72	0.46	0.31	1.26	0.23	0.27	0.22	0.33	0.84	0.58	0.59	0.44
	kg/year	0.26	0.17	0.11	0.46	0.08	0.10	0.08	0.12	0.30	0.21	0.22	0.16
Total PCBs	pg/L	35,507	47,252	50,407	52,243	36,782	36,858	42,349	44,003	93,000	60,000	43,000	58,000
	g/day	7.81	10.39	11.08	11.48	8.09	8.10	9.31	9.67	20.44	13.19	9.45	12.75
	kg/year	2.85	3.79	4.04	4.19	2.95	2.96	3.40	3.53	7.46	4.81	3.45	4.65
Mercury Field Blank	ng/L	0.181	0.273	0.263	0.328	0.197	U (0.188)	0.173	0.266	0.121	.152 (J)	U (.100)	U(.100)

QUALIFIERS:

U - Analyte not detected. Detection limit is given in parentheses.

QB- Data should not be used because concentration is indistinguishable from field blank. (ie less than three times blank concentration)

GENESEE RIVER		Latitude 43.22223	Longitude -77.61528 (WGS-84)										
DATE >>>		5/4/2005	8/30/2005	7/26/2006	9/20/2006	6/26/2007	10/16/2007	8/12/2008	10/21/2008	8/11/2009	10/14/2009	7/7/2010	10/13/2010
Flow	mgd	1,512	411	1,157	1,351	492	220	2,579	730	5,081	507	711	1700
	cfs	2,340	636	1,790	2,090	761	341	3,990	1,130	7,860	785	1,100	2630
pH	su	8.27	8	7.93	8.17	8.68	8.12	8.1	7.99	8.09	8.25	8.4	8.37
Specific Conductivity	uS/cm	431	563	387	512	546	549	484	588	331	599	569	400.9
Temperature	oC	9.7	24.1	24.1	19	24.6	16.3	20.8	12.8	21.5	11.03	26	12.6
TSS	mg/L	41	7.1	29	26	10	9.6	54	21	290	11	9.3	33
	kg/day	234,950	11,060	127,165	133,128	18,647	8,004	527,818	58,101	5,584,527	21,137	25,061	212,619
Total Mercury	ng/L	2.63	1.14	3.16	2.81	1.18	2.15	4.99	2.82	12.2	1.85	0.928	1.91
	g/day	15.07	1.78	13.85	14.39	2.20	1.79	48.77	7.80	234.94	3.55	2.50	12.31
	kg/year	5.50	0.65	5.06	5.25	0.80	0.65	17.80	2.85	85.75	1.30	0.91	4.49
Total PCBs	pg/L	313	338	358	596	60	422	224	414	1100	870	510	280
	g/day	1.79	0.53	1.57	3.05	0.11	0.35	2.19	1.15	21.18	1.67	1.37	1.80
	kg/year	0.65	0.19	0.57	1.11	0.04	0.13	0.80	0.42	7.73	0.61	0.50	0.66
Mercury Field Blank	ng/L	0.181	0.273	0.263	0.328	0.197	U (0.188)	0.173	0.266	0.121	.152 (I)	U (.100)	

QUALIFIERS:

U - Analyte not detected. Detection limit is given in parentheses.

QB- Data should not be used because concentration is indistinguishable from field blank. (ie less than three times blank concentration)

OSWEGO RIVER

Location thru 9/2006 >> Latitude 43.39683 Longitude -76.47060 (WGS-84)

Location beginning 6/2007 >> Latitude 43.45864 Longitude -76.51051 (WGS-84)

Location October 2010 >>> Latitude 43.45809861 Longitude -76.51096170 (WGS-84)

DATE >>>		5/4/2005	8/30/2005	7/25/2006	9/20/2006	6/27/2007	10/17/2007	8/13/2008	10/22/2008	8/12/2009	10/15/2009	7/8/2010	10/14/2010
Flow	mgd	9,352	679	5,532	3,406	834	1,932	5,043	3,212	5,824	1,584	2,178	6,154
	cfs	14,470	1050	8,560	5,270	1,290	2,990	9,350	4,970	9,010	2,450	3,370	9,520
pH	u	8.18	7.91	7.52	8.01	7.95	7.89	7.93	8	8.1	8.05	7.98	8.14
Specific Conductivity	uS/cm	573	954	581	639	639	585	524	658	717	750	715	580
Temperature	oC	10.4	24.8	26	19.6	25.1	16	22.9	12.2	24.2	12.1	26.1	14.5
TSS	mg/L	5.1	1.8	2.2	2.2	2.0	1.7	6.2	2.8	U (1.0)	2	1.6	6.9
	kg/day	180,765	4,632	46,126	28,399	6,322	12,448	141,998	34,086	0	12,007	13,207	160,933
Total Mercury	ng/L	1.71 QB (<0.593)		1.69	1.22	0.869	0.78	1.55	1.21	1.4	0.748	0.884	1.4
	g/day	60.61		35.43	15.75	2.75	5.71	35.50	14.73	30.90	4.49	7.30	32.65
	kg/year	22.12		12.93	5.75	1.00	2.08	12.96	5.38	11.28	1.64	2.66	11.92
Total PCBs	pg/L	4,760	107	335	26	15	39	30	136	93	1300	130	210
	g/day	168.71	0.28	7.02	0.34	0.05	0.29	0.69	1.66	2.05	7.80	1.07	4.90
	kg/year	61.58	0.10	2.56	0.12	0.02	0.10	0.25	0.60	0.75	2.85	0.39	1.79
Mercury Field Blank	ng/L	0.181	0.273	0.263	0.328	0.197	U (0.188)	0.173	0.266	0.121	0.152	U (0.100)	U(0.100)

QUALIFIERS:

U - Analyte not detected. Detection limit is given in parentheses.

QB- Data should not be used because concentration is indistinguishable from field blank. (ie less than three times blank concentration)

SALMON RIVER		Latitude 43.56965	Longitude -76.18530 (WGS-84)										
DATE >>>		5/5/2005	9/1/2005	7/25/2006	9/20/2006	6/27/2007	10/17/2007	8/13/2008	10/22/2008	8/12/2009	10/15/2009	7/8/2010	10/14/2010
Flow	mgd	314	1,655	756	282	151	95	615	303	173	847	167	559
	cfs	486	2560	1,170	436	233	147	952	469	267	1310	259	865
pH	su	7.76	7.41	7.65	7.91	8.04	8.03	7.57	7.73	7.63	7.92	7.62	7.88
Specific Conductivity	uS/cm	69	66	66	100	78	109	71.2	86.6	87	58.1	72.9	60.5
Temperature	oC	8.5	21.8	22.3	16.5	24.6	12.5	19.4	8.4	21.7	9.7	22.9	11.7
TSS	mg/L	1.4	5.3	3.6	4.0	2.0	1.2	4.3	1.9 U (1.0)		3.1	1.1	3.1
	kg/day	1,666	33,244	10,315	4,275	1,145	432	10,023	2,182	0	9,951	696	6,568
Total Mercury	ng/L	1.68	1.178	1.95	1.83	1.29	0.868	2.06	1.40	1.33	1.72	1.34	2.37
	g/day	2.00	7.39	5.59	1.96	0.74	0.31	4.80	1.61	0.87	5.52	0.85	5.02
	kg/year	0.73	2.70	2.04	0.71	0.27	0.11	1.75	0.59	0.32	2.02	0.31	1.83
Total PCBs	pg/L	7,401	848 U		390	2,653	173 U		52	0	80	49	62
	g/day	8.81	5.32		0.42	1.52	0.06		0.06	0.00	0.26	0.03	0.13
	kg/year	3.21	1.94		0.15	0.55	0.02		0.02	0.00	0.09	0.01	0.05
Mercury Field Blank	ng/L	0.181	0.273	0.263	0.328	0.197	U (0.188)	0.173	0.266	0.121	0.152	U (0.100)	U(0.100)

QUALIFIERS:

U - Analyte not detected. Detection limit is given in parentheses.

QR- Data should not be used because concentration is indistinguishable from field blank. (ie less than three times blank concentration)

BLACK RIVER April 2002 Latitude 43.99601 Longitude -76.06274 (WGS-84)
 All other dates Latitude 43.99969 Longitude -76.05785 (WGS-84)

DATE >>>		5/5/2005	9/1/2005	7/25/2006	9/20/2006	6/27/2007	10/17/2007	8/13/2008	10/22/2008	8/12/2009	10/15/2009	7/8/2010	10/14/2010
Flow	mgd	3,884	5,300	2,643	1,306	982	1,499	3,690	1,842	1,700	2,385	1,028	3,633
	cfs	6,010	8,200	4,090	2,020	1,520	2,320	5,710	2,850	2,630	3,690	1,590	5,620
pH	su	7.83	7.69	7.67	7.87	7.95	7.72	7.72	7.85	7.84	7.8	7.64	7.97
Specific Conductivity	uS/cm	91	122	91	101	103	98	84.6	136	96.2	80.9	100.3	106.4
Temperature	oC	9.7	21.8	24.4	18.7	24.5	12.3	19.9	9.3	23.4	8.5	26.1	11.1
TSS	mg/L	3.1	16	3.9	1.5	3.0	2.6	14	3.1 U (1.0)		2.4	2.6	3.1
	kg/day	45,633	321,392	39,066	7,425	11,165	14,771	195,791	21,642	0	21,696	10,128	42,681
Total Mercury	ng/L	2.82	5.55	2.84	2.19	2.15	2.57	4.15	2.32	2.72	2.67	3.16	3.2
	g/day	41.51	111.48	28.45	10.84	8.00	14.60	58.04	16.20	17.53	24.14	12.31	44.06
	kg/year	15.15	40.69	10.38	3.96	2.92	5.33	21.18	5.91	6.40	8.81	4.49	16.08
Total PCBs	pg/l	12,205	10,337	1,515	385	716	874	1,071	1,369	2,200	1,200	3,900	1,700
	g/day	179.66	207.64	15.18	1.91	2.66	4.97	14.98	9.56	14.17	10.85	15.19	23.41
	kg/year	65.58	75.79	5.54	0.70	0.97	1.81	5.47	3.49	5.17	3.96	5.54	8.54
Mercury Field Blank	ng/L	0.181	0.273	0.263	0.328	0.197	U (0.188)	0.173	0.266	0.121	0.152	U (0.100)	U(0.100)
TDS	mg/L												83

QUALIFIERS: U - Analyte not detected. Detection limit is given in parentheses.
 QB- Data should not be used because concentration is indistinguishable from field blank. (ie less than three times blank concentration)

OAK ORCHARD CREEK 1 Latitude 43.35745 Longitude -78.19542 (WGS-84)

DATE >>>		5/3/2005	9/19/2006	10/16/2007	10/21/2008	8/11/2009	10/14/2009	7/7/2010	10/13/2010
Flow	mgd					52	65	26	48
	cfs					81	100	40	74
pH	su	8.31	7.77	7.62	7.99	7.92	7.95	8.39	8.47
Specific Conductivity	uS/cm	726	559	462	588	653	693	737	632
Temperature	oC	10.3	19.3	15.5	12.8	24.7	12	26.6	14.3
TSS	mg/L	5.0	4.0	1.9	23 U (1.0)		2.5	5.6	2.5
	kg/day					0	616	552	455
Total Mercury	ng/L	2.20	2.97 QB (<0.496)	QB (<0.783)		1.28	1.12	0.74	0.476
	g/day					0.25	0.28	0.07	0.09
	kg/year					0.09	0.10	0.03	0.03
Total PCBs	pg/L	123	1156	424	291	220	430	170	280
	g/day					0.04	0.11	0.02	0.05
	kg/year					0.02	0.04	0.01	0.02
Mercury Field Blank	ng/L	0.181	0.328 U (0.188)		0.266	0.121	0.152 (J)	U (0.100)	U(0.100)

Note: Oak Orchard Creek 1 is the original sampling site for the program.

QUALIFIERS:

U - Analyte not detected. Detection limit is given in parentheses.

QB- Data should not be used because concentration is indistinguishable from field blank. (ie less than three times blank concentration)

OAK ORCHARD CREEK 2 (near Shelby, NY) Latitude 43.10.25 Longitude -78.23.13 (WGS-84)

DATE >>> 10/13/2010

Flow	mgd	48
	cfs	74

pH	su	7.69
Specific Conductivity	uS/cm	1317
Temperature	oC	10.4

TSS	mg/L	11
	kg/day	

Total Mercury	ng/L	3.15
	g/day	0.57
	kg/year	0.21

Total PCBs	pg/L	42
	g/day	0.01
	kg/year	0.00

Mercury Field Blank	ng/L	U(0.100)
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Note: Oak Orchard 2 is at the USGS gage station. First sampled in October 2010.

QUALIFIERS: U - Analyte not detected. Reporting limit is given in parentheses.

QB- Data should not be used because concentration is indistinguishable from field blank. (ie less than three times blank concentration)

SANDY CREEK Latitude 43.74468 Longitude -76.18564 (WGS 84)

DATE >>>		8/31/2005	7/25/2006	10/17/2007	8/13/2008	7/8/2010	10/14/2010
Flow	mgd	614	35	19	327	27	123
	cfs	950	54	29	506	42	190
pH	su	8.05	8.16	8.38	8.45	8.61	8.78
Specific Conductivity	uS/cm	298	406	329	228	358	395
Temperature	oC	20.1	20.9	11.7	17.5	29.8	10.4
TSS	mg/L	26	3.6	3.2	21	2	2
	kg/day	60,504	478	230	26,026	205	932
Total Mercury	ng/L	2.59	1.48	0.97	2.99	1.11	0.744
	g/day	6.03	0.20	0.07	3.71	0.11	0.35
	kg/year	2.20	0.07	0.03	1.35	0.04	0.13
Total PCBs	pg/L	74,140 U	U	U		27	83
	g/day	172.53				2.76E-03	3.87E-02
	kg/year	62.97				1.01E-03	1.41E-02
Mercury Field Blank	ng/L	0.273	0.263	U (0.188)	0.173	U (0.100)	U(0.100)

QUALIFIERS:

U - Analyte not detected. Reporting limit is given in parentheses.

QB- Data should not be used because concentration is indistinguishable from field blank. (ie less than three times blank concentration)

IRONDEQUOIT CREEK Latitude 43.15736 Longitude -77.52719 (WGS 84)

DATE >>> 7/26/2006 6/26/2007 8/11/2009

Flow	mgd	50	65	68
	cfs	78	100	105
pH	su	8.03	8.06	8.23
Specific Conductivity	uS/cm	1194	1257	981
Temperature	oC	21.2	21.4	22
TSS	mg/L	9.5	6 U (1.0)	
	kg/day	1,800	1,478	
Total Mercury	ng/L	2.01	1.49	1.65
	g/day	0.38	0.37	0.43
	kg/year	0.14	0.13	0.16
Total PCBs	pg/L	R	43	280
	g/day		0.01	0.07
	kg/year		0.00	0.03
Mercury Field Blank	ng/L	0.263	0.197	0.121

QUALIFIERS:

U - Analyte not detected. Reporting limit is given in parentheses.

QB- Data should not be used because concentration is indistinguishable from field blank. (ie less than three times blank concentration)

WINE CREEK Latitude 43.47119 Longitude -76.48571 (WGS 84)

DATE >>> 8/31/2005 6/27/2007 10/15/2009

Flow	mgd	11.9		
	cfs	18.4*		
pH	su	7.45	7.78	8.02
Specific Conductivity	uS/cm	497	282	1093
Temperature	oC	20.7	21.6	6.6
TSS	mg/L	21	1	1.8
	kg/day	947		
Total Mercury	ng/L	6.91	1.2	0.844
	g/day	0.31		
	kg/year	0.11		
Total PCBs	pg/L	36,429	1,991	30,000
	g/day	1.64		
	kg/year	0.60		
Mercury Field Blank	ng/L	0.273	0.197	0.152

QUALIFIERS:

U - Analyte not detected. Reporting limit is given in parentheses.

QB- Data should not be used because concentration is indistinguishable from field blank. (ie less than three times blank concentration)

* Flow for Wine Creek was estimated using a current meter, and measuring a cross sectional profile.

** On the day of sampling, rain was very heavy, resulting in higher than normal flow.

JOHNSON CREEK Latitude 43.36088 Longitude -78.26465 (WGS-84)

DATE >>> 5/3/2005 8/12/2008

Flow	mgd cfs	NA	NA
pH	su	8.41	7.65
Specific Conductivity	uS/cm	559	497
Temperature	oC	9.5	20.6
TSS	mg/L kg/day	5.1	16
Total Mercury	ng/L g/day kg/year	3.35	2.18
Total PCBs	pg/L g/day kg/year	U	U
Mercury Field Blank	ng/L	0.181	0.173

QUALIFIERS:

U - Analyte not detected. Reporting limit is given in parentheses.

QB- Data should not be used because concentration is indistinguishable from field blank. (ie less than three times blank concentration)

TWELVE MILE CREEK Latitude 43.30812 Longitude -78.85675 (WGS 84)

DATE >>> 9/19/2006 10/21/2008

Flow	mgd cfs		
pH	su	8.88	7.68
Specific Conductivity	uS/cm	665	458
Temperature	oC	19.2	11
TSS	mg/L kg/day	1.1	1.5
Total Mercury	ng/L g/day kg/year	QB (<0.895)	1.20
Total PCBs	pg/L g/day kg/year	7394	189
Mercury Field Blank	ng/L	0.328	0.266

QUALIFIERS:

U - Analyte not detected. Reporting limit is given in parentheses.

QB- Data should not be used because concentration is indistinguishable from field blank. (ie less than three times blank concentration)