



Olentangy State Scenic River



OHIO

Stream Quality Monitoring

2007 Annual Report



Olentangy State Scenic River 2007 Stream Quality Monitoring Annual Report

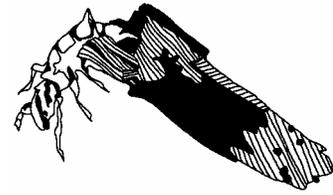
Contents

Introduction	2
Overview	3
Stream Quality Monitoring Station Map	4
2007 Stream Quality Monitoring Participants.....	5
Station Descriptions	6
Sampling Results and General Trends	8
Total Suspended Solids (TSS).....	9
Comparisons of Collected Stream Quality Monitoring Data.....	10
Table 1 - Macroinvertebrate Pollution Tolerance	10
Table 2 - 2007 Mean CIV by Reference Station.....	11
Figure 1.1 - 2007 CIV Ranges by Reference Station	11
Figure 1.2 - 1998-2007 Mean CIV by Reference Station	12
Table 3 Qualitative Habitat Evaluation Index	13
Appendix - 2007 Stream Quality Monitoring Data by Station	14

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 Natural Areas and Preserves, the Ohio Scenic Rivers Program oversees 12 state designated scenic river systems, comprising 722 river miles along 21 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 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 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, 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 of Natural Areas and Preserves, 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 the documenting of the health of Ohio's state scenic, wild and recreational rivers. This report is a compilation of field data collected during 2007 by volunteers and staff. It also represents a year of dedication and commitment shown to Ohio's special waterways by thousands of SQM volunteers.

Olentangy State Scenic River Overview

The Olentangy River was the third river designated in Ohio. It is designated as a State Scenic River for 22 river miles. The designation is from just below the Delaware Dam in Delaware downstream to old Wilson Bridge Road in Worthington.

The river is located within the rapidly developing area of northern Columbus and southern Delaware County. While development has been intense, a section of the river in southern Delaware County still maintains an exceptional warm water habitat classification by the Ohio Environmental Protection Agency. The river is within a ½ hour drive of more than 1.5 million people.

The river valley is characterized by gently rolling to relatively flat topography. The steep shale banks flanking the stream enhance the natural quality that signifies this river. The most spectacular shale banks, rising some 110 feet above the streambed, are found along Highbanks Metro Park. These banks are often dissected by ravines, which cut through and expose the underlying rock strata including the Ohio black shale, noted for its presence of large "ironstone" concretions.

The river's name has an interesting history. Olentangy was the name given to this river in 1833 by a legislative act that was attempting to restore Native American names to certain rivers in the state. The word Olentangy literally means "river of red face paint." This name actually belonged to Big Darby Creek further to the west, where the Wyandots of the Columbus area got their red face paint.

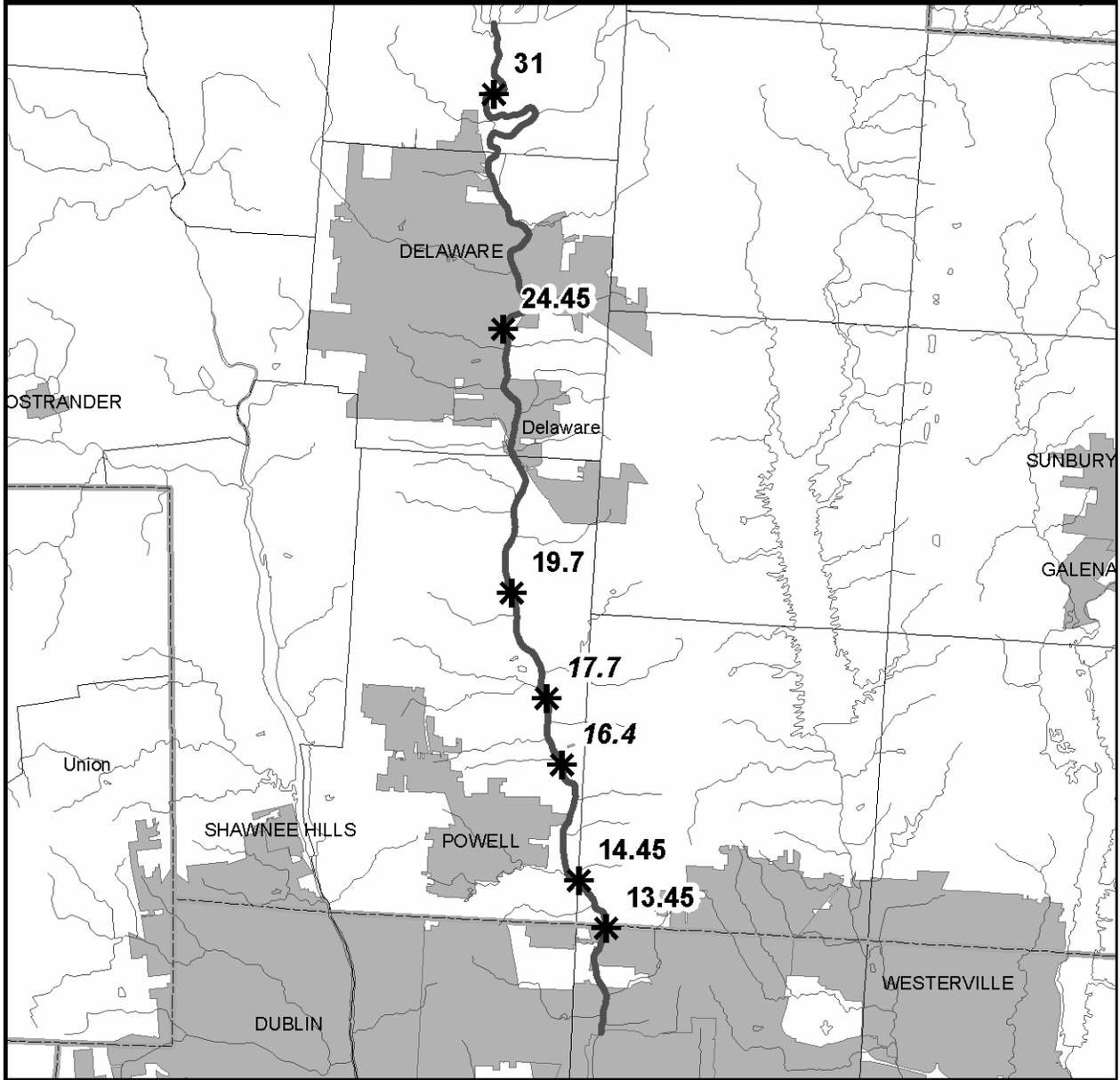
The Olentangy River should have been named the Whetstone River. The literal translation of the Delaware Indian name for the Olentangy River - "Kiin ansh ikan Siipunk" is "sharp/more and more/tool/river," or more precisely Whetstone. Both the Native Americans and early settlers used the black Ohio and Olentangy shale found along the river for whetstones to sharpen their tools.

The Olentangy, while continuing to experience development pressure, has retained a forest corridor, which has greatly assisted in protecting its 54 species of fish. The relatively high quality of the Olentangy and its wooded banks provides habitat for a variety of breeding birds and other animals. The predominate species of trees which make up the forested streamside include willow, red and silver maple, sycamore, oak, basswood and green ash.

Information about the Olentangy State Scenic River is available by contacting the Ohio Division of Natural Areas and Preserves at 614-265-6453 or by visiting www.ohiodnr.com/dnap.

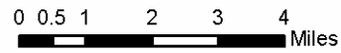


Olentangy River Stream Quality Monitoring Sampling Stations



Legend

- | | |
|--------------------------------|--------------------------|
| * SQM Station | Scenic River Designation |
| <i>*</i> Non-reference Station | Streams |
| County Boundary | Township Boundary |
| City Boundary | |



2007 Stream Quality Monitoring Participants

The following groups and individuals represent the 2007 Olentangy Scenic River stream quality monitoring season. Their assistance in monitoring the Olentangy River is sincerely appreciated. A special thanks is extended to Highbanks Metro Park, Olentangy Environmental Control Center, city of Delaware Water Treatment Facility, city of Delaware Water Pollution Control Facility, and the Olentangy Scenic River Advisory Council for their continued support and assistance.

River Mile 13.4 - Olentangy Environmental Control Center

Linda and Ethan Rau
Judy Lockwood
Marie Burleson
Michael Lee

River Mile 14.45 - Highbanks Metro Park

Danika Stoltz and Family
Kim Elofson, Family and Home School Group
Paul and Kelsey Sandstrom

River Mile 16.45 - Orange Road Bridge *(non-reference station)*

Chuck Richardson
Greg Myers

River Mile 17.7 - Home Road Bridge *(non-reference station)*

Bill Dudrow

River Mile 19.7 - Neuenschwander Riffle

Laubert Family
Ryan Bonner

River Mile 24.45 - Olentangy Avenue Bridge *(new reference station)*

John Edwards

River Mile 25.6 – Stanton Riffle *(new non-reference station)*

Comer Family
Paul Stewart

River Mile 31.0 - City of Delaware Water Treatment Facility

Candy Hawkins

The continued success of the Ohio SQM Project depends on the commitment and dedication of these (and past) volunteers. We would like to recognize volunteers Bill Dudrow, Linda and Ethan Rau, Chuck Richardson, Greg Myers the Comer Family Paul Sandstrom and Danika Stoltz for monitoring their sites at least three times during the 2007 season.

If you are interested in becoming a volunteer, please contact the Central Ohio SQM Coordinator at 614-265-6422 or the Division of Natural Areas and Preserves at 614-265-6453.

Station Descriptions

Stream quality monitoring (SQM) sites along the Olentangy River were selected based on suitable macroinvertebrate habitat and access. Sites are located approximately every 5 river miles along the designated segment. There are other suitable riffle sites but most are on private property and are generally inaccessible. Brief descriptions of the Olentangy Scenic River SQM monitoring stations follow.

River Mile 13.4 - Olentangy Environmental Control Center, Liberty Twp.

Located in Delaware County, the Olentangy Environmental Control Center is located at 10333 Olentangy River Road. Permission to access the river at this facility is necessary. The riffle area is located behind the plant just downstream from the effluent discharge. The substrate is mainly composed of sand, gravel and shale.

River Mile 14.45 - Highbanks Metro Park, Liberty Twp.

Highbanks Metro Park is located in both Delaware and Franklin counties and is owned and operated by Columbus/Franklin County Metro Parks. Located off U.S. 23, 2.5 miles north of I-270, this site offers ample parking and restroom facilities. The sampling site is located at the park's streamside study area. This station is ideal for larger groups.

River Mile 16.45 - Orange Rd. Bridge, Liberty Twp. (*non-reference site*)

The Orange Rd. bridge site is located at the intersection of S.R. 315 and Orange Road. Turn right off of S.R. 315 on to Orange Rd. Before you drive over the bridge turn left for parking. The riffle is located approximately 75 yards north of the bridge. An island divides the riffle. The riffle on the west side is the one being monitored. Access to the site is through private property and prior approval from the landowner is required. Please contact your SQM Coordinator before entering the property.

River Mile 17.70~Home Rd. Bridge, Liberty Twp. (*non-reference site*)

This site is located downstream of Home Road. From Columbus, take Rt. 315 N into Delaware County. It is approximately 4 mi. north on Old 315 before reaching Home Road. Just before reaching the intersection at Home Road, pull off to the right side of the road. There is room for several vehicles to park on the gravel area next to the road. A path leads down to the riffle. There are two riffles within this site. The first riffle downstream is much smaller and is not as well developed as the second riffle downstream. As a result, the second riffle may yield more invertebrates.

River Mile 19.7 - Neuenschwander Riffle, Liberty Twp.

This Delaware County site is located on the former property of the late Mr. Fred Neuenschwander, a past Scenic River Advisory Council member. The property is currently privately owned. The access is on the east side of the river on Chapman Rd., approximately 0.25 miles north of Hyatts Road. Although this site is open to volunteers, prior approval from the landowner is required. Please contact your SQM Coordinator before entering the property.

River Mile 24.5 - Olentangy Avenue Bridge, Delaware City

This riffle site is being monitored to replace river mile 25.2 that is no longer in existence. Located off of Stratford Road in Delaware, parking access is on Spring Lake Court. Park in the first parking lot, and go behind the apartment building. The riffle is located just up stream, south of the Olentangy Avenue Bridge. The riffle is made up of mainly bedrock, so it can be extremely dangerous in times of elevated water levels. This riffle is located on the Long Real Estate Property and is open to volunteers. However, permission from the office must be obtained prior to accessing the property.

River Mile 25.2 - City of Delaware Water Pollution Control Facility, Delaware City

The city of Delaware Water Pollution Control Facility is located at the end of Cherry Street in Delaware. The sampling site is about 0.3 miles downstream from the plant's effluent discharge. Permission from the plant superintendent or the city of Delaware Public Works Commission is required to access this site. Recently it has been decided to move this monitoring station downstream. Over the last several years this riffle has been slowly washed downstream. In an attempt to continue to collect the most accurate information, we have moved the station down to river mile 24.45.

River Mile 25.6 - Stanton Riffle, Delaware City *(new non-reference station)*

This riffle is located just off of St. Rt. 36 on River Street, in Delaware City. In 2005 a low head dam was removed from this site exposing a small riffle. The riffle is made up of mainly artificial substrate and gravel.

River Mile 31.0 - City of Delaware Water Treatment Facility, Troy Twp.

Located slightly more than 1 mile south of the Delaware Dam in Delaware County, this site is the farthest upstream sampling station on the Olentangy River. The substrate is mainly large cobble, which can make collecting samples difficult.

Sampling Results and General Trends

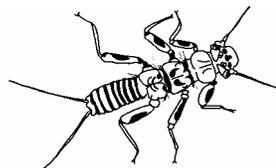
Weather conditions for the 2007 season were favorable for field monitoring. Central Ohio was subjected to a year of above-normal levels of precipitation, as data from the National Climatic Data Center indicates. We require three readings to calculate a Cumulative Index Value (CIV). Site 24.45 was only monitored two times for the 2007 monitoring season.

Volunteers and staff on the Olentangy River conducted 36 assessments in 2007. A total of five official reference sites and three non-reference sites along the Olentangy River were monitored. Volunteers and staff recorded an average CIV of 23.53., corresponding to the excellent range for stream quality. The average CIV is down slightly from the 2006 CIV average of 24.7. The average taxonomic diversity per assessment was 10 macroinvertebrate orders (e.g. stonefly, damselfly, mayfly, etc.).

Although the average CIV was slightly down for the 2007 season, the Olentangy River in the designated area overall is showing continued improvement since regular data collection began in 1988. All of the reference stations between the Delaware Dam and Hyatts Road show a continual increase in the trends over the past 19 years. However, reference stations south of Hyatts Road are starting to show impacts of the heavy development in the Orange Township and Lewis Center areas. In 1999 the Ohio EPA originally reported that they believed the impacts that they were observing in this area between Hyatts Road and Wilson Bridge Road were a result of a drought that year. The Ohio EPA performed another comprehensive study of the watershed in 2003. The 2005 EPA report shows the change in land use to a developing urban community is beginning to show impacts on the lower portion of the designation area. 2006 saw the completion of the 20,000 foot long Perry-Targgart Pipeline that will be connecting the new subdivisions and established properties to the Olentangy Environmental Control Center. This will help to eliminate some of the impacts that have been observed by old aerator systems and leach beds. However, the convenience of sewage hook ups will continue to encourage new development in an already rapidly developing area. We will continue to closely monitor this area over the following years, adding two new reference stations, at Home Road and Orange Road bridges.

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.

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 in the Olentangy State Scenic River during 2007. Working together has produced significant results but additional volunteers are needed to monitor at all reference sites to ensure accurate and thorough data. For more information, please contact Central Ohio SQM Coordinator at 614-265-6456.



Total Suspended Solids (TSS)

In 1999, the Scenic Rivers Program added Total Suspended Solids (TSS) monitoring to the Stream Quality Monitoring (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 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 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 stream
- TSS >133 mg/l = severely impacted stream

2007 Results: A total of 29 TSS readings were taken on the Olentangy River. The Olentangy had a median of 16 mg/l of TSS, corresponding to a “normal” stream rating for Ohio streams. The data set ranged from 5.0 to 54 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 annually, 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 Rivers staff identify pronounced stream quality problems.

The following 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)

Table 2 represents the mean CIV for each SQM reference station sampled on the river during 2005. 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. CIV of 23 or greater indicate *Excellent* stream quality; CIV of 17-22 indicate *Good* stream quality; CIV ranging from 11-16 suggest *Fair* stream quality; and CIV of 10 or less reflect *Poor* stream quality. Situated beside the CIV are the symbols + (improved), = (equal), or – (lower) indicating the relationship to the previous years CIV.

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

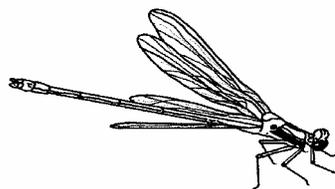


Table 2. - 2004 Olentangy River Mean CIV by Reference Station

STATION	W P	M F	S T	D O	C D	R I	O S	D A	D R	C R	B L	C F	S C	C L	S W	B F	A W	M I	P S	L E	CIV	
13.4	◆	◆	◆		◆	◆	◆				◆	◆		◆			◆	◆	◆		24+	
14.45	◆	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	24=
19.7	◆	◆	◆		◆	◆	◆	◆		◆	◆	◆		◆	◆	◆	◆	◆	◆		29+	
24.45	◆	◆	◆		◆	◆	◆	◆			◆	◆		◆	◆		◆	◆				
31	◆	◆	◆	◆	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		◆		29+

Figure 1.1 represents the maximum and minimum range of CIV recorded during the year for each reference station. Figure 1.2 represents mean CIV at each reference station over many years.

Figure 1.1 -Olentangy River CIV Max and Min Ranges 2007

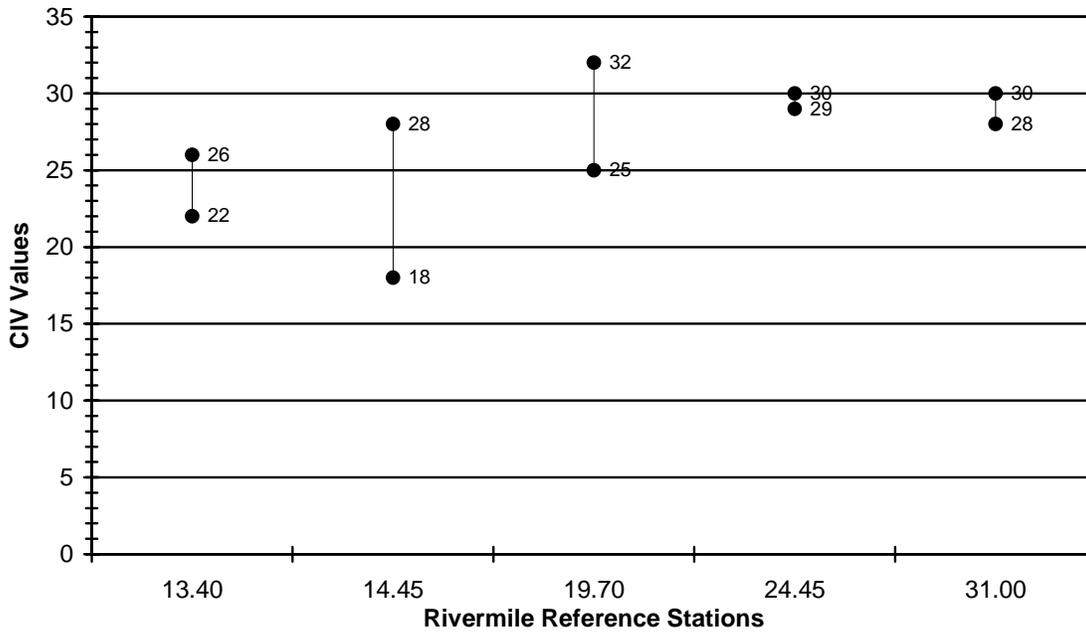
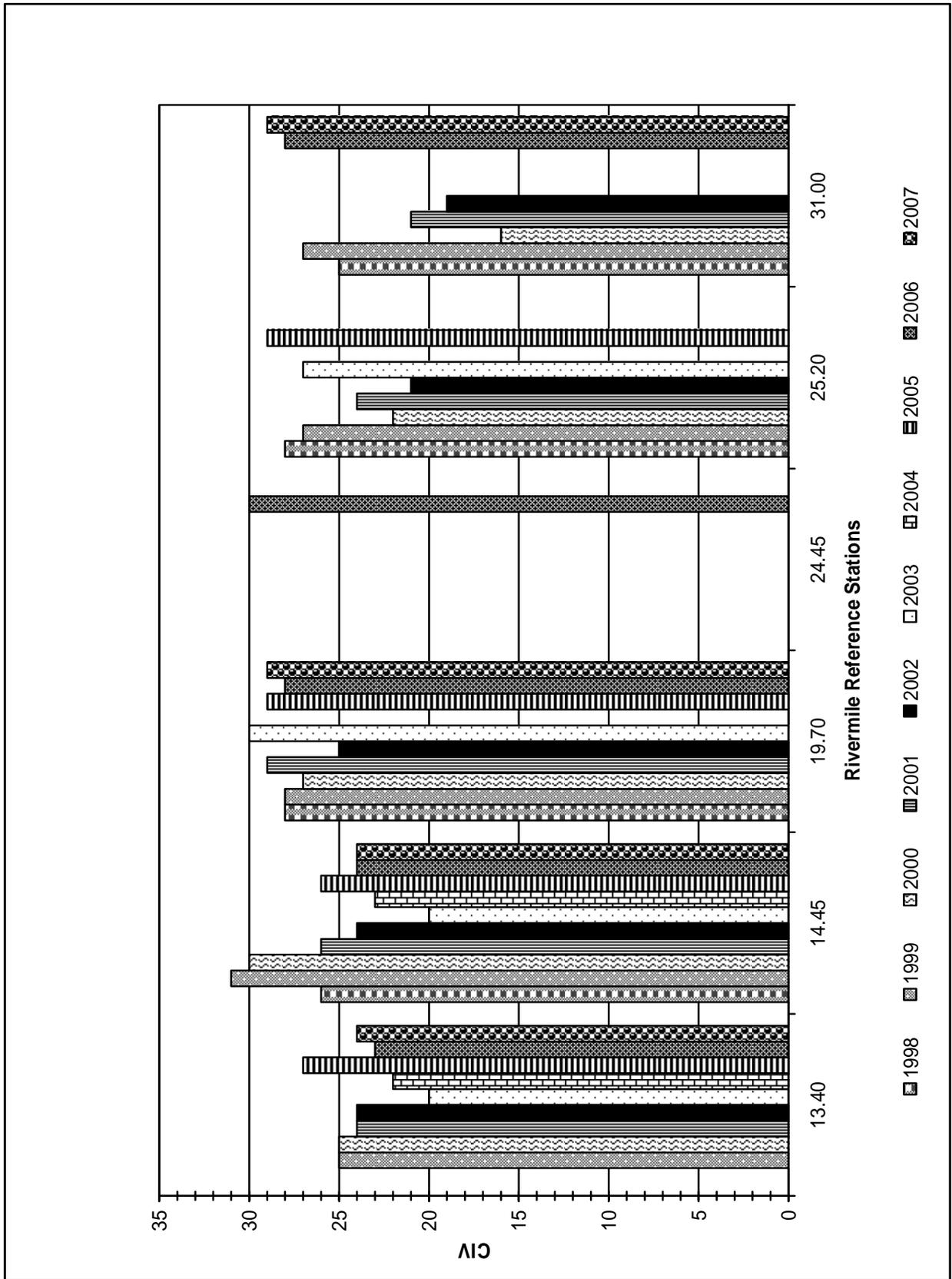


Figure 1.2 - Olentangy River Mean CIV 1998-2007



Qualitative Habitat Evaluation Index (QHEI)

The Qualitative Habitat Evaluation Index (QHEI) is a system developed and employed by the Ohio Environmental Protection Agency (OEPA) to measure physical habitat conditions in and around rivers and streams in Ohio. During 1998, the Stream Quality Monitoring Project staff tested a modified version of the QHEI, referred to as *Citizen's 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.

Results from 2007 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 75 are generally believed to contain exceptional habitat conditions for warmwater communities.

Table 3 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 -Olentangy QHEI and SQM Assessment Data

Reference Station	QHEI	Attainment Status	2007 Average CIV	SQM Assessment
RM 13.4	82	FULL	24	Excellent
RM 14.45	88.5	FULL	24	Excellent
RM 19.7	88.5	FULL	29	Excellent
RM 24.45	80	FULL	30	Excellent
RM 31	84	FULL	29	Excellent

***No data available**

Appendix

Stream Quality Monitoring Data by Monitoring Station

2007 CIVs by Monitoring Station OLENTANGY RIVER																				
RM	DATE	W P	M F	S T	D O	C D	R I	O S	D A	D R	C R	S C	C L	S W	B L	A W	M I	P S	L E	CIV
13.40	5/29/2007	B	C	B		B	B	A					A			A	B			26.00
13.40	6/22/2007	B	A	B		B	C	B					B							22.00
13.40	7/9/2007	B	B	A		C	B	A					B				B			25.00
13.40	8/3/2007	C	A	C		B	C	C					B			A	B	A		23.00
13.40	8/3/2007	C	A	C		B	C	C					B			A	B	A		23.00
13.40	10/10/2007	B	A	A		B	A	B					B			A	A			24.00
14.45	5/25/2007	B	A	B				A					B			A		A		18.00
14.45	6/10/2007	B	B	B		A	A	A	A		A		A				A			27.00
14.45	6/27/2007	B	B	A			A	B				B	B		A			B		23.00
14.45	7/15/2007	B	B	A		B	B	A	B	B	B		A							30.00
14.45	8/12/2007	A	B	A		A	B	B								A	A		A	23.00
14.45	9/5/2007	B	A	B		A	B	B	B		A	A	B							28.00
14.45	9/12/2007	B	A	B		A	A	A	A		A		A							26.00
14.45	10/6/2007	B	A	B		A	A	A	A				A							24.00
14.45	10/11/2007	B		B		B	A						A				A		A	18.00
16.40	5/10/2007	A		B		B	A	A						A					A	18.00
16.40	6/10/2007	B	B	B		B	B	A												22.00
16.40	7/6/2007	B	C	A		A	A	A					A							22.00
16.40	8/19/2007	B	A	B		B	B	A												22.00
16.40	9/23/2007	B		A		B	A	A	A											17.00
16.40	10/16/2007	A	A	A		A	A	A												20.00
17.70	6/1/2007	B	B	A		B	B		A										A	20.00
17.70	8/1/2007	B	B	A		B	B						A							17.00
17.70	10/7/2007	B		A		B	B	B					B				A			18.00
19.70	6/10/2007	B	B	A		B	A	A	A		A		A			A	A			30.00
19.70	9/3/2007	B	C	B		C	B	C					C		B		B	C		25.00
19.70	11/4/2007	B	A	B		B	A	A	A		A		B	A		A	A			32.00
24.45	6/25/2007	A	B	A		C	B	A	A				B			A	A		A	29.00
24.45	8/31/2007	A	B	A		C	B	B	B				C	A			B		A	30.00
25.60	5/12/2007	A	A	A		A	A	A			A		A			A				25.00
25.60	7/22/2007	A	A			C	A	A					B			A	A			23.00
25.60	8/16/2007	A	A	A		B	A	A	A				B				A			25.00
25.60	10/22/2007	A	A	B	A	C		B	A	A			B			A	C	A		29.00
31.00	4/20/2007	A	B		A	A	B		B		B		A	A	A	A	A			30.00
31.00	5/26/2007		B	B	A	B	A		A	A			C		A	C	A		A	29.00

2007 CIVs by Monitoring Station OLENTANGY RIVER																				
RM	DATE	W P	M F	S T	D O	C D	R I	O S	D A	D R	C R	S C	C L	S W	B L	A W	M I	P S	L E	CIV
31.00	6/30/2007		A	B	A	C			A	A	B		C		B	B			C	28.00