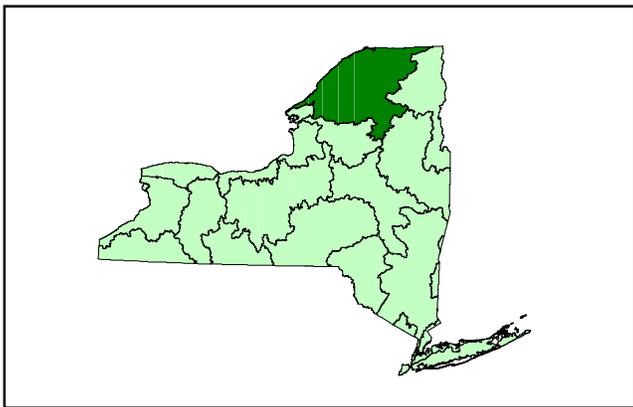
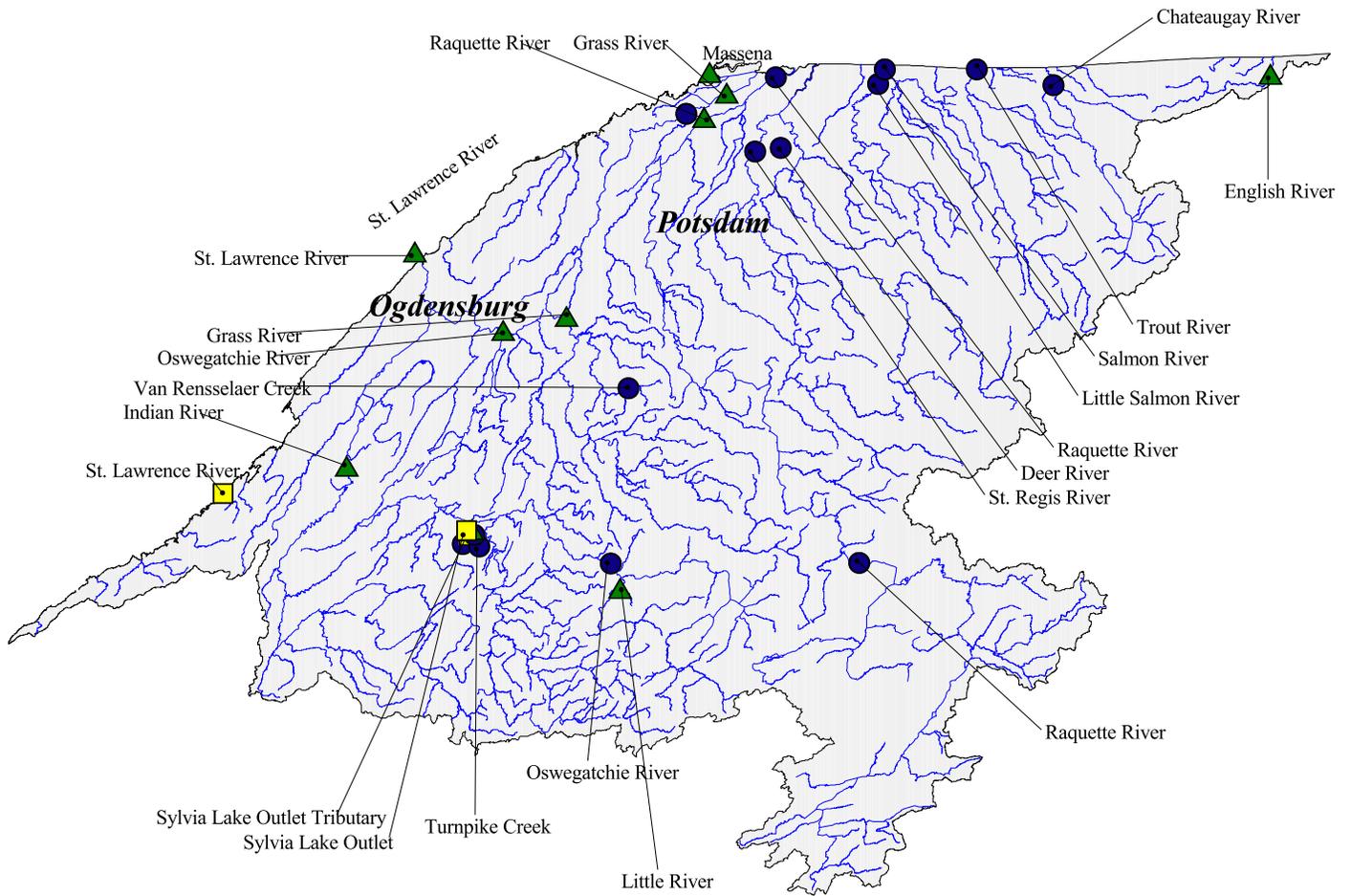


St. Lawrence River Drainage Basin



Water Quality Assessment based on Resident Macroinvertebrates

- non-impacted
- ▲ slightly impacted
- moderately impacted
- ◆ severely impacted



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

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

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

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

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

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

REPORTS OF MACROINVERTEBRATE SURVEYS WITHIN THE ST. LAWRENCE RIVER
WATERSHED

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

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

Chateaugay River

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

Deer River

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

English River

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

Grass River

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

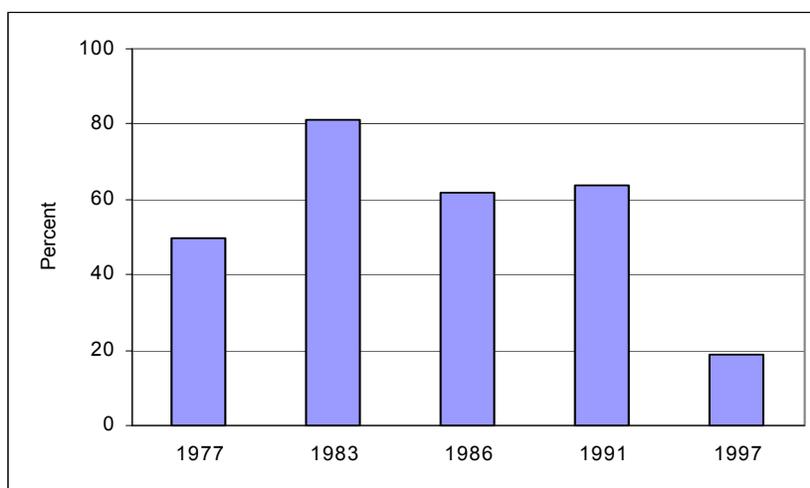


Figure 9-1. Percent contribution of tolerant worms in samples from the Grass River at Massena Center, 1977-1997.

Indian River

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

Little River

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

Little Salmon River

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

Oswegatchie River

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

Raquette River

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

St. Lawrence River

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

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

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

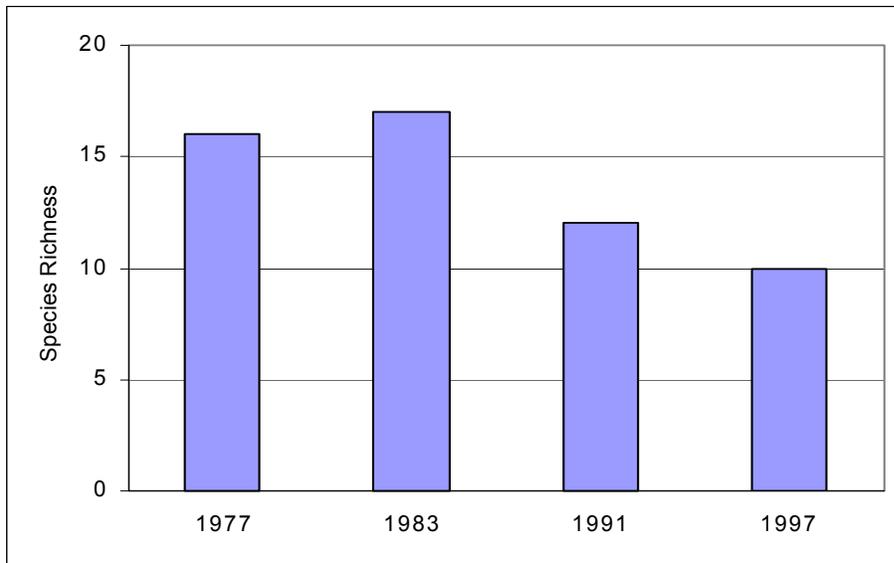


Figure 9-2. Species richness in the St. Lawrence River at Point Vivian, 1977-1997.

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

St. Regis River

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

Salmon River

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

Sylvia Lake Outlet

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

Trout River

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