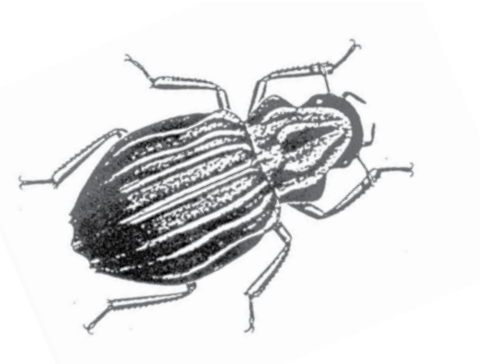
Stream Quality Monitoring 2011 Annual Report



Grand River
State Wild & Scenic River

Ohio

Department of Natural Resources
Division of Watercraft

Stream Quality Monitoring 2011 Annual Report
Grand State Wild & Scenic River

Contents

Introduction

Ohio Scenic Rivers Program

With more than 60,000 miles of streams, Ohio is a water-rich state. Many of Ohio's streams support thriving plant and animal communities, including Ohio's state designated scenic rivers. Administered by the Ohio Division of Watercraft, the Ohio Scenic Rivers Program oversees 14 state designated scenic river systems, comprising 800 river miles along 26 stream segments. These streams represent some of the best of Ohio's waterways.

Stream Quality Monitoring Project

Developed in 1983, the Ohio Stream Quality Monitoring (SQM) Project uses volunteers who assist in aquatic macroinvertebrate monitoring to compile biological and water quality data on the state's scenic rivers. The Ohio SQM Project is an excellent, simple, and cost-effective method of assessing a stream's health.

Aquatic macroinvertebrate organisms lack a backbone (invertebrate), are large enough to view with the naked eye (macro), and spend at least a portion of their lives in the water (aquatic). Macroinvertebrates, such as various aquatic insects (e.g. mayfly, stonefly), are good indicators of stream health. When negative impacts to a stream occur, the result may show a decline or absence of certain macroinvertebrate species.

Through consistent monitoring, changes observed in the macroinvertebrate community help the Ohio Scenic Rivers Program in detecting and addressing potential impacts to a stream. The Ohio Scenic Rivers Program compiles volunteer field assessment information into a statewide database. The database serves as a tool to track short- and long-term changes and trends over time.

SQM Project Relies on Volunteers

Coordinated by the Ohio Division of Watercraft's Scenic Rivers Program, the Ohio SQM Project provides opportunities for public participation in scenic river protection efforts. Many local, youth and conservation organizations, individuals, and families are committed to monitoring more than 150 stations along Ohio's scenic rivers.

SQM volunteers collect macroinvertebrate data from selected monitoring stations, also referred to as monitoring sites or reference stations, three times during the monitoring season. Volunteers complete field assessment forms which document taxonomy, tolerance, and abundance of collected organisms.

SQM Annual Report

The information collected by volunteers has become a critical tool for documenting the health of Ohio's state scenic, wild, and recreational rivers. This report is a compilation of field data collected during 2011 by volunteers and staff. It also represents a year of dedication and commitment shown to Ohio's special waterways by thousands of SQM volunteers.

Grand State Wild & Scenic River Overview

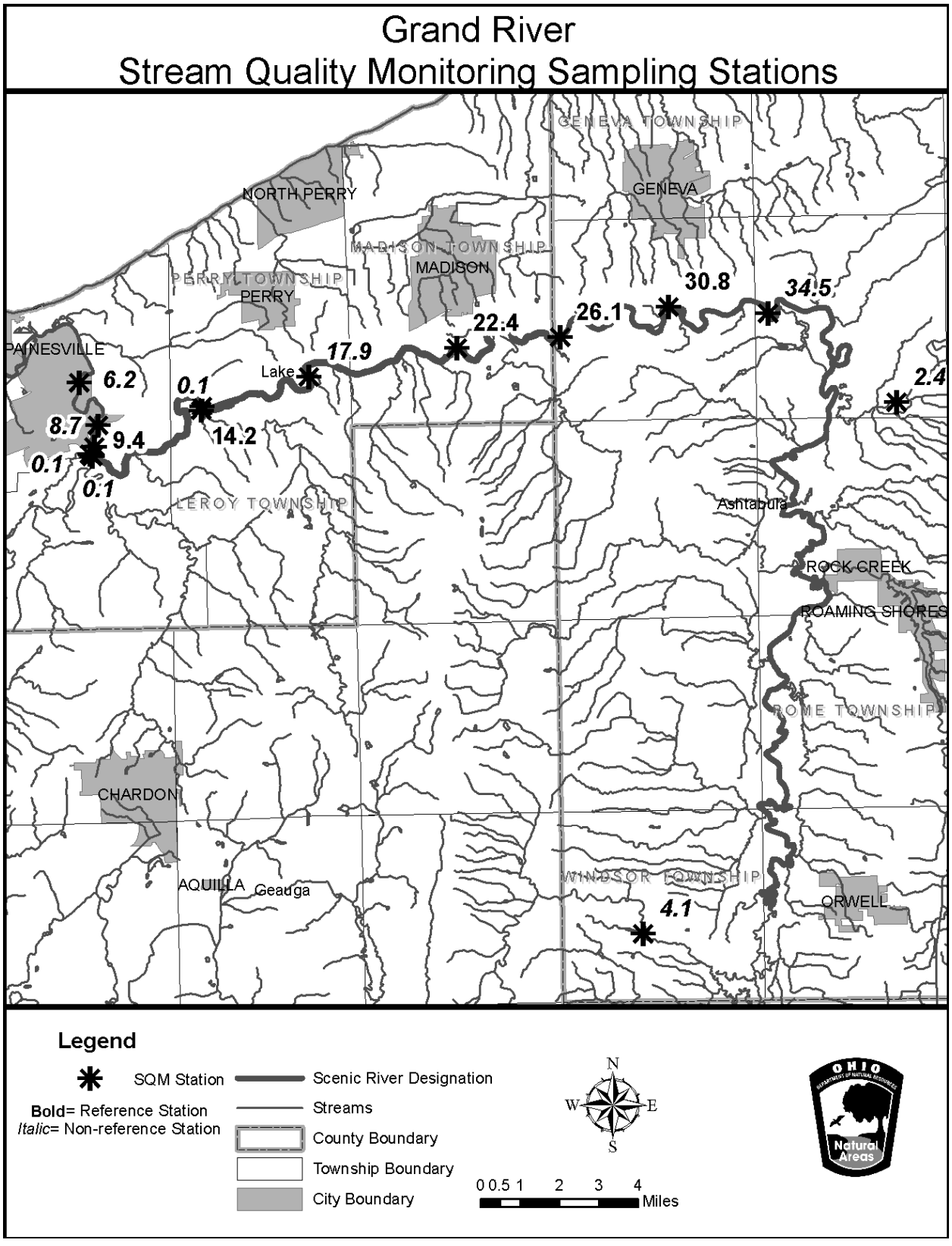
The Grand River was designated as a wild and scenic river by the Ohio Department of Natural Resources on January 17, 1974. The scenic portion of the Grand River flows from U.S. Route 322 downstream to the Harpersfield Dam. From Harpersfield Dam to the N&W railroad trestle south of Painesville, more than 23 miles of the Grand River is designated a wild river. Wild river designation recognizes the Grand River as one of the most naturally occurring streams remaining in Ohio. The Grand is one of only three rivers in the state to receive this designation.

The Grand River has an impressive forested corridor, which varies from only a few hundred feet wide to a mile wide. As a result, the Grand is the most biologically diverse of all Lake Erie tributaries. Numerous endangered species may be found in the watershed, including the northern brook lamprey and northern harrier, as well as 37 endangered and threatened plant species. A total of 57 fish species, 115 bird species, 49 mammal species, and 28 species of reptiles and amphibians have been found in or along the Grand River. Several species of state and federal special interest unionoid mussels also reside in the Grand.

Like most rivers in northeastern Ohio, the Grand is experiencing increased pressure from development. Although steep shale cliffs inhibit residential and riverfront development in many areas, development in other areas is less restricted, often occurring within view of the river. Concern about urban development led to the formation of the Grand River Partners who, working in conjunction with Ohio's Scenic River Program and numerous local governments and conservation organizations, help to increase preservation efforts along the Grand.

Large tracts of public preserves and parks help to ensure the Grand River will hold title as one of Ohio's truly wild and scenic streams for years to come. Areas such as Pallister State Nature Preserve and the Wright-Davis Scenic River Preserve owned by the Ohio Division of Watercraft, as well as areas managed by Lake County Metroparks, the Nature Conservancy, the Cleveland Museum of Natural History, the Ashtabula County Metroparks, and the Ohio Department of Natural Resources Division of Wildlife provide important long-term protection and splendid scenery. Additional protection has been achieved through conservation easements held by the Lake and Ashtabula County Soil and Water Conservation Districts and Grand River Partners, Inc.

For additional information about preservation efforts and public access to the Grand State Wild and Scenic River, please contact the Division of Watercraft at 614-265-6814 or visit *www.ohiodnr.com/watercraft* online.


Grand River
Stream Quality Monitoring Sampling Stations
GENEVA TOWNSHIP
NORTH PERRY
GENEVA
MADISON TOWNSHIP
MADISON
PERRY TOWNSHIP
PERRY
PAINESVILLE
Lake
30.8
34.5
26.1
22.4
17.9
6.2
0.1
2.4
8.7
9.4
14.2
0.1
0.1
LEROY TOWNSHIP
Ashtabula
ROCK CREEK
ROAMING SHORES
ROME TOWNSHIP
CHARDON
AQUILLA
Geauga
WINDSOR TOWNSHIP
4.1
ORWELL
Legend
SQM Station
Bold= Reference Station
Italic= Non-reference Station
Scenic River Designation
Streams
County Boundary
Township Boundary
City Boundary
N
W
E
S
0 0.5 1 2 3 4
Miles
OHIO
Natural Areas

2011 Stream Quality Monitoring Participants

Whether their contribution was a one-time event or a recurring commitment to stream quality monitoring, the individuals and organizations listed below played a significant role in protecting the Grand River. Their time and dedication to this river and the Ohio SQM Project is greatly appreciated. Special thanks go to the Grand Scenic River Advisory Council, the Grand River Partners, Lake County Metroparks staff and the Lake County Soil and Water Conservation District Watershed Watch for their continued support and assistance.

Grand River - Main Stem

River Mile 6.2 - Kiwanis Recreation Park, Lake County (non-reference site)
Volunteers Needed

River Mile 8.7 - N&W Railroad Trestle, Lake County (non-reference site)
Volunteers Needed

River Mile 9.4 - Helen Hazen Wyman Park, Lake County
Cleveland Museum of Natural History: Nathan Taxel

River Mile 14.2 - Indian Point Lake County Metropark
The Retych Family and Friends
Cleveland Museum of Natural History: Nathan Taxel

River Mile 17.9 - River Road, Perry Township, Lake County (non-reference site)
YMCA Outdoor Family Camp/OEE Instructor: Nancy Hartmann
Perry YMCA: Beth Landers

River Mile 22.4 - Hidden Valley Metropark, Lake County
The Glinski Family
Geauga SWCD: Colleen Sharp and Ledgemont High School

River Mile 26.1 - County Line Road, Ashtabula County
Volunteers Needed

River Mile 30.8 - Harpersfield Covered Bridge, Ashtabula County
Thomas Burns Family

River Mile 34.5 - Mechanicsville (non-reference site)
Volunteers Needed

Grand River - Big Creek

River Mile 0.1 - Helen Hazen Wyman Park, Painesville (non-reference site)
Watercraft SQM Volunteer Training Workshop

Grand River - Kellogg Creek

River Mile 0.1 - Helen Hazen Wyman Park, Painesville (non-reference site)
Volunteers Needed

Grand River - Mill Creek

River Mile 2.4 - Eagleville, Ashtabula County (non-reference site)
Volunteers Needed

Grand River - Paine Creek

River Mile 0.1 - Indian Point Picnic Area, Lake County (non-reference site)

LaMuth Middle School: S. Dieterle and J. Weimer
Andrews – Osborne Academy
Perry High.School: Beth Landers

Grand River - Phelps Creek

River Mile 4.1 - 4H Camp Whitewood, Ashtabula County (non-reference site)

Camp Whitewood: Berea 6th Graders and Eliza Porter

The continued success of the Ohio SQM Project depends on the commitment and dedication of these (and other) volunteers and participants. If you would like to become a volunteer, please contact the Northeast Ohio SQM Coordinator at 330-527-2961 or the Northeast Ohio Regional Scenic River Manager at 330-872-0040.

Station Descriptions

Public access to the Grand River is available through a variety of park areas owned and administered by both the Lake and Ashtabula County Metro Parks systems. Most SQM sites on the Grand River are located on either public property or at highway bridge crossings. Generally, monitoring stations present little difficulty for volunteers to access and monitor regularly. The following are brief descriptions of selected SQM sites along the Grand River.

Grand River - Mainstem

River Mile 6.2 - Kiwanis Recreation Park, Lake County (non-reference site)
Although this area does not fall within the designated portion of the Grand River, SQM results from this station are important nonetheless. Accessing the riffle here to perform sampling is perhaps the least difficult of all the stations on the mainstem. Parking is more than adequate with multiple ball diamonds adjacent to the site. No samples were taken at this location during the 2011 season.

River Mile 8.7 - N&W Railroad Trestle, Painesville, Lake County (non-reference site)
This station marks the end of the wild designated portion of the river. Access is steep and difficult. The riffle area is dominated by a high percentage of cobblestones and gravel. No samples were taken at this location during the 2011 season.

River Mile 9.4 - Helen Hazen Wyman Park, Lake County
Located in the Helen Hazen Wyman Park, an area managed by the Lake County Metro Parks, this reference station is a popular site for anglers and picnickers to access the Grand River. Access to the river is safe and convenient with ample parking provided in the park area. The riffle area is located approximately 150 yards downstream from the confluence of Big Creek and the Grand River. To access the sampling area, you must wade down Big Creek.

The stream bottom is comprised of cobblestones, gravel, sand, and an occasional boulder. Habitat for aquatic macroinvertebrates is very good. As a result, the samples taken at this station are usually excellent with an abundance of nearly all pollution-intolerant organisms.

Large amounts of sand and gravel at the confluence of Big Creek and the Grand River have created a large delta fan resulting in a narrowing of the channel. This unusual amount of material can be attributed to disruption from upstream logging operations and the lack of adequate erosion control measures on upstream construction sites.

River Mile 14.2 - Indian Point, Lake County Metropark, Paine Creek
This area received its name, Indian Point, from the high bluff overlooking the river at the confluence of Paine Creek and the Grand River. Rich in Indian history, a large number of artifacts have been found at this park through the years. Access to this interesting area is convenient and ample parking may be found in the park.

The sampling station is located downstream from the confluence of Paine Creek. The riverbed is comprised of an ideal mixture of boulders, cobblestones, gravel and sand. This type of substrate provides exceptional habitat for a wide variety of organisms.

River Mile 17.9 - YMCA Outdoor Family Center, Lake County (non-reference site)
This station is located immediately behind the YMCA Outdoor Family Center located off River Road in Perry Township. To access the river, a long trail descends from the Family Center and requires a vigorous hike. High bluffs comprise a significant portion of the bank area at this station. SQM samples are collected in the riffle area between the shore and the mid-stream island.

River Miles 22.4 and 22.6 - Hidden Valley Metroparks (River Mile 22.6 - non-reference site)
A popular picnic area and park within the Lake County Metroparks system, this reference station, River Mile 22.4, is located on State Route 528 within Madison Township in Lake County. In addition to being an effective SQM sampling station, this area is also an ideal site for canoe launching and take-outs. Pilings on the State Route 528 Bridge have high water footage scales and should be checked prior to canoeing and/or sampling.

The first site, River Mile 22.4, is located immediately across from the picnic area and provides ideal habitat in the boulder, cobblestone, gravel and sand river bottom. The second sampling site (River Mile 22.6) is immediately upstream from the bridge. The sites also provide the bonus of being one of very few places in Ohio where you may occasionally find mudpuppies, a large native salamander.

River Mile 26.1 - County Line Road, Ashtabula County
Accessing this sampling station is difficult. The riffle area is immediately upstream from the bridge and requires climbing under a guardrail and down a steep bank to reach the river.

Although the riffle area at this station is somewhat limited, CIVs for the area are usually excellent with a variety of pollution-intolerant species well represented in samples. It is important for samplers at this site to realize that the area adjacent to the bridge is private property and that permission for river access should be obtained before going onto private land.

River Mile 30.8 - Harpersfield Covered Bridge
The Harpersfield Covered Bridge provides a beautiful backdrop to the Grand River at this sampling station. Sampling is conducted downstream from the dam and immediately across from the picnic area. Access to the riffle area is convenient and safe during periods of normal flow with the river running wide and shallow.

The riverbed at this location includes large expanses of exposed shale bedrock. However good deposits of boulders, cobblestones, sand, and gravel can be found which provide very good macroinvertebrate habitat.

River Mile 34.5 - Mechanicsville (non-reference site)
This riffle is located approximately 75 yards upstream from the covered bridge. Parking is limited to one or two cars along the roadside; permission must be obtained before accessing the site. The riffle area is comprised mostly of cobblestones and sand with a small percentage of gravel. Results obtained at this station are consistently excellent with the more sensitive species of macroinvertebrates dominating the samples.

Grand River - Big Creek

River Mile 0.1 - Helen Hazen Wyman Park, Painesville (non-reference site)

This sampling station is located across from the picnic area and upstream from the confluence with Kellogg Creek. There is ample parking and access to the river is convenient and relatively easy. The river bottom is a mix of boulders, cobbles, sand and gravel; it provides excellent habitat despite heavy public recreational use during the spring and summer.

Grand River - Kellogg Creek

River Mile 0.1 - Helen Hazen Wyman Park, Painesville (non-reference site)

This sampling station is located upstream from the confluence of Kellogg and Big Creeks and is easy and safe to access. Typically, most species of macroinvertebrates are collected at this station.

This shallow creek provides exceptional habitat. CIVs indicate high quality water supporting an abundant variety of macroinvertebrates. However, the quality of this habitat has recently been threatened. Increasing urbanization has contributed to more runoff resulting in several areas of stream bank failure thereby changing the structure of the streambed.

Grand River - Paine Creek

River Mile 0.1 - Indian Point Picnic Area, Leroy Township (non-reference site)

Paine Creek is a beautiful, remote area with steep cliffs advancing to the water's edge on the far side of the creek. Accessing the sampling station is convenient and safe with ample parking provided in the picnic area.

The water is typically quite shallow and the stream bottom is an ideal mixture of cobblestones, gravel, and sand. Upstream from the sampling area exposed areas of shale bedrock are evident.

Grand River - Phelps Creek

River Mile 4.1 - 4H Camp Whitewood (non-reference site)

This site is located at 4-H Camp Whitewood off of Wiswell Road in Ashtabula County. The river bottom is a mixture of sand, gravel, cobblestones, and boulders. At this point, the creek is very small and shallow; however, habitat for macroinvertebrates is very good. Sampling results are affected by stream flow during periods of low water.

Sampling Results and General Trends

Stream Quality Monitoring results for the Grand River in 2011 ranged from good to excellent despite above normal precipitation recorded throughout the year. The year 2011 will be remembered across Northern Ohio and Northwestern Pennsylvania for record precipitation and frequent flooding. According to the National Oceanic and Atmospheric Administration (NOAA) the entire region received between 125 and 200 percent more precipitation than average for the year. Cumulative Index Values (CIV) for the sampling season were consistent with those in recent years with high numbers of insects collected per sample. Total Suspended Solid (TSS) values throughout the sampling year were in the normal to excellent range as well. Overall, the 2011 sampling results from the Grand River indicate an excellent diversity of aquatic insects, especially the pollution sensitive species.

Volunteers and ODNR staff on the Grand River conducted a total of 21 assessments at six official monitoring sites in 2011. The Grand River recorded an average CIV of 23 for the year corresponding to the excellent range for water quality. The average is slightly down from the 2010 CIV average of 25. The average taxonomic diversity for the mainstem of the Grand River per assessment was 10 macroinvertebrate orders (e.g. stonefly, damselfly, mayfly, etc.).

The Grand Wild & Scenic River continues to maintain a high diversity of macroinvertebrates which are critical to sustaining this outstanding aquatic ecosystem. As a founding member of the Grand River Partners, the Ohio Scenic Rivers Program continues leadership efforts to provide long-term protection of the Grand River Watershed. It is vital that efforts continue to protect the high water quality critical to sustaining the outstanding aquatic diversity of the Grand State Wild and Scenic River for many generations to come.

Data collected by SQM Project volunteers and ODNR staff is used as a water quality-screening method. The data helps to detect significant changes in stream quality based on CIV data from sites monitored for many years. If there is a significant decline in the average CIV, potential problems that may be causing stream degradation can be further investigated and addressed.

The staff of the Ohio Scenic Rivers Program appreciates the assistance we receive from our dedicated volunteer monitors. It is only through their efforts that it was possible for the SQM samples to be completed in the Grand River Watershed during 2011. Working together has produced significant results, but more help is always needed. For more information, please contact either the Northeast Ohio SQM Coordinator at 330-527-2961 or the Northeast Ohio Scenic River Manager at 330-872-0040.

Total Suspended Solids (TSS)

In 1999, the Scenic Rivers Program added Total Suspended Solids (TSS) monitoring to the Ohio SQM Project. The purpose of this addition is to estimate the amount of soil sediments impacting a stream by estimating the turbidity of the water. These sediments are attributed to problems originating upstream of the sampling site. The equipment is calibrated to predict TSS at 90% accuracy. The measurements are accurate enough to determine the changes in sediment rates in a stream at a given location and time. Variables such as amount of precipitation, slope and gradient of the river system, soil type, time of year data was collected, amount of development, amount of riparian corridor, velocity of the river flow and the amount of waste water effluent may have a great effect on the TSS value.

Precipitation amount is important because of the increased potential for sediments to be carried into the river during a rain event. The TSS value may appear higher than normal if precipitation amounts are not taken into account. Since large rain events usually happen in the spring and early summer, the time of year the samples are taken could affect the TSS score. The gradient of the stream is important as well. Sediments do not settle out as easily in high gradient streams because the velocity of the water washes it downstream. In low gradient streams, sediment has a chance to settle out, resulting in a lower TSS value. Soil types impact TSS values because some soil types erode faster than others. A better understanding of the types of soils within the watershed may give way to a better understanding of the baseline TSS values for a stream.

Development in an area can cause changes in the TSS score. Areas cleared for new buildings are often not covered, causing an acute rise in the amount of suspended solids in nearby streams. Impermeable surfaces can also cause chronic elevation of TSS values because there is no buffer to absorb or trap runoff. Wastewater treatment plant effluent would only affect TSS scores in low flow situations, and only if the plant employs only primary or secondary treatment.

The actual process of taking a sample is simple. Using a clear Lucite sediment stick developed by the Lake Soil and Water Conservation District, a water sample is collected from the stream. Keeping the sample materials suspended, water is then poured out of the tube until the 0.4-inch target dot is visible on the tube bottom. A reading of the water column height is taken from the markings on the stick to the nearest ¼ inch. A conversion table is then used to convert the sediment stick reading to a TSS measurement in the form of an estimate of the weight of solids suspended in the water column (mg/l).

The TSS measurement can be used to estimate water quality with the following scale:

TSS < 10 mg/l = excellent water quality
TSS 10-28 mg/l = normal water quality
TSS >29-133 mg/l = impaired water quality
TSS > 133 mg/l = severely impacted water quality

2011 TSS Results: A total of 17 TSS readings were taken in the Grand River. The Grand River had a median of 11.0 mg/l of TSS, which corresponds to the normal range. The data set ranged from < 6.2 mg/l to 60.0 mg/l of total suspended solids.

Comparisons of Collected Stream Quality Monitoring Data

Monitoring of the same reference station is performed a minimum of three times per year, consistently year after year. An assessment of the diversity and tolerance levels of taxonomy collected generates the Cumulative Index Value (CIV) for the site on a given date. Field assessment results are used as basic indicators of long-term changes in a stream's macroinvertebrate community and help the Scenic Rivers staff identify pronounced stream quality problems.

Table 1 identifies the 20 macroinvertebrates that are assessed and their general tolerance to pollutants. Pollution-intolerant organisms, such as those listed in Group I, require unpolluted, high quality water in order to survive. Pollution-tolerant organisms, such as those listed in Group III, are extremely tolerant of deteriorated water conditions.

Table 1. Macroinvertebrate Pollution Tolerance

Group I Taxa Pollution Intolerant	Group II Taxa Moderately Tolerant	Group III Taxa Pollution Tolerant
Water Penny Beetle Larvae (WP) Mayfly Nymphs (MF) Stonefly Nymphs (ST) Dobsonfly Larvae (DO) Caddisfly Larvae (CD) Riffle Beetle Adult (RI) Other Snails (OS)	Damselfly Nymphs (DA) Dragonfly Nymphs (DR) Crane Fly Larvae (CR) Beetle Larvae (BL) Crayfish (CF) Scuds (SC) Clams (CL) Aquatic Sowbugs (SW)	Black Fly Larvae (BF) Aquatic Worms (AW) Midge Larvae (MI) Pouch Snails (PS) Leeches (LE)

Table 2 represents the mean CIV for each SQM reference station sampled on the river during 2011. In addition, the table uses symbols (◆) to indicate those macroinvertebrates found to be present at least once during the year at the respective reference station. Each macroinvertebrate is identified by a 2-letter code given in Table 1. CIVs of 23 or greater indicate *Excellent* stream quality; CIVs of 17-22 indicate *Good* stream quality; CIVs ranging from 11-16 suggest *Fair* stream quality; and CIVs of 10 or less reflect *Poor* stream quality. Situated beside the CIVs are the symbols + (improved), = (equal), or – (declined) indicating the relationship to the previous years CIVs.

For the full range of CIVs attained at all sites monitored during the year, including non-reference stations, please see the *Appendix*.

Table 2. Grand River 2011 Mean CIVs by Reference Station

STATION	WP	MF	ST	DO	CD	RI	OS	DA	DR	CR	BL	CF	SC	CL	SW	BF	AW	MI	PS	LE	CIV
9.4	◆	◆	◆	◆	◆	◆			◆	◆	◆	◆		◆		◆	◆	◆			23-
14.2	◆	◆	◆	◆	◆	◆	◆			◆	◆	◆		◆		◆	◆	◆			25-
22.4	◆		◆	◆	◆	◆	◆	◆		◆	◆	◆		◆	◆		◆	◆			16-
26.1	◆	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆		◆		◆	◆	◆		◆	27+
30.8	◆	◆	◆	◆	◆	◆	◆	◆		◆	◆	◆		◆		◆	◆	◆		◆	25-

Figure 1 represents the maximum and minimum range of CIVs recorded during the year for each reference station. Figure 2 represents the mean CIVs at each reference station over multiple years.

Figure 1. Grand River 2011 CIV Maximum and Minimum Ranges

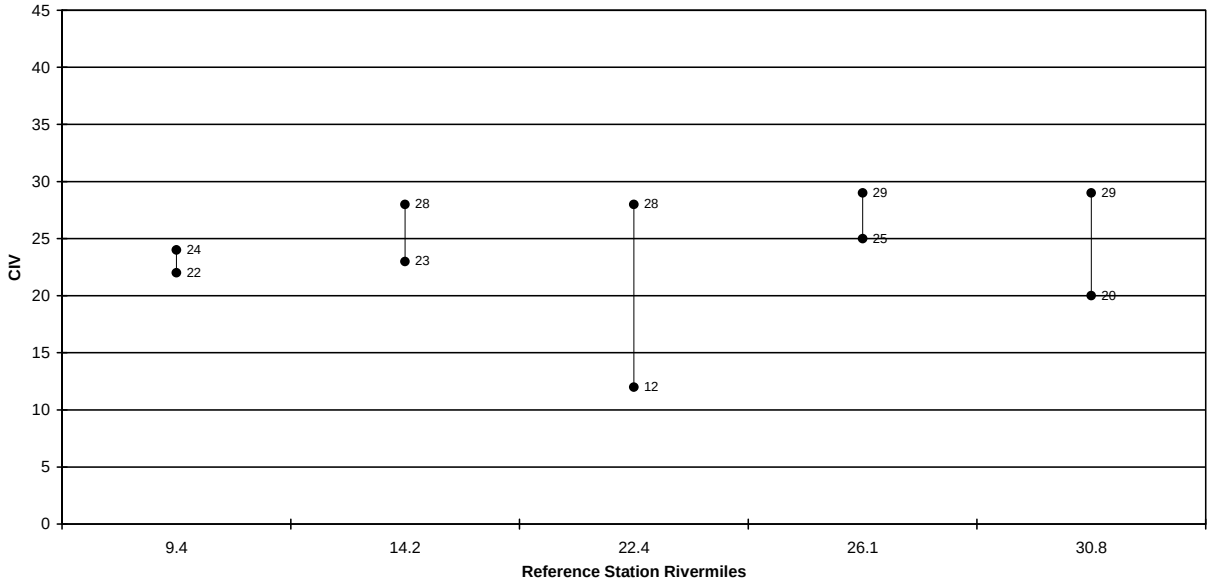
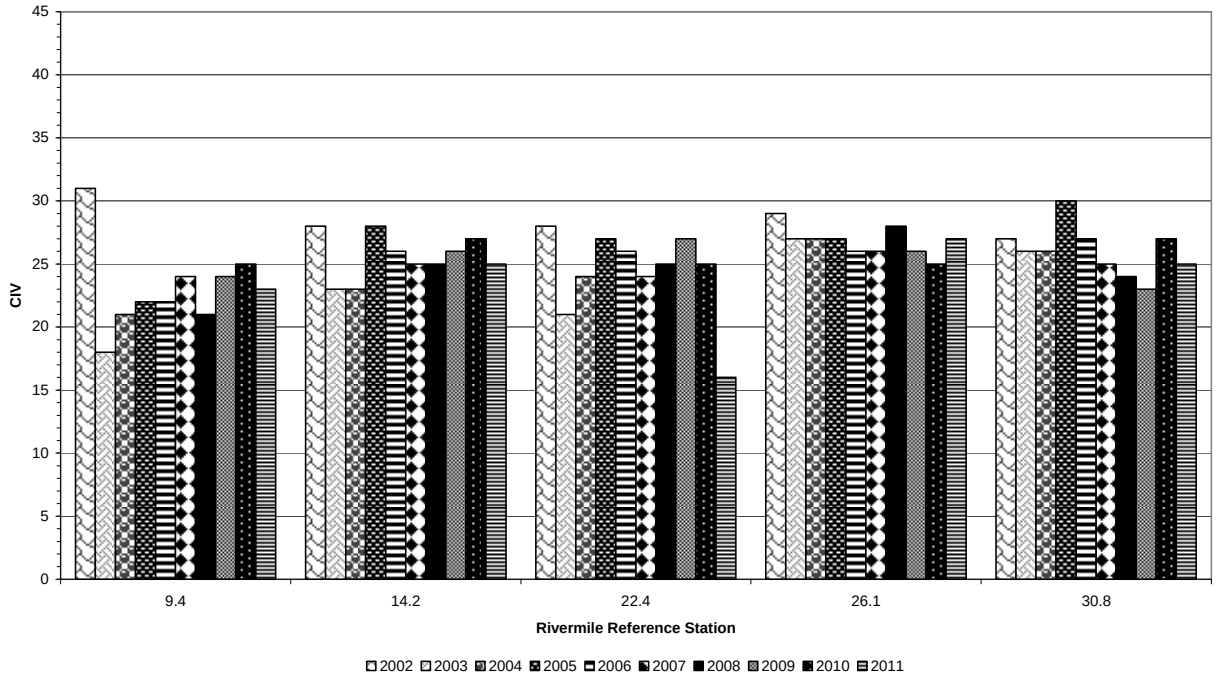


Figure 2. Grand River 2002 - 2011 Mean CIVs



Qualitative Habitat Evaluation Index (QHEI)

The Qualitative Habitat Evaluation Index (QHEI) is a system developed and employed by the Ohio Enironmental Protection Agency (OEPA) to measure physical habitat conditions in and around rivers and streams in Ohio. During 2008, SQM staff completed the QHEIs to gather measurements at reference stations on several of Ohio's scenic rivers. It is anticipated that such measurements will become yet another annual tool that will be used to monitor habitat and water quality conditions on all Ohio scenic rivers.

Habitat conditions are re-evaluated every five years. SQM staff and volunteers are scheduled to perform evaluations next in 2013. Until then, results from the 2008 QHEI are included below. When attempting to interpret this data, it is important to recognize that OEPA generally concludes that any site receiving a QHEI value greater than 60 meets current warmwater habitat (WWH) standards. Meeting WWH standards suggests that such locations should be adequate for supporting reproducing communities of fish and macroinvertebrate life. Sites attaining QHEI scores of greater than 80 are generally believed to contain exceptional habitat conditions for warm water communities.

The following table has been prepared to assist with determining the relationship between habitat conditions, measured by the QHEI, and macroinvertebrate community performance, measured by the Cumulative Index Value, at each of the reference stations on selected rivers.

Table 3. Grand River 2008 QHEI and SQM Assessment Data

Reference Station	Citizen's QHEI	Attainment Status	2008 Average CIV	SQM Assessment
RM 9.40	75	FULL	21	GOOD
RM 14.20	78	FULL	25	EXCELLENT
RM 22.40	82	FULL	25	EXCELLENT
RM 26.10	83	FULL	28	EXCELLENT
RM 30.80	77	FULL	24	EXCELLENT

Appendix

Stream Quality Monitoring Data by Monitoring Station

2011 CIVs by Monitoring Station
GRAND RIVER

RM	DATE	WP	MF	ST	DO	CD	RI	OS	DA	DR	CR	BL	CF	SC	CL	SW	BF	AW	MI	PS	LE	CIV
9.40	10/11/2011	B	A	A	A	B	A					A						A	A			22.00
9.40	6/22/2011	A	A	A	A		A			A	A		A		A		A					24.00
9.40	8/9/2011	A		A	A	A	A					A	A		A			A				22.00
14.20	6/22/2011	A	A	A	A	B	A					A	A		A			A	B			23.00
14.20	7/12/2011	A	B	B	B	B	A	A			A		B		A			A				28.00
14.20	8/9/2011	B	B	B	B	B	B				A	A	A									24.00
22.40	9/23/2011			A				B	A				A		A							12.00
22.40	9/23/2011			A				B	A				A		A							12.00
22.40	9/23/2011			A				B	A				A		A							12.00
22.40	6/22/2011	A		A	A	B	A	A			A	A	A			A		A	A			28.00
26.10	11/10/2011	A	A	A		A		A	A	A			A		A			A	A		A	26.00
26.10	7/8/2011	B	A	A		B	B	A		A	A		A					A				25.00
26.10	6/22/2011	A	A	A		B	A	A			A	A	A		A		A	A	A			29.00
30.80	6/29/2011	A	A			B	B	B			A	A	A		B		A	B	A			26.00
30.80	7/6/2011	A	A	A	A	B	A	B				A	A		B				A		A	29.00
30.80	8/31/2011		A		A	B	B	A							A		A	B	A			20.00
30.80	11/9/2011	B	A	B	A	C	B		A		A		A		A			A				27.00
30.80	11/10/2011	A	A	A	A	B	A	A					A		A							25.00
30.80	8/31/2011	B	B	A		B	B	C					A		A		A	A	A		B	26.00
30.80	6/22/2011	B			A	B	B	A				A	A		A			A	A			23.00
34.50	11/10/2011	A	A	A		A	A				A		A		A			A				22.00

2011 CIVs by Monitoring Station
GRAND RIVER-KELLOGG CREEK

RM	DATE	WP	MF	ST	DO	CD	RI	OS	DA	DR	CR	BL	CF	SC	CL	SW	BF	AW	MI	PS	LE	CIV
0.10	5/24/2011	A	A				A										A	A	A			12.00

2011 CIVs by Monitoring Station
GRAND RIVER-PHELPS CREEK

RM	DATE	WP	MF	ST	DO	CD	RI	OS	DA	DR	CR	BL	CF	SC	CL	SW	BF	AW	MI	PS	LE	CIV
4.10	9/14/2011	A		A		A							B									11.00
4.10	9/29/2011	A	A			A				A	A	B	A		A			A			A	21.00