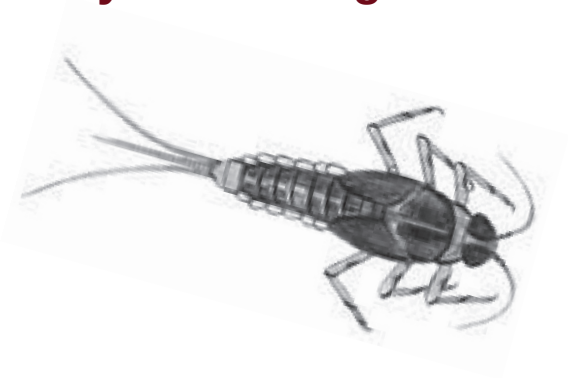
Stream Quality Monitoring 2009 Annual Report



Ashtabula River
State Scenic River

Ohio

Department of Natural Resources
Division of Watercraft

Stream Quality Monitoring 2009 Annual Report
Ashtabula State Scenic River

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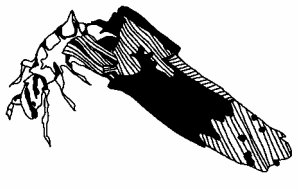


Ohio Scenic Rivers Program

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

Aquatic macroinvertebrates are organisms that lack a backbone (invertebrate), are large enough in size 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 in the SQM Project, 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 Division Watercraft, the 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 the documenting of the health of Ohio's state scenic, wild and recreational rivers. This report is a compilation of field data collected during 2009 by volunteers and staff. It also represents a year of dedication and commitment shown to Ohio's special waterways by thousands of SQM volunteers.

Overview

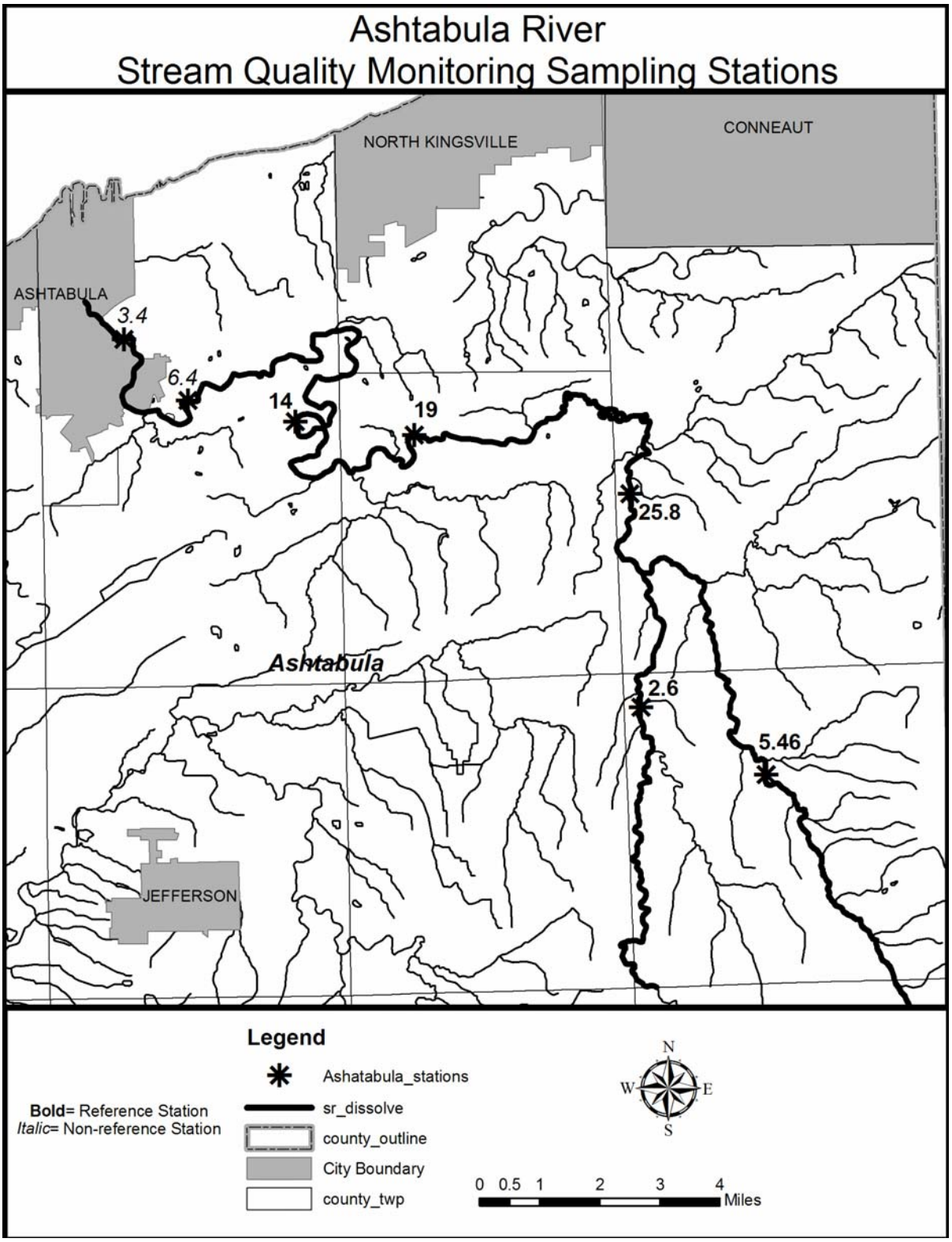
On October 30, 2008, the Ashtabula River was designated as Ohio's 14th state scenic river by the Director of the Ohio Department of Natural Resources. Flowing mainly through the geologically diverse County of Ashtabula in northeast Ohio, the designated portions of the Ashtabula River, totaling 46.29 miles, include the mainstem of the river from the confluence of the East and West Branches (River Mile 27.54), downstream to the East 24th Street Bridge crossing (RM 2.3); the East Branch of the Ashtabula River from Pennline Fen (RM 12.0) to its mouth; and the West Branch of the Ashtabula River from the North Richmond Road Bridge crossing (RM 9.05), downstream to its mouth.

The Ashtabula River watershed supports high quality natural features which include an outstanding wooded riparian corridor and diverse populations of wildlife and plants. A variety of plant communities including Great Lakes hemlock-beech hardwood forest, Lake Plain swamp forest, mixed oak, rich shrub fen, emergent deep marsh and northern rich mesic forest cover the majority of the watershed. Nearly forty rare plant species have been documented in the area surrounding the Ashtabula State Scenic River. Eighty-eight species of fish have been documented in the river. The river is also home to rare animals including black bear, bald eagle, Indiana bat, Northern harrier, osprey, spotted turtle, queen snake, Northern brook lamprey and least brook lamprey. As a reflection of the number of fish in the river, the name Ashtabula is thought to be an Algonquin name, meaning "river of many fish."

The exceptional diversity and habitat of the Ashtabula State Scenic River offers numerous recreational opportunities. Many fishermen take advantage of the excellent water quality found in the Ashtabula River. The river supports a great rainbow trout (steelhead) fishery, and four miles of fishing access is available in Ashtabula Township's Indian Trails Park. For avid paddlers, seasonal opportunities are available to canoe or kayak class I, II and III waters through remote ravines. Water levels must be closely watched and are usually only floatable from late fall to early spring.

The Ashtabula River qualified for scenic river designation as direct result of the exceptional stewardship by area landowners. Many local landowners along the river have maintained wooded riparian buffers with widths of 120 feet or more along the river banks. Maintaining wooded buffers is critical to protecting the high water quality of the Ashtabula River.

For more information about the Ashtabula State Scenic River, please contact the Northeast Ohio SQM Coordinator at 330-872-0040 or the Division of Watercraft at 614-265-6814. Information is also available online: *www.ohiodnr.com/watercraft*


Ashtabula River
Stream Quality Monitoring Sampling Stations
NORTH KINGSVILLE
CONNEAUT
ASHTABULA
3.4
6.4
14
19
25.8
Ashtabula
2.6
5.46
JEFFERSON
Legend
Ashatabula_stations
sr_dissolve
county_outline
City Boundary
county_twp
Bold= Reference Station
Italic= Non-reference Station
N
W
E
S
0 0.5 1 2 3 4
Miles

2009 Stream Quality Monitoring Participants

Whether their contribution was a one-time event or a recurring adventure in stream exploration, the individuals listed below played a significant role in protecting Ashtabula State Scenic River. Their time and dedication to this river and the Stream Quality Monitoring Project is greatly appreciated.

Ashtabula River – Main Stem

River Mile 3.4 – Tannery Hill Road (non-reference site)
Lakeside Intermediate

River Mile 6.4 – Indian Trails Park (non-reference site)
Volunteer needed

River Mile 14.0 – Greenhill Road
Volunteer needed

River Mile 19.0 – Benetka Road
Phyllis Willis and Family

River Mile 25.8 – Root Road
Phyllis Willis and Family

Ashtabula River – West Branch

River Mile 2.6 – Graham Road

Ashtabula River – East Branch

River Mile 5.46 – Cain Road
Daryl Sensky

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

Stream Quality Monitoring Station Descriptions

Stream quality monitoring (SQM) stations along the Ashtabula River have been selected based upon their ease of access, macroinvertebrate habitat and adequate sampling areas. Wherever possible, sampling stations are located on public property or where public access to the riffle areas is convenient and safe. The following are brief summaries of the stream quality monitoring stations located on the Ashtabula River.

Ashtabula River – Mainstem

River Mile 3.4 – Tannery Hill Road (non-reference site)

The sampling area at this station is located immediately downstream from the bridge crossing. Access to the river is relatively easy with good parking on the northeast side of the bridge. This is also a popular fishing location used year round depending on weather conditions.

Like many sites along the Ashtabula, the riverbed is comprised of boulders, cobbles, sand and gravel; the macroinvertebrate habitat is very good. All CIVs recorded during 2009 fell within the fair to excellent range for relative water quality.

River Mile 6.4 – Indian Trails Park (non-reference site)

This monitoring station is located upstream from the recently built Smolen-Gulf covered bridge. Composition of the streambed at this location consists predominately of gravel and cobblestones with a small percentage of sand. Habitat and water quality in the area is very good as reflected by the large number of pollution intolerant organisms collected at this site. During 2009 one sample was performed at this station resulting in an excellent reading.

River Mile 14.0 – Greenhill Road

The riffle area at this site is located slightly upstream of the bridge. Parking is limited to the side of the road and caution must be taken when accessing the river due to thick vegetation and a steep riverbank. During low flow, the riffle area is only five to eight feet wide.

The streambed is comprised of a relatively equal mixture of cobblestones and gravel where the sampler can find a diverse macroinvertebrate population. The aquatic sampling that was done at this station during 2009 resulted in one good and four excellent CIVs.

River Mile 19.0 – Benetka Road

To reach this site, park in the small pull-off located at the northwest corner of the bridge and walk upstream to the riffle area. In addition to being an effective SQM sampling station, this area is also an ideal site for canoe launching and take-outs.

The substrate in the sampling area consists of cobblestones and gravel with a small percentage of sand. CIVs are consistently excellent with nearly all taxa well represented. Four excellent readings were recorded during the 2009 season.

River Mile 25.8 – Root Road

The sampling area at this station is located immediately upstream from the covered bridge. Access to the river is not difficult and parking is limited to the pull-off on the side of the road.

The streambed is comprised of cobble, gravel and sand. Habitat for aquatic macroinvertebrates is very good. As a result, CIVs for this station in 2009 showed excellent water quality with an abundance of nearly all pollution intolerant organisms.

Ashtabula River – West Branch

River Mile 2.6 – Graham Road

Located within an Ashtabula County Metropark, this reference station is a popular stop for covered bridge tourists. Access to the river is safe and convenient but parking is limited to the side of the road.

The substrate within this area of the stream consists of a relatively equal mixture of sand, gravel and cobblestones. Although the riffle area at this station is somewhat limited, the sampler will consistently find a diverse macroinvertebrate population. All five samples that were completed resulted in excellent CIVs.

Ashtabula River – East Branch

River Mile 5.46 – Cain Road

This monitoring station can be accessed from the northeast corner of the bridge. Care must be taken when entering the river due to the steep road edge. Parking is also limited. The riffle area is located immediately upstream from the bridge.

The substrate consists of sand, gravel, and cobbles with as occasional boulder providing excellent habitat for aquatic insects. CIVs at this site are consistently exceptional; the aquatic samples that were performed in 2009 resulted in excellent readings

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Sampling Results and General Trends

Stream Quality Monitoring sample results for the Ashtabula River ranged from fair to excellent throughout the 2009 sampling season. According to the monthly water inventory reports compiled by ODNR's Division of Water, stream flow in the spring of 2009 in eastern Ohio was below normal until mid-June when flows increased statewide following widespread precipitation. Overall, water levels fluctuated throughout the sampling season but never rose to what is considered excessive levels. Aquatic organisms also benefited from the significantly cooler than normal air temperatures across the region in July. An average of 11 macroinvertebrate orders (e.g. stonefly, damselfly, mayfly, etc.) of taxonomic diversity were found per assessment on the Ashtabula River.

Long-term stream quality monitoring data on the Ashtabula River is limited at this time, mainly due to the fact that the river has only been a component of the Scenic Rivers system since October 2008. The SQM program for the Ashtabula River was initiated in the spring of 2009. SQM samples were taken sporadically over the years by volunteers assigned on other designated rivers in northeast Ohio as well as by ODNR staff. This previous information supports the data recorded during 2009 with high Cumulative Index Values (CIVs) and predominately pollution intolerant organisms in most samples performed.

The staff of the Ohio Scenic Rivers Program appreciates the assistance we received from our dedicated volunteer monitors. It is only through their efforts that it was possible to complete the SQM samples along the Ashtabula River during 2009. Working together has produced significant results but more help is needed. For more information please contact the Northeast Stream Quality Monitoring Coordinator at 330-527-2961 or Northeast Ohio Regional Scenic River Manager at 330-872-0040.

Volunteer and staff data results are used for the purposes of the Ohio SQM Project as a water quality-screening method. The data helps in detecting significant changes in stream quality based on CIV data from sites that have been monitored for many years over time by staff and trained volunteers. In the event that significant CIV declines are noticed for a particular site, potential problems that may be causing stream degradation can be further investigated and addressed.

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 is collected, amount of development, amount of riparian corridor, velocity of the river flow and the amount of waste water effluent have an 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 impact 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 total suspended solids measurement in the form of an estimate of the weight of solids suspended in the water column (mg/l).

The TSS measurement can further be used to estimate water quality through the use of 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

2009 TSS Results: A total of 29 TSS readings were taken on the Ashtabula River. The median reading was 6.2 mg/l of TSS, which corresponds to the excellent range. The data set ranged from <6.2 mg/l to 9.0 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 Scenic River's staff identify pronounced stream quality problems.

Table 1 identifies the 20 macroinvertebrates 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)

Tables 2.1 through 2.3 represent the mean Cumulative Index Values (CIVs) for each Stream Quality Monitoring reference station sampled on the river during 2009. 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.

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

Table 2.1 Ashtabula River 2009 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
14.0	◆	◆	◆	◆	◆	◆	◆			◆	◆	◆		◆		◆	◆	◆			24
19.0	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		◆		◆	◆	◆			29
25.8	◆	◆	◆	◆	◆	◆		◆	◆	◆	◆	◆		◆		◆	◆	◆	◆	◆	27

Table 2.2 Ashtabula River – West Branch 2009 Mean CIV 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
2.6	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		◆		◆	◆	◆	◆	◆	25

Table 2.3 Ashtabula River – East Branch 2009 Mean CIV 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
5.46	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		◆		◆	◆	◆			25

Figures 1.1 to 1.3 represent the maximum and minimum range of the CIVs recorded during the year for each reference station. Figures 2.1 to 2.3 represent the mean CIVs at each reference station during 2009.

Figure 1.1 Ashtabula River – Mainstem 2009 Maximum and Minimum CIV Ranges

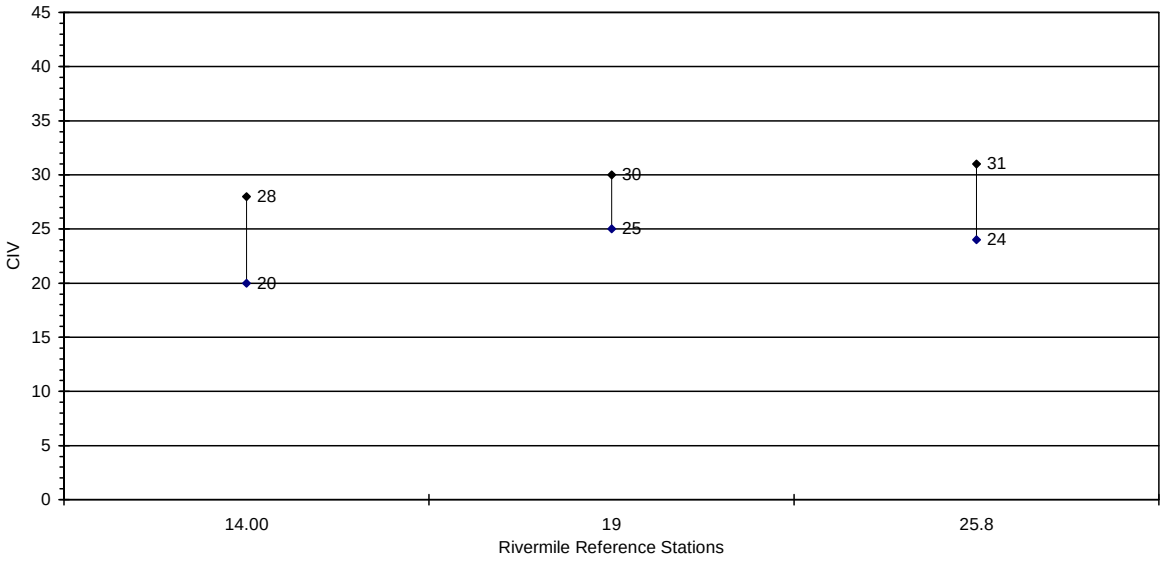


Figure 2.1 Ashtabula River – Mainstem 2009 Mean CIVs

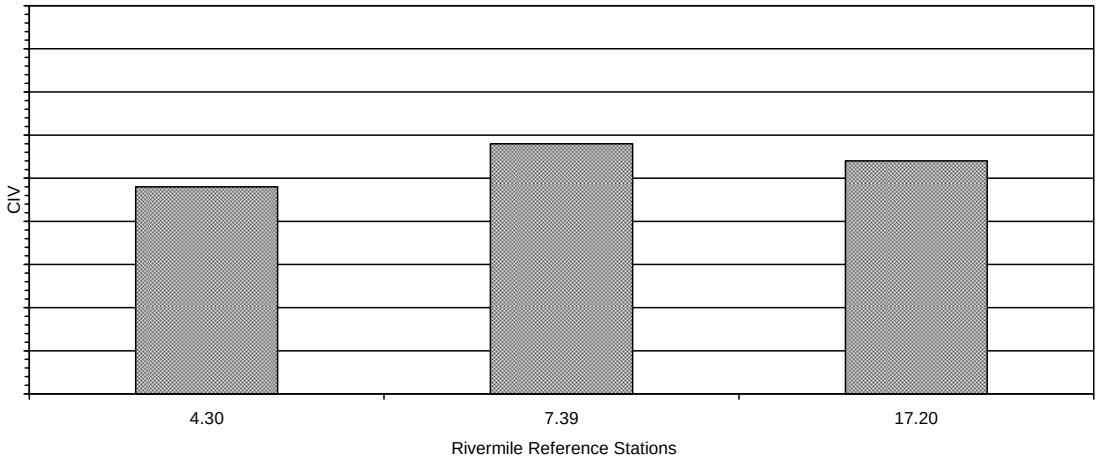


Figure 1.2 Ashtabula River – West Branch 2009 Maximum and Minimum CIV Range

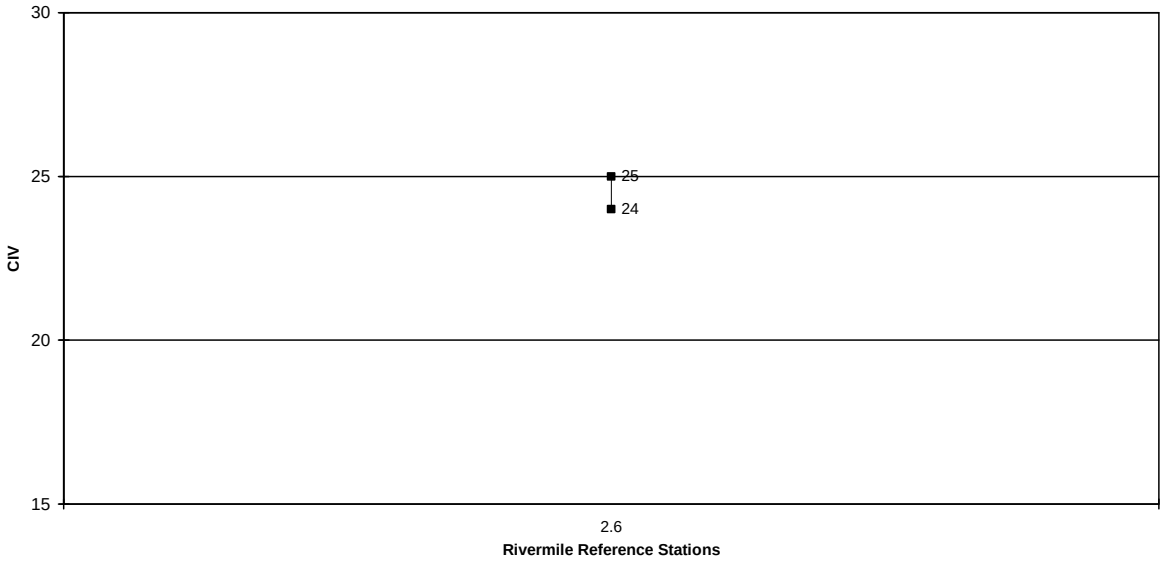


Figure 2.2 Ashtabula River – West Branch 2009 Mean CIV

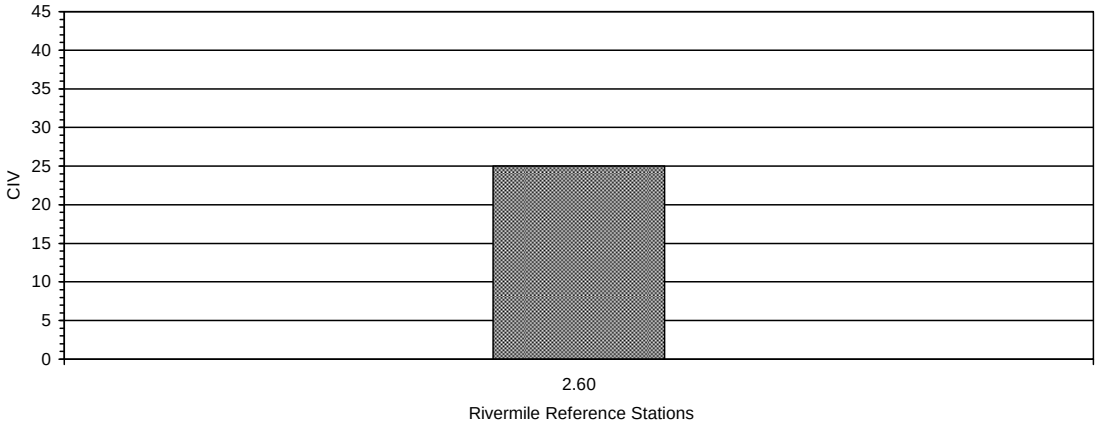


Figure 1.3 Ashtabula River – East Branch 2009 Maximum and Minimum CIV Range

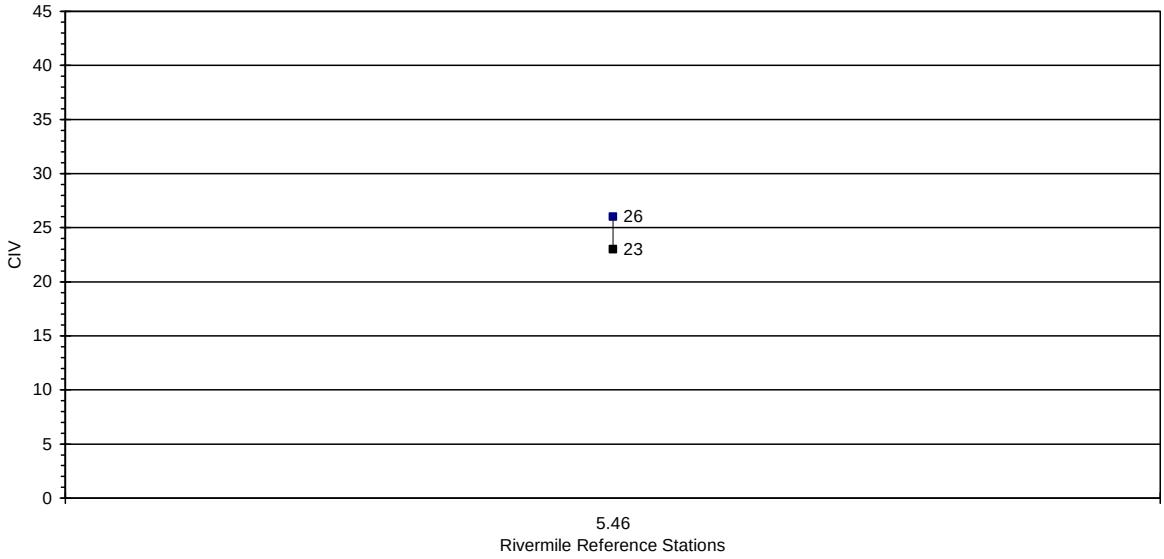
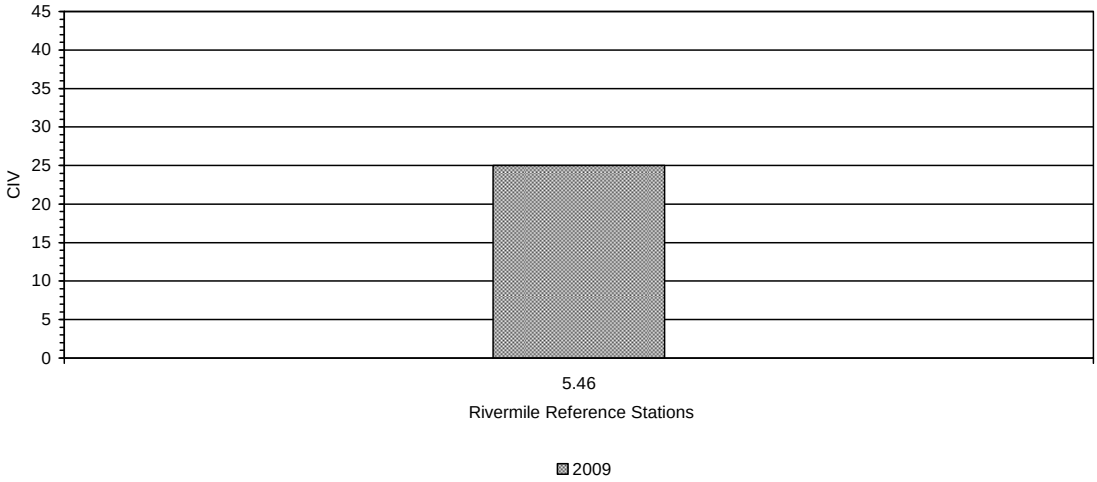


Figure 2.3 Ashtabula River – East Branch 2009 Mean CIV



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 2009, SQM staff conducted the QHEI to gather baseline 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 2014. Results from the 2009 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 warmwater communities.

The following tables have 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 3.1 Ashtabula Scenic River 2009 QHEI & SQM Assessment Data

Reference Station	QHEI	Attainment Status	2009 Average CIV	SQM Assessment
RM 14.0	67	FULL	24	EXCELLENT
RM 19.0	82	FULL	29	EXCELLENT
RM 25.8	84	FULL	27	EXCELLENT

Table 3.2 Ashtabula River – West Branch 2009 QHEI and SQM Assessment Data

Reference Station	QHEI	Attainment Status	2009 Average CIV	SQM Assessment
RM 2.6	73	FULL	25	EXCELLENT

Table 3.3 Ashtabula River – East Branch 2009 QHEI and SQM Assessment Data

Reference Station	QHEI	Attainment Status	2009 Average CIV	SQM Assessment
RM 5.46	79	FULL	25	EXCELLENT

Appendix

2009 Sampling Data by Monitoring Station

2009 CIVs by Monitoring Station
ASHTABULA RIVER MAINSTEM

RM	DATE	WP	MF	ST	DO	CD	RI	OS	DA	DR	CR	BL	CF	SC	CL	SW	BF	AW	MI	PS	LE	CIV
3.40	4/24/2009			A		A	A											A	A			11.00
3.40	5/11/2009		A	A		B	A	A					A				A	A	B			20.00
3.40	6/30/2009	A	A	A		B	A				A	A	A	A				A	A		A	26.00
3.40	11/18/2009	A	B	A	A	B	B		A		A		A					A				25.00
6.40	6/22/2009	B	A	A		B	B				A	A	A	A					A	A		25.00
14.00	6/4/2009	B	A	B		A	B	A				A							A			21.00
14.00	6/19/2009	B	B	A		B	B	A			A	B	A		A		A		B			28.00
14.00	6/30/2009	B	B	A	A	C	C				A	A	A		A			A	B			28.00
14.00	8/25/2009	B	A	A		B	B					A	A		A			A	A			23.00
14.00	10/6/2009	B	A	A		A	A				A		A					A				20.00
19.00	6/4/2009	B	B	B		A	B		A	A	A	A	A		A			A	A			29.00
19.00	6/30/2009	B	A	A		B	B	A	A		A	A	A		A			A	A			30.00
19.00	8/25/2009	B	A	A	A	A			A		A	A	A				A		A			25.00
19.00	10/6/2009	B	B	A	A	A	B	A	A		A		A		B			A				30.00
25.80	6/4/2009	B	B	C	A	B	B				A		A		A		A		B		A	27.00
25.80	6/22/2009	B	B	A	A	B	B		A				A		A		A	A	A			27.00
25.80	6/30/2009	B	B	A	A	C	B			A	A	A	A		A			A	A	A		31.00
25.80	7/28/2009	A	B	A		B	B			A	A	A	A					A	A			25.00
25.80	8/25/2009	A	A	A	A	B	A			A		A	A									24.00
25.80	10/6/2009	B	B	B	A	B	B		A	A	A		A		B			A	A			30.00

2009 CIVs by Monitoring Station
ASHTABULA RIVER – EAST BRANCH

RM	DATE	WP	MF	ST	DO	CD	RI	OS	DA	DR	CR	BL	CF	SC	CL	SW	BF	AW	MI	PS	LE	CIV
5.46	6/22/2009	B	B	A	A	B	B			A			A		A			A	A			26.00
5.46	7/28/2009	A	B		A	B	A					A	A		A			A	A			23.00
5.46	8/25/2009	A	B	B	A			A	A	A			B				A	A	A			24.00
5.46	10/6/2009	A	A		B	A	B			A	A		A		A			A	A			25.00

2009 CIVs by Monitoring Station ASHTABULA RIVER – WEST BRANCH																					
RM	DATE	WP	MF	ST	DO	CD	RI	OS	DA	DR	CR	BL	CF	SC	CL	SW	BF	AW	MI	PS	LE	CIV
2.60	6/4/2009	B	A	B		A	B	A		A			B		A				B			25.00
2.60	6/22/2009	B	B	B		B	B			A	A		A		A				B	A		25.00
2.60	7/28/2009	A	B	A	A	B	A					A	A		A			A				25.00
2.60	8/25/2009	A	A	A		B	A		A	A			A		A		A					24.00
2.60	10/6/2009	B	A		A	B	B				A		A		A			A	A	A	A	25.00